

# ACTION PLAN FOR GREEN BUDGETING IN PUNJAB

Concepts, Rationale and Ways Forward



**teri**

The Energy and Resources Institute

**Project support:** Department of Science Technology and Environment, Government of Punjab

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### **The Cover**

The exhibit on the cover page is metaphorical depiction of a pot with a flowering plant. The picture attempts to communicate how a proactive mind-set could lead to activities contributing to environmental sustainability through enhanced allocation of public finance.

#### **Project**

Action Plan for Green Budget for Punjab

#### **Document Name**

Action Plan for Green Budgeting in Punjab: Concepts, Rationale and Ways Forward

#### **Project Support**

Department of Science Technology and Environment, Government of Punjab

#### **Nodal Agency**

Punjab State Council for Science and Technology (PSCST), Chandigarh

#### **Research Organization**

The Energy and Resources Institute (TERI), Delhi

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## **Acknowledgements**

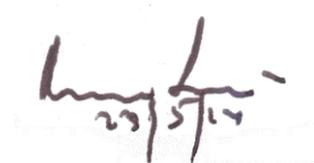
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## Foreword

The achievement of sustained and equitable development remains the greatest challenge being faced by governments today. Whereas the essential task of development is to provide access to resources and opportunities for a better quality of life to all people but recent years have witnessed rising concerns on whether development would lead to environmental damage which could adversely affect life quality or whether environmental constraints would limit development. This issue was discussed by the world community at Rio de Janeiro in June 2012 at the occasion of the 20<sup>th</sup> anniversary of the United Nations Conference on Environment and Development. To promote positive action on the ground, Rio+20 also deliberated upon the themes of 'institutional framework for sustainable development' and 'green economy in the context of sustainable development and poverty eradication'. The deliberations served to remind global citizen that a meaningful consensus on environment and development issues was perhaps equally hard to achieve today as it was about two decades ago.

In light of this, the sub-national actors such as state governments and urban & rural local bodies need to play a more pro-active role in addressing environmental sustainability. This has been discussed by the Thirteenth Finance Commission also which calls for empowerment of these actors as well as expansion of fiscal space at the sub-national and local levels. With its various environmental problems, Punjab as a state, needs to be a front-runner in addressing sustainability. For this, the State needs to institutionalize green thinking in the existing fiscal space in its annual state budget process and to introduce "Green Budgeting". Preparing Green Budget Statements will help in benefiting from the momentum of the environmental consciousness in the mind-sets of departments.

This initiative of the Department of Science, Technology and Environment, with nodal support from the Punjab State Council for Science and Technology and facilitated by The Energy and Resources Institute, New Delhi is the first step towards designing the process of green budgeting. In subsequent phases, through participation from departments, we will seek to evolve a process through which this process can be taken forward for implementation in the state of Punjab.

A handwritten signature in dark ink, appearing to read 'Rakesh Singh', with the date '23/5/14' written below it.

Rakesh Singh, IAS  
Chief Secretary to Government of Punjab

## Foreword

Natural resource management issues in Punjab have been regularly engaging the attention of the State Government. The State Forest Policy and Strategic Plan has set a target to increase forest and tree cover from the current 6.3% to 15% of its geographical area by 2017 under the State Forestry Action Programme. The Agriculture Policy of the State seeks to incentivize capital assistance, subsidies, assured pricing and marketing for alternate crops. The policy also advises restricting of area under Paddy to 16 lakh hectares for maintaining the ground water balance. The Government has also passed the Punjab Preservation of Sub-soil Act 2009, according to which, no farmer can trasplant paddy before 10<sup>th</sup> June so as to prevent the indiscriminate use of groundwater. The government has further released Policy Guidelines for Release of Agricultural Pumpset Connections (2013-14). The State Action Plan on Climate Change has been recently finalized and submitted to the Ministry of Environment & Forests, Government of India in March, 2014. Further, New & Renewable Sources of Energy Policy, 2012 has been notified by the State Government.

To address the issue of paddy straw burning, the Department of Science, Technology and Environment, Government of Punjab has prepared a draft policy document titled, "Policy for Management and Utilization of Paddy Straw in Punjab".

The above initiatives reflect the growing environmental consciousness in the policy sphere in the State. However there is much to achieve in policy implementation to promote resource and environmental conservation, waste management, and soil and water quality. There is also a growing need to create a new cadre of individuals and sensitize citizen for the cause of the environment which means that education and awareness requires its due importance and diligence.

Green budgeting through preparation of Green Budget Statements presents a unique opportunity to bring collective environmental thinking in the state and mainstream environmental sustainability within existing development processes. In order to raise awareness about the issue and design and process, the Punjab State Council for Science & Technology with The Energy and Resources Institute, New Delhi, engaged in the present project with the hope that this exercise will trigger greening of the State's economy. The Department of Science, Technology and Environment will seek support and participation from other departments to take this initiative forward in the subsequent phase.



Seema Jain, IAS

Secretary to the Government of Punjab  
Department of Science, Technology & Environment

## Foreword

Punjab has shown remarkable progress in expanding its production of foodgrains and other outputs from agriculture. For decades now Punjab has been India's granary, since the farmers of that state accepted and implemented technological change inherent in the green revolution. However, this progress has come at a price, because not only has Punjab witnessed very rapid growth in the use of several key resources such as water, but there has also been a major impact on the environment, which, unfortunately, does not get reflected in statistics of production and the State Domestic Product.

It is significant that the person who introduced the green revolution in India, Dr. B.P. Pal, while he was the first Director General of ICAR also then became the Chairperson of the committee on environmental policy, which was the forerunner of the Department of Environment, and which later became the Ministry of Environment and Forests.

The State Government has set ambitious targets for increasing forest cover and managing its natural resources efficiently, including the utilisation of crop residue in a clean and productive manner. Essentially, a new era of sustainable development which focuses on controlling pollution and ensuring efficient use of all resources would need to be ushered in to reduce some of the negative externalities that the current pattern of growth has imposed.

The Government of Punjab will have to take the lead in creating policy frameworks that lead to enabling conditions which encourage environmental sustainability and conservation of resources. One means by which this could be done is by using "green budget statements" as an instrument based on the premise that such interventions in public finance will send signals to encourage other actors including business and industry, communities and individuals to engage in initiatives for environmental protection and sustainable use of resources and their conservation.

This report finds that revenue account fund disbursement in Punjab in terms of percentage share of the total for water supply, irrigation, and science, ecology and environment has decreased for the financial year 2012-13 over 2011-12. This finding further strengthens the need for a process that will enable pro-active measures for supporting environmental sustainability considerations within the existing public finance framework.

The report articulates "green budgeting" as a process where every year, government agencies (departments/ directorates/ boards/ councils/ commissions) through the Annual Budget Circular, by preparing Green Budget Statements, will highlight the quantum of public expenditure earmarked in the state budget for environmental sustainability initiatives as well as reducing expenditure in unsustainable sectors. For implementing such a process in Punjab, the Planning Department and Finance Department will need to play a role in coordinating the process along with nodal support from the Department of Science Technology and Environment.

Punjab is a front-runner state which has initiated a process to work towards drawing a process for green budgeting. This initiative is a beginning that sets the rationale for

designing the process of green budgeting. The Energy and Resources Institute would welcome the opportunity to work with the Government of Punjab and extend support to further facilitate this timely and much needed initiative.



R K Pachauri, PhD

Director General, The Energy and Resources Institute

## Preface

The state of Punjab presents a unique example where rapid economic growth and development has had a visible ecological backlash. Whereas on one hand the State has led the country from a good deficit to a grain surplus nation and had ensured national food security through extensive and intensive agriculture, on the other hand this has caused groundwater depletion and adverse impact on its air and soil quality, as well as loss of natural biodiversity. Resource depletion has increased the vulnerability of the environment and uncertainties in the future climate are expected to further accentuate the situation. Projected changes in the climate are thus threatening to increase the challenges in the pursuit of sustainable development.

The need of the hour is to consider environmental and development issues in tandem and strengthen the existing institutional frameworks to respond to global and local environmental challenges. The State Government has already initiated some programs to address this situation but the effort needs to be institutionalized in the fiscal budgeting process. Even small percentages of the state budget currently dedicated to the environment would make a difference in sending policy signals to all stakeholders for encouraging greener growth and development.

The present publication is an outcome of review of issues and practices to help design the green budgeting process in the State and take up financial planning and budgeting practices that account for environmental sustainability. It is hoped that this publication will trigger the thought process for mainstreaming environmental sustainability considerations with developmental initiatives.



Neelima Jerath, PhD  
Executive Director, Punjab State Council for Science & Technology

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## Abbreviations

BE	Budget estimates
EDPRS	Economic Development and Poverty Reduction strategy
ENR	Environment and Natural Resources
ESI	Environmental Sustainability Index
FY	Financial Year
GSDP	Gross State Domestic Product
HUDCO	Housing and Urban Development Corporation Ltd.
IAY	Indira Awaas Yojana
IBP	Irrigation Benefit Programme
MGNREGS	Mahatma Gandhi National Rural Employment Guarantee Scheme
MINECOFIN	Ministry of Finance and Economic Development
MINELOC	Ministry of Local Governments
MoF	Ministry of Finance
MONRE	Ministry of Natural Resources and Environment
MPI	Ministry of Planning and Investment
MPs	Member of Parliaments
MTEF	Medium-Term Expenditure Framework
NABARD	National Bank for Agriculture and Rural Development
NDRC	National Development and Reform Commission
NHB	National Housing Bank
NO <sub>x</sub>	Nitrogen Oxide
NRLM	National Rural Livelihood Mission
NRSE	New and Renewable Sources of Energy
NT\$	New Taiwan Dollar
OECD	Organisation for Economic Co-operation and Development
PAU	Punjab Agricultural University
PEDA	Punjab Energy Development Agency
PEER	Public Environmental Expenditure Review
PEI	Poverty-environment Initiative
PERs,	Public Expenditure Reviews
PSCST	Punjab State Council for Science and Technology
RCTs	Resource Conserving Technologies
REMA	Rwanda Environment Management Authority
SLUB	State Land Use Board
SO <sub>x</sub>	Sulphur Oxide
TEPA	Taiwan Environmental Protection Administration
TERI	The Energy & Resources Institute
UGPS	Underground Pipe System
VOCs	Volatile Organic Compounds

## Executive Summary

### *Introduction*

India is a federal country where states and union territories are empowered to legislate, administer and govern over different issues as specified in the Indian Constitution. The mandate of the Thirteenth Finance Commission was to foster “inclusive and green growth promoting fiscal federalism”. It is worthwhile to recognize that the Commission understood that a degraded environment would mean a reduced quality of life for citizens of India, which will be particularly pronounced in its impact on the poor and vulnerable groups, as they would suffer the most from polluted air, degraded lands, lack of access to basic services such as clean drinking water and sanitation, as well as climate vulnerability (Kelkar 2012; Pachauri and Kedia 2014). With reference to green growth, the Commission recommended grants to be awarded for preservation of forests and wildlife, achievements in grid-connected renewable energy and better water sector management.

### *Punjab and Environmental Sustainability*

Punjab is one of the fastest developing states in India. The state has posted a steady growth during the last decade. The average real GSDP (gross state domestic product) of the state at current prices has grown at around 12.5% during the last decade (2002–2011) and has increased more than threefold from around INR 79611 crore in 2001–02 to around INR 259223 crore in 2011–12 (Planning Commission 2012). However, this growth has not come without a cost to the environment.

According to the Central Groundwater Board, the stage of groundwater development is 170%. The state also lags behind the national average in terms of installed capacity in renewable energy. It is inevitable that the state steps up measures to allow for resource conservation (water, energy and waste recycling) in various sectors of the economy. This apart, the state has to enhance forest cover and quality of natural resources including soil, water and biodiversity.

The state of Punjab has to prepare and respond to both local and global environmental issues. In terms of global environment, climate projections for 2021–2050 indicate an increase

in annual average precipitation by about 13.3–21.5% with respect to the base line 1961–1990. The annual mean maximum temperature is projected to increase by 1.0–1.8°C in all parts of Punjab by 2021–2050. By 2021–2050, the annual mean minimum temperature is also projected to rise by 1.9–2.1°C (Punjab SAPCC: Jerath et al., 2014). Punjab is enlisted as a frequent drought prone area according to the IMD classification of drought incidences in the 1875–2004 period.

In the context of increasing vulnerabilities due to resource depletion and climate change, institutional frameworks need to be strengthened to respond to global and local environmental challenges. The rice-wheat cropping pattern dominant in Punjab is under threat and climate change is posing new challenges on future agricultural growth (GoP 2013).

It is the government that will have to take the lead in creating a framework to maximize the environment's potential for sustainable, broad-based growth. For this, strengthening the financial framework for public spending keeping in mind priorities and potential for environmental sustainability becomes essential.

### *Green Budgeting*

“Green budgeting” is a specific tool which involves preparing separate green budget statements while preparing annual budgets (state budgets in this case). It can be said that green budgeting by preparing “green budget statements” is one of the strategies which is a subset of the broader environmental fiscal reform.

Preparing green budget statements can be an opportunity to encourage proactive mind-sets among government departments regarding environmental sustainability. This document is meant to facilitate a process through which Punjab government officials develop an Action Plan on the Green Budget for the state of Punjab. This document seeks to provide technical information for considering environment in financial planning and budgeting practices of the state.

The working definition for “green budgeting” for this project is:

“Every year, government agencies (Departments/ Directorates/ Boards/ Councils/ Commissions) through the Annual Budget Circular, by preparing Green Budget Statements, will highlight the quantum of public expenditure earmarked in the state budget for environmental sustainability initiatives as well as reducing expenditure in unsustainable sectors.”

The rationale for this green spending by using “green budget statements” as an instrument is based on the premise that earmarked public expenditure will send policy signals and hence, encourage other actors (including businesses and industry, communities and individuals) to contribute to sustainability initiatives. Thus, green budgeting (through green budget statements) has a potential to play an important role in helping developing countries raise revenues, while creating incentives that generates environmental benefits and support poverty reduction efforts.

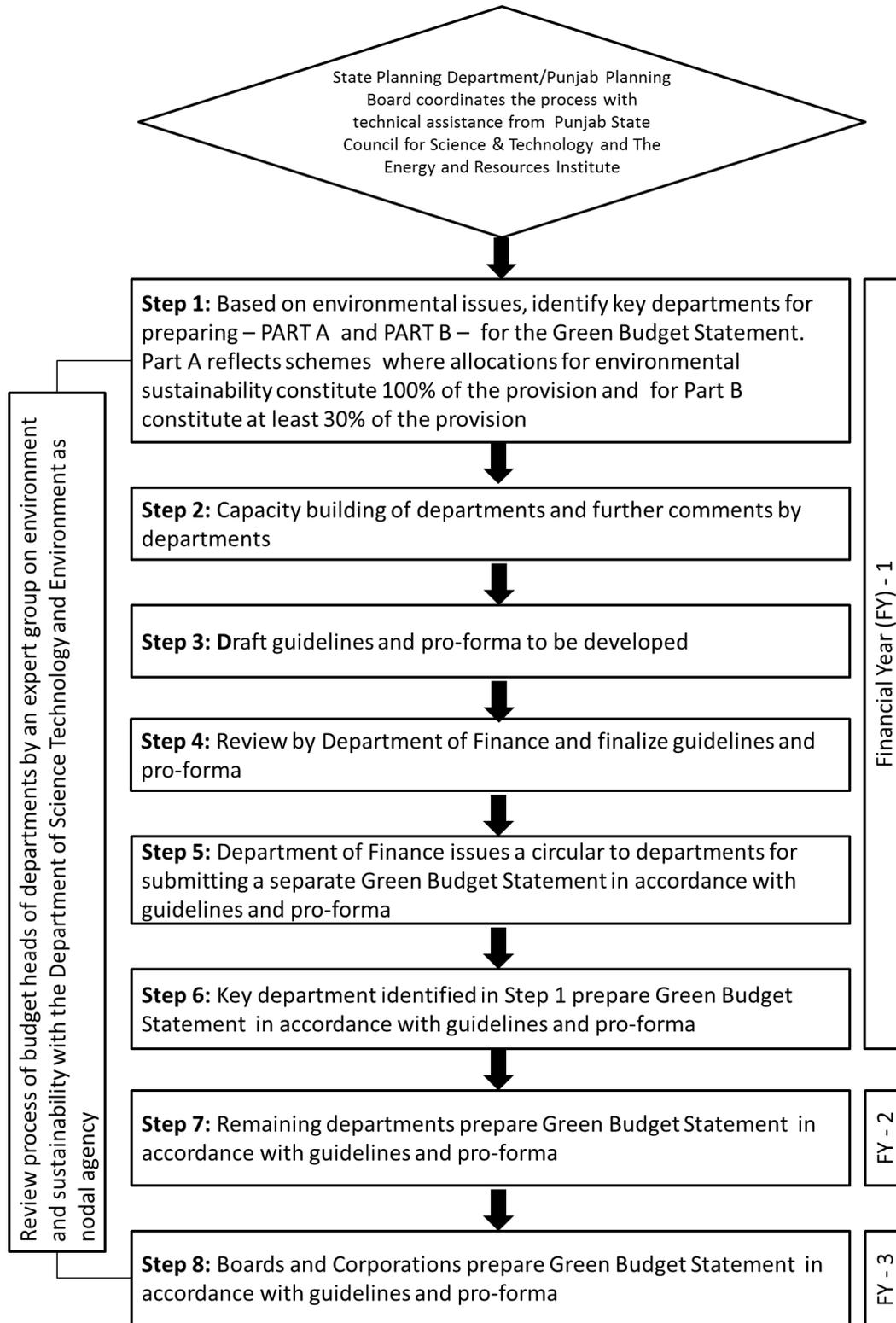
The rationale for green budgeting is hence aimed at strengthening three aspects of public policy and implementation which is expected to lead to the following outcomes:

- (1) Mind-set: Conscious thinking about interventions related to environmental sustainability
- (2) Implementation: Support for implementing programmes for positive environmental impact
- (3) Impact: Positive environmental outcomes in terms of clean air, water, forest cover and resilience

Green budget statements can be modelled on the lines of gender budget statements followed in the Union Budget process. The processes will be similar with only the issue being different. The process of developing these recommendations will be consultative and iterative, involving representatives from various departments of the government of Punjab and other stakeholders. In order to ensure effectiveness of green budgeting, it is highly essential to adopt an ex-ante planning and then ex-post monitoring and evaluation of environmental expenditures and the resulting outcomes. Lessons are to be learnt from the “gender budgeting” process, which is followed at the national level (Union Budget process).

The process is explained in the schematic diagram shown in Figure A.

**Figure A:** Flow chart for Action Plan for Green Budgeting in Punjab



**Table A:** Department-wise priority issues and activities to be considered in preparing green budget statements

No.	Departments	Priority issues to be considered for environmental sustainability	Phase
1	Science, Technology and Environment	Overall role in encouraging green think among departments, bio-energy, air pollution, water pollution, waste management, research and development for environmental issues (including pollution control and monitoring), renewable energy, fuel switching (from fossil fuel based to clean/ renewable), recycling technologies, waste-to-energy, environment education and awareness, promoting eco-drives, wet-land preservation, awareness regarding carbon credits and climate change issues.	I
2	Finance	Overall role in encouraging green think among departments. Issuing pro-forma and guidelines for green budget statements.	I
3	Planning	Overall role in encouraging green think among departments	I
4	Agriculture	Crop diversification, address paddy straw burning, input use (pesticide and fertilizer), groundwater management, resource conservation, soil erosion, horticulture, fuel switching (from fossil fuel based to clean/ renewable), farmer training, climate change and adaptation, agro-forestry, reduce area under paddy cultivation	I
5	Forest and Wildlife Preservation	Increase green cover according to state forest policy, biodiversity conservation, soil erosion, rainwater harvesting and recharging (including in Kandi areas), crop diversification (including non-timber forest produce), tree plantation, agro-forestry, wet-land preservation, eco-sensitive zone around sanctuaries, enforcement of Act to deter wildlife offenders	I
6	Health and Family Welfare	Climate change and adaptation infrastructure, research on environment and health	I
7	Housing and Urban Development	Waste management, recycling, energy efficiency, water efficiency, solid waste management and sewage treatment	I
8	Information and Public Relation	Awareness programmes on environmental sustainability, encouraging sustainable consumption, environment education and awareness, promoting eco-drives	I
9	Local government	Awareness programmes on environmental sustainability, encouraging sustainable consumption, citizen training	I
10	Power	Demand side management, increase use of CFL, renewable energy (including decentralized electrification using renewable energy), fuel switching (from fossil fuel based to clean/ renewable)	I
11	Rural Development and Panchayats	Crop residue management (collection through MG-NREGS), address soil erosion, soil preservation, rainwater harvesting, farmer training, roadside plantation, agro-forestry, village pond cleaning and maintenance	I
12	Tourism and Cultural Affairs	Eco-tourism, sustainable consumption, waste management, tree plantation in tourist spots	I
13	Animal Husbandry, Dairy Development and Fisheries	Dung management, waste-to-energy, crop residue management, fodder management	I

No.	Departments	Priority issues to be considered for environmental sustainability	Phase
14	Cooperation	Crop diversification activities, social enterprises around paddy straw, strengthening allied sectors for crop diversification, farmer training	I
15	Industry and Commerce	Develop industry in green technologies (including biotechnology), encourage public-private cooperation for environmental sustainability, encourage green R&D in industry and business, green products, steps to reduce pollution (promote APCDs and ETPs)	I
16	Information Technology	Public sensitization on environmental sustainability through ICT	I
17	Irrigation	Groundwater, resource conservation, clean energy based pump-sets, rain water harvesting, flood management, management of water logging	I
18	Printing and Stationary	Resource conservation and sustainable consumption, sustainable procurement, recycling	I
19	Public works	Green buildings, energy efficiency, water efficiency	I
20	School Education	Education on environment through school curriculum, environment education and awareness, promoting eco-drives	I
21	Technical Education and Industrial Training	Training on environment through programmes, farmer training for sustainable resource management	I
22	Transport	Public transport, fuel efficiency, fuel switching (including encouraging CNG), pollution control, implementing emission standards, education regarding sustainable consumption, clean fuel technologies	I
23	Water Supply and Sanitation	Water quality, improve sanitation, solid waste management and sewage treatment, bio-energy	I
24	Soil and Water Conservation	Water conservation, improve soil quality, water harvesting	I
25	Civil Aviation	To be deliberated with department/ experts in subsequent phase	II
26	Defence Welfare Services	To be deliberated with department/ experts in subsequent phase	II
27	Employment Generation and Training	To be deliberated with department/ experts in subsequent phase	II
28	Governance Reforms	To be deliberated with department/ experts in subsequent phase	II
29	Investment Promotion Department	To be deliberated with department/ experts in subsequent phase	II
30	Labour	To be deliberated with department/ experts in subsequent phase	II
31	NRI Affairs	To be deliberated with department/ experts in subsequent phase	II
32	Personnel	To be deliberated with department/ experts in subsequent phase	II

No.	Departments	Priority issues to be considered for environmental sustainability	Phase
33	Programme Implementation	To be deliberated with department/ experts in subsequent phase	II
34	Removal of Grievance	To be deliberated with department/ experts in subsequent phase	II
35	Sports and Youth Services	To be deliberated with department/ experts in subsequent phase	II
36	Vigilance	To be deliberated with department/ experts in subsequent phase	II
37	Welfare of Scheduled Caste and Backward Classes	To be deliberated with department/ experts in subsequent phase	II
38	Elections	To be deliberated with department/ experts in subsequent phase	II
39	Excise and Taxation	To be deliberated with department/ experts in subsequent phase	II
40	Food and Civil Supplies	To be deliberated with department/ experts in subsequent phase	II
41	General Administration	To be deliberated with department/ experts in subsequent phase	II
42	Grievance Cell	To be deliberated with department/ experts in subsequent phase	II
43	Home Affairs and Justice	To be deliberated with department/ experts in subsequent phase	II
44	Legal and Legislative Affairs	To be deliberated with department/ experts in subsequent phase	II
45	Medical Education and Research	To be deliberated with department/ experts in subsequent phase	II
46	Parliamentary Affairs	To be deliberated with department/ experts in subsequent phase	II
47	Revenue and Rehabilitation	To be deliberated with department/ experts in subsequent phase	II
48	Social Security and Development of Women and Child	To be deliberated with department/ experts in subsequent phase	II
	<b>Shaded box denotes departments/ agencies who can be involved in the first phase</b>		

Source: This table is mainly based on inputs received in the project brainstorming workshop organized on January 30, 2014 (see Annexures 1-2).



The study recommends that there be a review process of the budget heads of the various departments by an expert group on environment and sustainability with the Department of Science, Technology and Environment coordinating the process. Unless environmental sustainability concerns are integrated with social progress and economic growth objectives, sustainable development that treats future generations equitably will remain a distant objective.

## Full Project Report

### 1. The Project

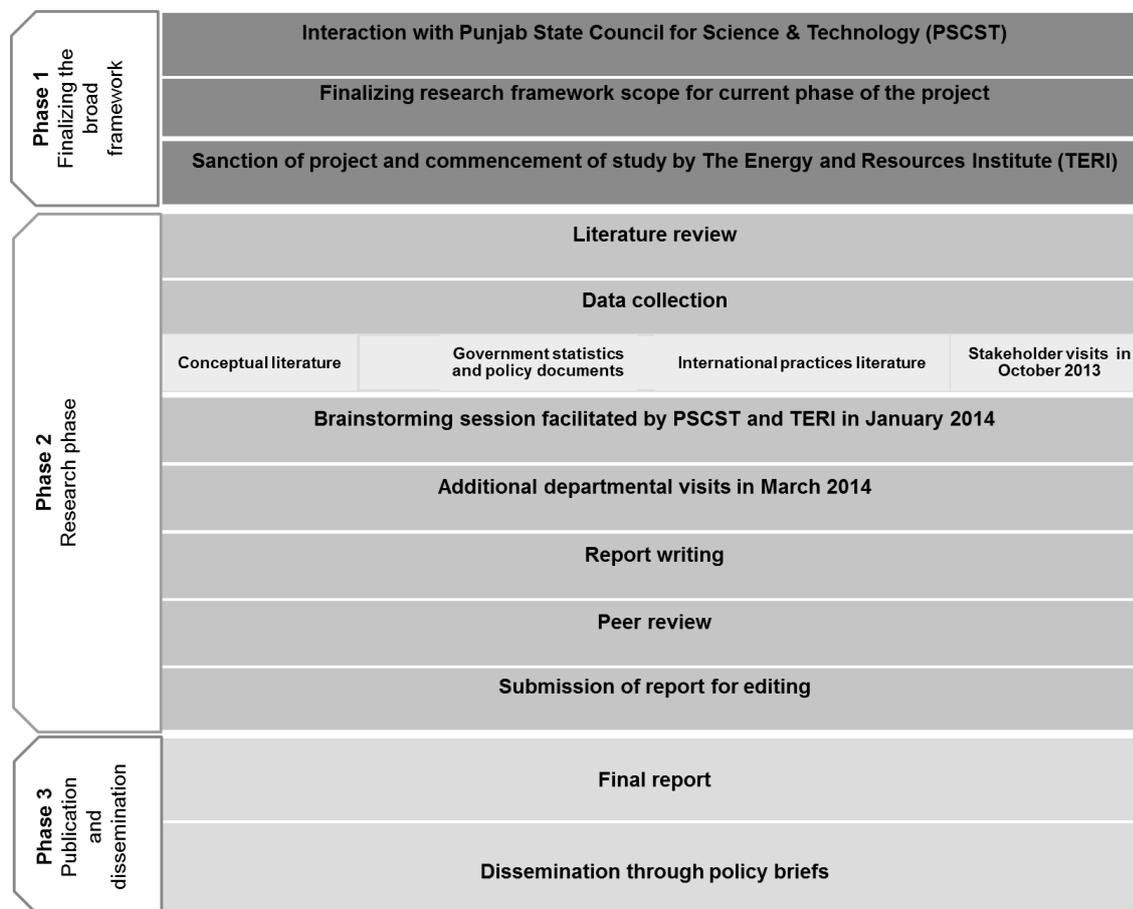
India is a federal country where states and union territories are empowered to legislate, administer and govern over different issues as specified in the Indian Constitution. With respect to financial resources, states and union territories have a share in union revenue based on the guidance of the finance commission which is appointed every five years to design transfer mechanisms. The key mandate of the Thirteenth Finance Commission is to foster “inclusive and green growth promoting fiscal federalism”. The Commission recognized that a degraded environment would mean a reduced quality of life for citizens of India, which will be particularly pronounced in its impacts on the poor and vulnerable groups, as they would suffer the most from polluted air, degraded lands, lack of access to basic services such as clean drinking water and sanitation, as well as climate shocks (Kelkar 2012). With reference to green growth, the Commission recommended grants to be awarded for preservation of forests and wildlife, achievements in grid-connected renewable energy and better water sector management.

The purpose of the project—*Action Plan for Green Budgeting in Punjab*—is to study budgetary allocations towards key sectors in Punjab for environmental protection and to understand key trends with respect to green budget indicators. The study seeks to provide technical inputs to facilitate financial planning and budgeting practices which in turn would lead to better outcomes in terms of environmental protection activities through conscious financial planning. This document is meant to facilitate a process for Punjab State government officials to help develop an Action Plan on Green Budget for the state of Punjab. This document seeks to provide technical information to consider environment in financial planning and budgeting practices of the state.

The project framework with activities is depicted in Figure 1. The project was in three phases – the first phase was dedicated to finalizing the broad framework. In the first phase professionals from TERI interacted with officials from PSCST to finalize a study framework. The second phase was dedicated to research activities that included literature review, data analysis, documentation from international cases studies and policy initiatives in India. The

second phase also involved an initial interaction (October 2013) with government departments mainly to understand key issues and data availability and gaps. A brainstorming session was organized on 30 January 2014 for getting inputs from departments on the departmental priority areas. Another follow-up visit was organized in March 2014 to select departments. Documentation was done in a report and then submitted for review. After addressing reviewer’s comments on the report with respect to the scope of the project, the document was structured, compiled and edited. The third phase included final report preparation, printing and dissemination. The executive summary will be converted to policy briefs for wider dissemination.

**Figure 1:** Project framework and activities

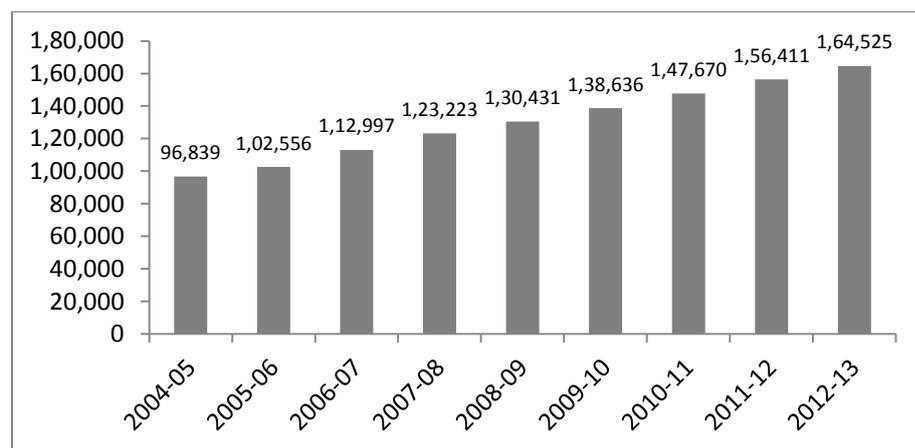


This project is supported by the Department of Science, Technology and Environment with the Punjab State Council for Science and Technology being the nodal agency. It is implemented by The Energy and Resources Institute, New Delhi.

## 2. Punjab: Growth and Environmental Sustainability

Punjab is one of the fastest developing states in India. The state has posted a steady growth during the last decade. The average real GSDP of the state at current prices has grown at around 12.5 % during the last decade (FY02-FY11) and has increased more than threefold from around INR 79611 crore in 2001-02 to around INR 259223 crore in 2011-12 (Planning Commission 2012). Figure 2 shows the gross state domestic product of Punjab for the last decade.

**Figure 2:** Gross State Domestic Product (INR crore)



Note: Amount in 2004-05 Constant Prices

Source: Planning Commission (2013)

The tertiary sector contributes a significant share of around 47% in the GSDP followed by the secondary and primary sector at 30% and 23% respectively during 2011–12. However, the share of agriculture has declined from around 28% in 2007–08 to 23% in 2011–12. The share of the secondary sector has more or less remained constant during the same period. Table 1 gives details of the contribution of different sectors towards the GSDP of Punjab.

**Table 1:** Sectoral contribution in GSDP (%) at constant (2004–05) prices

Sectors	2007–08	2008–09	2009–10	2010–11(P)	2011–12 (Q)
Primary	28	27	25	24	23
Secondary	31	30	31	31	30
Tertiary	42	43	44	45	47

P: Provisional, Q: Quick

Source: Statistical Abstract Punjab (2012)

There has been a decline in the growth rate of the GSDP of Punjab in recent years while the ratio of public debt has largely remained constant around 31%. The contribution of wheat to the central pool has declined from 42.2% in 2009–10 to 33.6% in 2012–13, while that for rice (which is a water intensive crop) has increased from 28.9% in 2009–10 to 41.9% in 2012–13 (Table 2).

**Table 2:** Key economic indicators of Punjab

Indicator	Unit	2009–10	2010–11	2011–12	2012–13
GSDP at 2004–05 prices	(INR crore)	138636 (R)	147683 (P)	156454	164575(A)
Growth rate of GSDP at 2004–05 prices	(Percent)	6.29	6.53	5.94	5.19
Per capita income at 2004–05 prices	(INR)	42831 (R)	44783 (P)	46422 (Q)	48496 (A)
Fiscal deficit	(INR crore)	6170 (A)	7143 (A)	9633 (RE)	8923 (BE)
Revenue deficit	(INR crore)	5251 (A)	5289 (A)	5584 (RE)	3123 (BE)
Outstanding liability (public debt)	% GSDP at current prices	31.97	30.93	31.51	31.95
Food grain production	(000 tonne)	26947	27846	29092 (P)	27946 (P)
Contribution to central pool: Wheat	(000 tonne)	107.3	102.1	109.6 (P)	128.3 (P)
Share in central pool: Wheat	(Percent)	42.2	45.4	38.7	33.6
Share in central pool: Rice	(Percent)	28.9	25.3	22.1	41.9
Net irrigated area	(000 Ha)	4071	4070	4069(P)	4070
Cropping intensity	(Percent)	189.42	189.56	189.65	189.6
Electricity generated	(MKwh)	27662 (A)	27768 (P)	29033 (P)	27368 (RP)
Transmission and distribution losses	(Percent)	20.12 (A)	18.49 (P)	17.42(P)	17.00 (RP)

Note: R is revised, A is advanced, Q is quick, P is provisional, RE is revised estimates, BE is budget estimates, RP is revised provisional

Source: Economic Survey, 2012–13, Economic Adviser, Government of Punjab

However, GDP being an economic indicator of a country’s development path delves little into sustainability. It fails to track the depletion or degradation of natural, human, built, and social capital on which all economic activity ultimately depends. The demand for green

national accounts has risen due to this shortcoming of the traditional measures of an economy's performance and wellbeing.

Since gross domestic product ignores the environment, decision makers need a revised model that incorporates green accounting. It is being increasingly recognized that contemporary national accounts are an unsatisfactory basis for economic evaluation. The qualifier "green" signals that we should be especially concerned about the absence of information on society's use of the natural environment (MoSPI 2013). Therefore, it is very important to examine environmental issues closely so that a better and balanced development without the destruction of habitats and the degradation of the total environment is achieved.

Figure 3 depicts environment performance index (EPI) and gross state domestic product index (GSDP) for thirty five states and union territories in India. The data is based on a composite index developed by the Planning Commission<sup>1</sup> by combining 16 indicators based on criteria including air pollution, water quality, forests, waste management and climate change. It can be seen that with increase in GSDP, the EPI score is also increasing indicating a trend which agrees with the environmental Kuznets curve (EKC)<sup>2</sup>.

In case of Punjab, it is observed that the gap between score of state income and EPI is lesser than other states indicating clearly that the state's economic progress has come with the cost to the environment. Punjab state has a groundwater deficit of 9.719 MCM. It has to have a twin pronged strategy to manage its groundwater resources—arresting the declining trend of groundwater; and combating water logging. Punjab is in the least sustainable state category according to the environmental sustainability index (IFMR 2011); see Table 3. The environmental sustainability index (ESI) is a comparative analysis of the environmental achievements, challenges and priorities of Indian states. This metric is indicative of a state's

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<sup>1</sup> See Planning Commission Press Release; Press Information Bureau - <http://pib.nic.in/newsite/erelease.aspx?relid=95839>

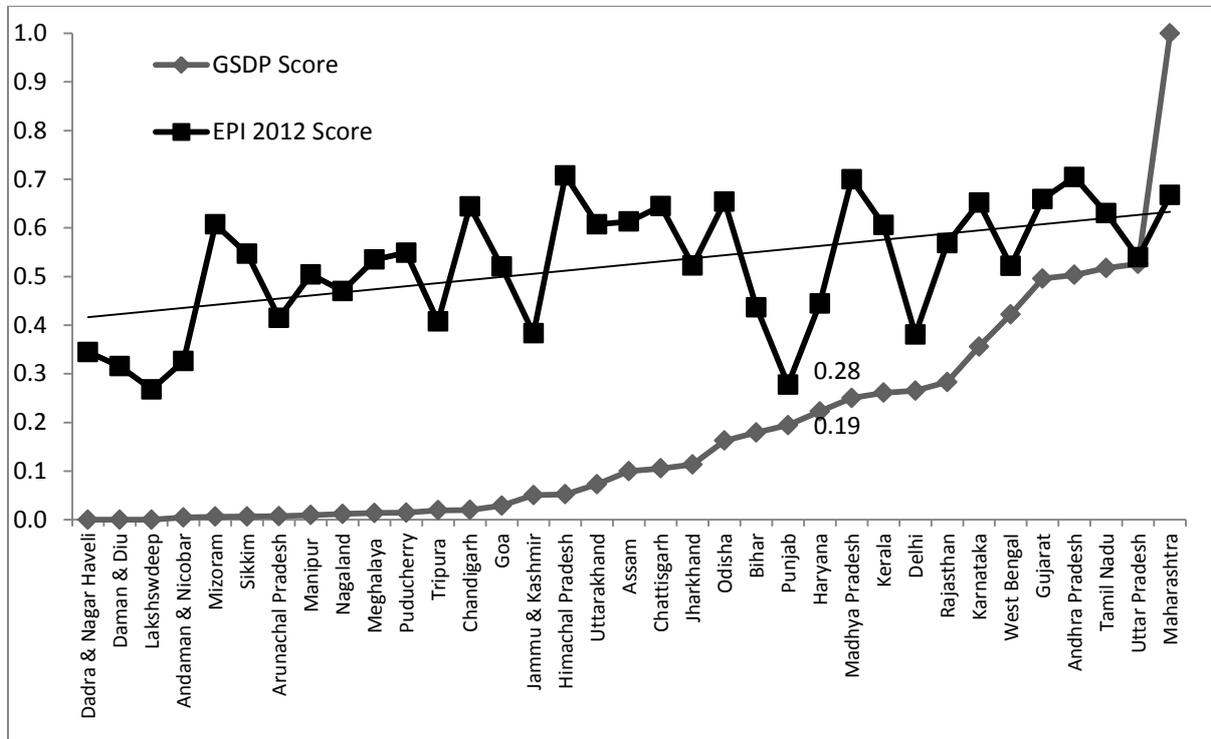
<sup>2</sup> EKC is a hypothesized relationship between various indicators of environmental degradation and income.

<sup>2</sup> EKC is a hypothesized relationship between various indicators of environmental degradation and income.

<sup>3</sup> Adaptive capacity index is based on poverty, literacy, public infrastructure (electrification and health) and

general environmental condition, capturing both historical resource endowments and achievements of policies and strategies undertaken for conserving natural resources. Punjab scores poorly because resource intensive agriculture has worsened conditions of groundwater availability and soil conditions.

**Figure 3:** State environment performance index and gross state domestic product index



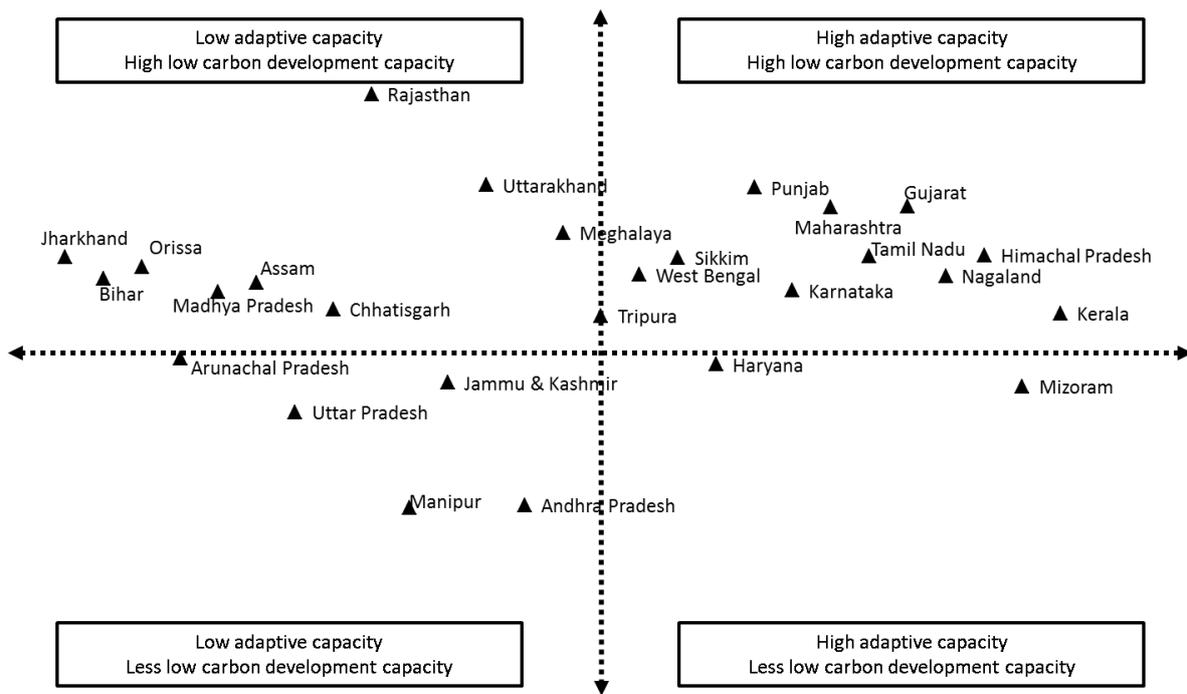
Note: Value 0.19 is GSDP score for Punjab and 0.28 is EPI score for Punjab

Source: Based on Planning Commission and see Chandrasekharan et al (2013)

The state of Punjab has to prepare and respond to both local and global environmental issues. In terms of global environment, climate projections for 2021-2050 indicate an increase in annual average precipitation by about 13.3-21.5% with respect to base line 1961-1990. The annual mean maximum temperature is projected to increase by 1.0-1.8°C in all parts of Punjab by 2021-2050. The annual mean minimum temperature is also projected to rise by 1.9-2.1°C by 2021-2050 (Draft Punjab SAPCC). Punjab is enlisted under frequent drought prone areas as per IMD classification of drought incidences from 1875-2004 period.

A set of performance metrics<sup>3</sup> for low carbon development capacity and adaptive capacity for Indian states (Figure 4) indicates that Punjab is doing relatively well in terms of performance on low carbon development and adaptive capacity – however the performance could be further improved. At a more disaggregated level, in terms of adaptive capacity, gender indicators need to be improved and forest cover can be further enhanced.

**Figure 4:** Performance metrics for low carbon development capacity and adaptive capacity for Indian states



Source: Based on TERI India study on low carbon development; see TERI-NCSC-CUFE-ZU-UNDP (2014)

In the context of increasing vulnerabilities due to resource depletion and climate change, strengthening of institutional frameworks to respond to global and local environmental challenges need urgent attention.

<sup>3</sup> Adaptive capacity index is based on poverty, literacy, public infrastructure (electrification and health) and capacity of local institutions to implement social programmes. For low carbon development (LCD) capacity index, the study considered performance in interventions related to grid and off-grid clean energy and also the change in forest cover at the state level.

**Table 3:** State groups based on overall environmental sustainability index in 2011

<b>ESI category</b>	<b>States in ESI 2011</b>
Most sustainable states (80–100 percentiles)	Mizoram Arunachal Pradesh Sikkim Nagaland Manipur Himachal Pradesh
More sustainable states (60–80 percentiles)	Meghalaya Tripura Uttarakhand Assam Odisha
Moderately sustainable states (40–60 percentiles)	Kerala Tamil Nadu Goa Karnataka Andhra Pradesh Maharashtra
Less sustainable states (20–40 percentiles)	Chhattisgarh Jammu and Kashmir West Bengal Madhya Pradesh Rajasthan
Least sustainable states (0–20 percentiles)	Bihar Gujarat Haryana Punjab Uttar Pradesh Jharkhand

*Source: IFMR (2011)*

There has been a sectoral shift in the Punjab economy and the share of agriculture in the state's GSDP has fallen from 21.19% in 2004–05 to 13.68% in 2012–13, while the share of the tertiary sector in the corresponding period has increased from 42.59% to 48.68%. The share of workforce engaged in agriculture (cultivators and agricultural labourers) declined from 62.57% in 1971 to 39.36% in 2001 and this proportion is expected to decline further (Gill 2006). The "Green Revolution" was first introduced in Punjab and the new technology introduced led to a significant increase in crop productivity. Of all the states of India, Punjab's agricultural growth rate was the highest during the 1960s to the mid-1980s (Jodhka

2006). As a result, Punjab became the food basket of India and the country became self-sufficient.

A significant portion of the arable land has come under rice/wheat crops because of low production risks and assured marketing (Table 4). This cropping system contributed to a high growth in agricultural production and farm incomes; the production potential of these two crops have been almost fully exploited, and now there is a stagnation in the growth process, decline in real farm incomes and over exploitation of natural resources like soil and water. The very sustainability of the wheat–rice production system is under threat and climate change is posing new challenges on future agricultural growth (GoP 2013).

**Table 4:** Rice–wheat area in Punjab (% area)

Year	Wheat		Rice	
	Area (In '000 ha)	% of total area	Area (In '000 ha)	% of total area
1970-71	2999	59.59	390	7.75
1980-81	2812	55.87	1183	23.50
1990-91	3273	65.03	2015	40.04
2000-01	3408	67.71	2612	51.90
2010-11(P)	3510	69.74	2826	56.15

Note: Total area in thousand hectares = 5033; P = provisional data

Source : *Economic & Statistical Organization, Govt. of Punjab and Economic Adviser to Govt. of Punjab*

According to Central Groundwater Board, the stage of groundwater development is 170%. The increased level of groundwater tapping for irrigation which threatens the sustainability of agriculture in Punjab is a concern that has been expressed since the early 1990s (Singh 1991; Joshi and Tyagi 1991; Bathla 1997, Tiwana *et al.*, 2005 & 2007 and Sarkar *et al.* 2009). The studies mentioned above have examined the ecological sustainability issues due to falling water tables. Groundwater holds increased importance for agriculture in Punjab with 73% of the irrigated area dependent on groundwater irrigation (GoP 2013). The central Punjab districts which comprise the rice belt of the state have witnessed a decline in groundwater levels since 1982. Farmers in rice-wheat cropping dominant areas also

perceive<sup>4</sup> that there has been a decline in groundwater level. The rate of fall in the water table per year was 18 cm during 1982–87; it increased to 42 cm during 1997–2002 (Hira et al. 2004) and further to 75 cm during 2002–06 (Singh 2006). In 2010, the percentage area with depth to water table more than 10 m was 91.6%, more than 15 m was 75.1% and more than 20 m was 50.5% (Table 5).

**Table 5:** Decline of water table in Central Punjab

Year	Percentage area with depth to water table more than		
	10m	15m	20m
1973	3.7	0.6	0.4
1980	5.7	0.6	0.4
1990	26.7	2.9	0.4
2000	53.2	14.1	0.1
2001	65.7	21.7	1.2
2002	72.7	26.1	4.3
2003	79.9	32.7	5.7
2004	84.6	36.6	12.5
2005	85.4	42.1	14.5
2006	85.5	52.0	19.2
2007	80.4	46.4	26.3
2008	86.5	60.5	32.1
2009	81.9	62.9	34.5
2010	91.6	75.1	50.5

Source: GoP (2013)

Paddy is cultivated in 2.8 million ha area in Punjab resulting in a generation of about 20 million tonnes of paddy straw (data from PAU, Ludhiana). The burning of paddy straw leads to loss of nutrients—nearly 25% nitrogen and phosphorus, 50% sulphur and 75% of potassium uptake from soil are retained in the crop residues (GoP 2013). It has been estimated that burning of 1 tonne of paddy straw accounts for the loss of 5.5 kg nitrogen, 2.3 kg phosphorus, 25 kg potassium and 1.2 kg sulphur, besides 4 kg organic carbon (data provided by PAU, Ludhiana).

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<sup>4</sup> Preliminary findings based on questionnaire based interaction with farmers in Amritsar, Fardikot, Sangrur and Rupnagar districts. The activity was part of TERI project supported by Global Green Growth Institute and nodal support from Department of Science, Technology and Environment, Government of Punjab.

A comprehensive draft policy document has been prepared by the Department of Science, Technology and Environment, Government of Punjab in October 2013 which envisages several options to address the problem in coordination with different line departments in the Government of Punjab. An important point that emerged during stakeholder consultations held by Chief Minister Punjab was the need for efforts to ensure the incorporation of residue to improve soil quality besides options for its gainful utilization. There is a need to arrive at cost-effective methods which make this an attractive option for the farmer, rather than resorting to burning of the residues.

It is encouraging that the Government of Punjab has recognized that over-exploitation of groundwater is an issue of serious concern and has recently implemented the Punjab Preservation of Subsoil Water Act of 2009 to contain groundwater exploitation. The main purpose of the Act is to save groundwater by prohibiting sowing and transplanting paddy before specified dates in the hot and dry summer<sup>5</sup> period. The Act prohibits farmers from transplanting paddy before 10 June in a year. Any farmer, who contravenes the provisions of the Act, shall be liable of penalty of INR 10000 for every month or part thereof, per hectare of the land till the period such contravention continues.

The authorized officer, either *suo motto* or on the information brought to his notice regarding the violation of any provision of the Act, shall be competent to issue directions to the farmer, who has violated any provision of this Act to destroy the nursery of paddy sown or transplanted before the notified date. In case, a farmer does not act according to the directions of the authorized officer given under Section 5 of the Punjab Preservation of Subsoil Water Act of 2009, the authorized officer shall cause such nursery of paddy, or sown or transplanted paddy, as the case may be, to be destroyed at the expenses of the farmer.

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<sup>5</sup> There is hardly any rainfall up to June 15 in Punjab and the relative humidity is lowest, wind speed is highest and temperature is maximum, due to which water evaporates very fast (Karam Singh 2009).

According to Singh (2009), the fall in water table can be checked by about 30 cm by delaying the transplanting with the effective implementation of the Act. The savings in electricity have been estimated at 276 million units<sup>6</sup>.

The state government has prepared the draft Policy for Management and Utilization of Paddy Straw in Punjab (2013). The document (DSTE 2013a) discusses the issue in terms of volume of paddy straw generated, utilization options, challenges and policy management. The agencies responsible for the policy management and implementation include: Department of Agriculture, Punjab; Department of Industries, Punjab; Department of Animal Husbandry; Punjab Pollution Control Board, Patiala; Punjab State Council for Science and Technology; Punjab Energy Development Agency; Punjab Agricultural University, Ludhiana; and National Agri-Biotechnology Institute, Mohali, Punjab Remote Sensing Centre, Ludhiana and Punjab Agro Industry Corporation. A notification was also issued by the Government of Punjab in consultation with the Punjab State Pollution Control Board. A notification (DSTE 2013b) was also issued by the government in consultation with the Punjab State Pollution Control Board for directions to all departments concerned and also the general public to prohibit the indiscriminate burning of left over paddy and wheat straw in the state of Punjab.

While there is merit in allocating resources to encourage the gradual shift in cropping pattern, an enabling environment with price and procurement support for alternate crops, support for resource conserving technologies (RCTs) should be examined in a holistic manner. The focus should be more on rotation of crops which will result in additional benefits of restoration of soil quality and pest control which are the fall outs of the continuous rice–wheat cropping system.

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<sup>6</sup> These estimates are based on simulations using historic data from central Punjab and does not account for selection issues (Sekhri 2012).

### 3. Green Budgeting: Concept and Rationale

As mentioned before, government needs to strengthen the financial framework for public spending keeping in mind priorities and potential for environmental sustainability. Green fiscal measures include both revenue and expenditure aspects of public finance. These measures involve identifying fiscal instruments to address energy and environmental concerns and developing analytical tools to examine the sustainability implications of development (TERI 2004).

In the longer term, greater fiscal space needs to be obtained by increasing the revenue. However in the short term, even the small percentages of the state budget currently dedicated to the environment would make a difference by sending policy signals for encouraging a greener economy. This also means that there would be need for savings in the current fiscal space. This can be achieved through greater convergence between programmes—for example, convergence in programmes implemented by forest, rural development, water resources, land resources and horticulture departments.

#### Box 1: The Concept of Green Budgeting

The working definition for “green budgeting” for this project is:

“Every year the government agencies (Departments/ Directorates/ Boards/ Councils/ Commissions) through the Annual Budget Circular by preparing Green Budget Statements will highlight the quantum of public expenditure earmarked in the state budget for environmental sustainability initiatives as well as reducing expenditure in unsustainable sectors.”

Green fiscal measures aim at identifying budgetary instruments to address environmental concerns<sup>7</sup>. Several countries in the world have resorted to green fiscal practices to obtain adequate financing for environmental programmes. Country case studies reveal a large window of opportunity for developing and implementing green budgeting in planning.

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<sup>7</sup><http://www.teriin.org/ee/index.htm>

Countries such as Germany, China, Taiwan and Korea have introduced green fiscal reforms to improve upon their environmental performance. International experiences with respect to these countries would be discussed in greater detail in a later section.

“Greening the budget” or “green budgets” can be broadly defined as the increase in public funds dedicated to environmental programmes (a policy choice). This is more akin to “green budget reforms” or “green fiscal reforms” or “environmental fiscal reforms”, where fiscal policy as a whole—both the revenue and expenditure side—are mobilized for environmental sustainability.

“Green budgeting” on the other hand, as mentioned before, is a specific tool which involves preparing separate green budget statements in the process of preparing annual budgets (state budgets in this case). It can be said that green budgeting by preparing ‘green budget statements’ is a one of the strategies which is a subset of the broader environmental fiscal reform.

Public finance tools such as fiscal stimulus packages have not been applied to enhance finance in sectors around environmental sustainability until now in India (TERI-NCSC-CUFE-ZU-UNDP 2014). Given that Indian stakeholders<sup>8</sup> attach importance to public finance (including measures such as subsidies), in a limited fiscal space, it is essential that Indian government through measures in the public finance space sends signals to other actors. In this context green budgeting could prove to be an important initiative within the existing fiscal space.

Preparing Green budget statements can be an opportunity to encourage proactive mind-sets among the government departments regarding environmental sustainability. This document is meant to facilitate a process for Punjab State government officials to help develop an Action Plan on Green Budget for the state of Punjab. This document seeks to provide

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<sup>8</sup> Preliminary findings based on questionnaire based needs assessment as a part of TERI India low carbon development study (supported by UNDP and Shakti Sustainable Energy Foundation); see - <http://www.teriin.org/projects/loci/>

technical information for considering environment in financial planning and budgeting practices of the state.

The rationale for this green spending by using 'green budget statements' as an instrument is based on the premise that earmarked public expenditure will send policy signals and hence encourage other actors (including business & industry, communities and individuals) to contribute to sustainability initiatives. Thus green budgeting (through green budget statements) have a potential to play an important role in helping developing countries raise revenues, while creating incentives that generates environmental benefits and support poverty reduction efforts. In the interest of having a well-defined scope for the users of these 'green budget statements', the scope of the action plan of the "green budget" will be on the public spending aspect of public finance.

The rationale for green budgeting is hence aimed at strengthening three aspects of public policy and implementation; this is expected to lead to the following outcomes:

- (1) Mind-set: Conscious thinking about interventions related to environmental sustainability
- (2) Implementation: Support for implementing programmes for positive environmental impact
- (3) Impact: Positive environmental outcomes in terms of clean air, water, forest cover and resilience

There is a need to strengthen the structures for revisiting, mobilizing and coordinating actions on the environment in all the departments of the state government. One way to galvanize action is to ensure availability of finance for environmental sustainability through recurrent budgets, i.e., the state budgets. An active mind-set for environmental protection, energy and resource conservation is required not only for the main environment regulation agencies but also for other government departments to promote sustainable development practices.

This project is aimed at evolving a process of green budgeting through the preparation of green budget statements annually. Srivastava, Pandey and Bhujanga Rao (2012) classified

budget items/ heads into two types: (1) Budget heads/ items implying direct positive effect on the environment, and (2) budget heads implying adverse or mixed effect on environment. Budget heads/ items are classified accordingly and listed in Box 2 and Box 3.

**Box 2: Budget heads/ items with direct positive effect on the environment**

- (1) Ecology and environment
- (2) Prevention and control of pollution
- (3) Forestry and wildlife
  - Forest conservation, development and regeneration
  - Environmental forestry and wildlife
  - Afforestation
- (4) Non-conventional sources of energy
- (5) Sewerage and sanitation
- (6) Soil and water conservation
- (7) Agricultural research and education
  - Soil and water conservation
  - Forestry and Agro-forestry
- (8) Special areas development programme
  - Drought prone areas
  - Desert development programme
  - Wasteland development programme
- (9) Flood control and drainage
- (10) Disaster management and prevention

**Box 3: Budget heads/ items with adverse or mixed effect on environment**

- (1) Major and medium irrigation
- (2) Minor irrigation
- (3) Command area development programme
- (4) Fertilizer
- (5) Pesticide and chemicals
- (6) Mining
- (7) Cement and non-metallic industries
- (8) Non-ferrous mining and metallurgical industries
- (9) Power
- (10) Industries and commerce
- (11) Urban development
- (12) Transport

These broad budget heads can help in prioritizing departments who would participate in the first phase of preparing green budget statements.

There exist several opportunities<sup>9</sup> in the annual budget of Punjab to address environmental concerns in the following areas:

1. Water and sewage treatment
2. Pollution monitoring and control in industry clusters
3. Groundwater quality and quantity
4. Crop diversification
5. Paddy straw burning
6. Reducing inputs in agricultural systems
7. Greening consumption
8. Energy production and efficiency
9. Forest cover
10. Strengthening data systems (including for infrastructure to monitor groundwater quality and quantity)
11. Soil and water management
12. Solid waste, biomedical and hazardous waste management
13. Check environmental performance parameters
14. Knowledge, education and outreach on environmental sustainability

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<sup>9</sup>Moreover, an allocation of a maintenance budget presents an opportunity in infrastructure related interventions. For example, well maintained roads will result in less consumption of material and energy and hence the resulting resource conservation can be seen as a “green” outcome. Similarly, watershed projects that are maintained will help in the contribution of ecosystem services such as groundwater recharge in a more sustained manner.

#### 4. Relevant Model for Issue-based Budget Statements in India

There exists a process in India, where conscious thinking (or mindset) regarding a particular issue is done. For example, the issue of women empowerment was considered while preparing the Union Budget. The Gender Budget Statement was first introduced in the Budget in 2005–06 (see Box 4).

**Box 4:** Gender budget process for Union Budget in India

In order to refine the Statement further, every year, the ministries/departments are requested through the Annual Budget Circular to highlight the quantum of public expenditure earmarked in the budget for women. On the basis of the information thus furnished by the ministries/departments, the Gender Budget Statement is prepared. This Statement indicates, in two parts, the budget provisions for schemes that are substantially meant for the benefit of women.

- Part A details schemes in which 100% provision is for women
- Part B reflects schemes where the allocations for women constitute at least 30% of the provision

The table below depicts an example of the gender budget heads (Part A) provided by the Department of Agricultural Research and Education, Government of India.

Gender budget head of the Department of Agricultural Research and Education

	2012-13 Budget			2012-2013 Revised			2013-2014 Budget		
	Plan	Non-Plan	Total	Plan	Non-Plan	Total	Plan	Non-Plan	Total
Department of Agricultural Research & Education									
Directorate of Women in Agriculture	1.5	3.67	5.17	1.5	3.5	5	4.9	3.78	8.68
All India Co-ordinated Research Project on Home Science	11.5	...	11.5	11.5	...	11.5	20.51	3.78	24.29

Source: [http://www.wcd.nic.in/gb/material/Instructions/GB%20Stat20\(2013-14\).pdf](http://www.wcd.nic.in/gb/material/Instructions/GB%20Stat20(2013-14).pdf)

Thirty ministries/departments and five union territories governments have made gender budget statements. The statement shows 18.6% increase for 100% women-specific programmes, having gone up from INR 22,969 crore in BE 2012–13 to INR 27,248 crore in BE 2013–14. Overall, taking parts A and B together, there is an increase of 10.2% from INR 88,143 crore in budget estimatee BE 2012–13 to INR 97,134 crore in BE 2013–14. Thus, the gender budget statement serves as a good example for the way in which the state governments can think of an issue—in case of green budgets; the issue is that of environmental sustainability.

As said before, green budget statements can be modeled on the lines of gender budget statements.

## 5. International Experiences

As governments seek ways to move their economies and societies towards sustainable development, taxation and expenditure policies are increasingly being recognized as important tools. While several developing countries have made noteworthy progress in the use of fiscal instruments for the management of natural resources, their use in India has been limited despite repeated government recognition of their merits. The financial crisis has driven many economies to the brink with strained public funds. At the same time, the impact of climate change demands bold actions and investments in clean energies.

Reforms to address environmental sustainability require an increase of public funds dedicated to environmental programmes. Relatively large environmental investments are planned in several OECD (Organisation for Economic Co-operation and Development) countries; for instance, Canada will invest 1.3%, Australia 0.8%, the United States 0.7% and France 0.5% of the GDP. While non-OECD countries may invest less in environmental projects and not aim to shift to green growth in the short to medium-term perspective, they are nevertheless likely to boost spending on environmental programmes in the context of climate change (Kedia and Anand 2013).

As environmental problems grow alongside consumption, pollution and population levels, it becomes increasingly clear that budgets have impacts on nature. Making budgets green is about ideas for turning government budgets into more effective mechanisms of sustainable development. With such an approach, environmental concerns can be integrated into development policy. Taxes and subsidies can be a powerful tool for achieving environmental policy goals. Unless environmental sustainability concerns are integrated with social progress and economic growth objectives, sustainable development that treats future generations equitably will remain a distant objective.

Public finance tools such as fiscal stimulus packages have not been applied to enhance finance in sectors around environmental sustainability until now in India (TERI-NCSC-

CUFE-ZU-UNDP 2014). Given that Indian stakeholders<sup>10</sup> attach importance to public finance (including measures such as subsidies) – in a limited fiscal space, it is essential that Indian government through measures in the public finance space sends signals to other actors. In this context green budgeting could prove to be an important initiative within the existing fiscal space.

Programmes in environmental sustainability do not adequately include clear and measurable environmental targets, performance indicators (particularly for the investment part) and are not consistent across the years of programme implementation. Often, they consider only the capital costs of investments and disregard operating and maintenance costs. This costing approach produces a misleading picture of public expenditure needs. Financial strategies, market studies or feasibility studies are rarely prepared. All these make it difficult for the relevant ministries and department of finance to assess the soundness of proposed environmental programmes.

There is an increased emphasis world-wide to increase public expenditure to support environmental sustainability in both developed and developing countries. Some of the initiatives in various countries that encourage environmental sustainability need to be examined. For example, the public environmental expenditure review (PEER) that was commissioned by Rwanda Environment Management Authority (REMA) seeks to strengthen integration of environment into national policy and district planning, policy and budget processes (Box 5).

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<sup>10</sup> Preliminary findings based on questionnaire based needs assessment as a part of TERI India low carbon development study (supported by UNDP and Shakti Sustainable Energy Foundation); see - <http://www.teriin.org/projects/loci/>

**Box 5: Public Environmental Expenditure Review (PEER) by Rwanda Environment Management Authority (REMA)**

The Public Environmental Expenditure Review (PEER) was commissioned by Rwanda Environment Management Authority (REMA) in support of the implementation of the poverty-environment initiative (PEI) Rwanda. Broadly, the initiative aims to enhance the contribution of sound environmental management to poverty reduction, sustainable economic growth and the achievement of the millennium development goals.

The initiative seeks to facilitate a process to strengthen integration of environment into national policy and district planning, policy and budget processes to implement the economic development and poverty reduction strategy (EDPRS). The initiative is meant for the following stakeholders: (i) Environment and natural resources (ENR) sector institutions, (ii) the ministry of finance and economic development (MINECOFIN), (iii) ministry of local governments (MINELOC), (iv) civil society organizations active in environmental advocacy and (v) other sectors whose programmes and sub-programmes are relevant for the environment.

In public expenditure reviews (PERs), the allocation and management of public spending is analysed. The objective of a PER is to analyse the extent to which policy priorities are effectively implemented in practice through budget allocation in order to increase the effectiveness and efficiency of public spending. PERs look at both recurrent and development expenditures, and attempt to review the joint impact of both types of spending on budgetary outcomes including economic growth, poverty reduction, and asset maintenance. A PER may also contain an institutional assessment and analyse the whole public expenditure management system. Lessons learned from the PER can inform strategic planning and budget preparation by identifying ways to improve budget allocation to achieve faster progress towards a sector's policy objectives

*Source: REMA (2010).*

***Indonesia***

A medium term outlook for the budget can give greater space for governments to shape the overall direction of spending patterns over time, as the margin for change will be typically greater in the medium term with revenues growing and existing commitments coming to an end (ADB 1999). This is one of the major reasons why many countries in the region such as Indonesia and Ukraine have introduced, or are in the process of introducing medium term expenditure frameworks (MTEF).

The government of Indonesia has a “rolling 3 year” medium-term expenditure framework in place. This means that each year when the annual budget is prepared, budgets are presented at an aggregate level for the coming three years (although only the coming financial year is legally agreed upon by the Parliament). Indonesia also provides budgets for each sector for

the coming three years. By providing sector ministries with more predictable resource envelopes, it helps to allocate funds in line with priorities in a fiscally sustainable way.

Further, as part of the MTEF (Medium-Term Expenditure Framework) in Indonesia, each sector is required to provide a breakdown of their budget by programmes. It is therefore possible to monitor both how the budget is evolving over time at a national level between sectors, and also how the budget is changing within sectors, which is important for monitoring cross-cutting issues like climate change.

The Indonesian MTEF separates on-going and new policies. All new policy initiatives are submitted for scrutiny by the Cabinet, who ultimately decide upon how discretionary resources should be allocated. Trade-offs are therefore made at the highest level of government on how budgetary resources should be allocated over the medium-term to best achieve government policy objectives.

### *China*

Recently, the Chinese government has taken a step toward greening public finance measures. On the expenditure side, it has increased government environmental investment, which was over 1.3% of the GDP in 2007. It has also reduced the amount of environmentally harmful subsidies such as subsidy for energy and water consumption. On the revenue side, it started discussion on the adoption of energy and carbon tax. These changes in budgeting are in tandem with more stringent environmental laws and regulations. China has legislated a variety of environmental laws and regulations since the latter part of the 1970s, and has developed them both in terms of number and effectiveness since the 1990s.

Now China is recognized as a nation with an advanced system of environmental laws among developing countries (Li 1999). In order to implement these laws and regulations, the government created, in parallel, an administrative and fiscal system at the central level in the early 1970s, and expanded them to state and local governments since the 1990s. An environmental administrative and fiscal system was created and integrated into the existing ones that were established to manage the economy (Jin, Mori 2009). Integration of the Five-

Year Plan for National Environmental Protection into the Five-Year National Development Plan was one of the biggest successes in environmental administration during the 1990s. On the expenditure side, China has increased government environmental investment—over 1.3% of the GDP in 2007.

The “Green Stimulus” in China (Box 6) is seen as the largest public spending measure which has been put in place for stimulating the growth of green sectors in China around the manufacturing and research and development sectors.

**Box 6: Green Stimulus in China**

China’s National Development and Reform Commission (NDRC) announced a variety of green stimulus measures in response to the global economic crisis in 2009. The table below shows the stimulus measures announced by various countries. Over one-third of the massive Chinese stimulus package and nearly 27% of the 2009 budget has been allocated to green themes, mostly rail, grids and water infrastructure, along with spending on environmental improvement.

Stimulus packages by various countries and the corresponding green investment

Countries	Stimulus package (USD billion)	Low carbon (USD billion)	Percentage of green fund
Australia	43.8	9.9	22.6
Canada	31.8	2.8	8.8
China	647.5	218	33.6
France	33.7	6.1	18.1
Germany	104.8	13.8	13.2
Japan	630	36	5.7
Mexico	7.7	0.8	10.4
Korea	76.1	59.9	78.7
Britain	34.9	5.8	16.6
USA	787	94.1	12
EU	38.8	24.7	6.3

Source: UNEP (2009)

Chinese green spending is worth USD 218 billion or 33.6% of the total stimulus and the fiscal budget. Almost half of the Chinese green stimulus is invested in railways, followed by the investment on grid (32.1%), then water and waste (15.6%), building (3.4%), low-carbon vehicles (0.7%) and renewable energy (0.7%). In addition to the green stimulus package, the Chinese government in 2011 announced that it would share 50% of the investment costs for

solar power capacity over 500 MW. Stimulus measures also provide subsidies for automakers to develop efficient energy cars. Provision of green stimulus to various industries and sectors clearly shows the strategic intent of China to enhance competitiveness in its green sectors.

### *Ukraine*

The current problems with environmental finance are significant in Ukraine. Domestic support to the environment sector (in constant terms) has been decreasing over the past few years. Environmentally-related official development assistance has also been low. This situation was further aggravated by the financial crisis: at the end of 2008, the budget of the Ministry of Environment Protection was cut by about 70% compared to the budget commitment at the beginning of that year. At the same time, the World Bank has calculated that Ukraine's investment needs in environmental protection over a period of ten years (2006–2015) may amount to some USD 1.5–3 billion annually (excluding investments in energy and water supply and sanitation projects), which may translate into almost 2% of GDP.

### *Taiwan*

In Taiwan, prior to the 1970s, pollution management referred to the simple control of pollution through regulatory measures. Examples included the specification of emissions standards, regulation of emissions, and creation of permission systems. For this reason, the social cost induced by environmental pollution was not reflected properly in the policies, and an enormous amount of labour and other resources were wasted in policy execution. Also, the effect of these regulatory measures was limited because of a lack of incentives for polluters to proactively contribute to the reduction of pollution. In response to the situation, research began in the 1990s on the pollution control fee systems followed by European nations, the United States, and Japan, and attempts have been made to reduce environmental pollution through an incorporation of economic instruments into environmental policies. This led to Taiwan's pollution control fee systems. Among Taiwan's pollution control fees, the fee for general waste disposal and the recycling fee have been studied recently by the Ministry of Economy, Trade and Industry.

Although Taiwan has not established a system of environmental taxes and pollution control fees that are defined by the OECD, there are equivalents—energy taxes, pollution control fees, natural resource taxes, and transportation taxes. All the pollution control fees collected by the Taiwan Environmental Protection Administration (TEPA) are revenues earmarked for limiting the source of pollution or properly processing relevant pollutants. The energy taxes administered by the Ministry of Finance, Ministry of Economic Affairs, and Ministry of Transportation and Communication are revenue sources earmarked mainly for the reduction of air pollution and road constructions. The natural resource taxes and transportation taxes are general revenue sources for which no specific uses are predetermined. Table 6 shows the environmental taxes from 2004 through 2006 and their structure. As can be inferred from table, the share of the energy taxes, pollution control fees, natural resource taxes, and transportation taxes in the environmental taxes for 2006 was 45.6%, 4.8%, 0.1%, and 49.5%, respectively.

**Table 6:** Environmental taxes and their structure (Million NT\$, %)

Tax revenue	2004		2005		2006	
	Value	%	Value	%	Value	%
Energy taxes	149,819	41.7%	154,776	40.6%	168,824	45.6%
Pollution control fees	17,996	5.0%	18,050	4.7%	17,701	4.8%
Nature resource taxes	352	0.1%	512	0.1%	395	0.1%
Transportation taxes	190,719	53.1%	208,028	54.5%	183,187	49.5%
Total taxes revenue	358,886	100.0%	381,366	100.0%	370,107	100.0%

Source: Chen, Li-chun (2009)

As for the pollution control fees, the following are levied under a corresponding law: the APC fees are levied under the Air Pollution Control Act; the fee for general waste disposal and recycling fee under the Waste Disposal Act; the WPC fees under the Water Pollution Control Act; the fee for soil and groundwater remediation under the Soil and Groundwater Remediation Act; the fee for man-made marine pollution (effluent or contamination) under the Marine Pollution Control Act; and the airplane noise control fee under the Noise Control Act (Table 7). Each of these pollution control fees enters a fund as earmarked revenues, and the revenues are used for measures to protect the environment. TEPA recently created the

Environmental Protection Fund which combines four major funds—the APC fund, the recycle management fund, soil and groundwater remediation fund and the WPC fund.

The Air Pollution Control Act (APC Act), which was amended in 1992, prescribes the collection of fees associated with reducing air pollution. The process toward creating a system to control air pollution took a long time and involved policy planning and discussions, hearings with experts, the assessment of the effectiveness and benefits of implementing the system, discussions in academic circles, and public participation in discussions. The process faced intense questions and fierce protests by stakeholders opposing the new policy, but moved to the first phase of implementing APC fees on July 1, 1995 with the formal initiation of the sulphur oxide (SO<sub>x</sub>) APC fee. The collection of other fees followed: the building construction particulate APC fee started in July 1997; the launch of the nitrogen oxide (NO<sub>x</sub>) APC fee in July 1998 marked the second phase; and the launch of the volatile organic compounds (VOCs) APC fee on January 1, 2007 marked the third phase.

**Table 7:** Various types of pollution control fees in Taiwan (Million NT\$)

<b>Pollution control fees</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>
Air pollution control fee	4,084	3,837	3,546
Fee for soil and groundwater remediation	759	757	593
General waste disposal fee	5,749	5,647	5,501
Recycling fee	6,707	7,115	7,374
Airplane noise control fee	698	694	687
<b>Total pollution control fees revenue</b>	<b>17,996</b>	<b>18,050</b>	<b>17,701</b>

*Source: Chen, Li-chun (2009)*

## **Vietnam**

At a national level, one of the easiest ways to prioritize budgets is to adjust the allocations of sector ministries. For example, to increase the budget for agricultural productivity, the Ministry of Finance can increase the budget allocation for the Ministry of Agriculture. In order to prioritize resources across various ministries for climate change and sustainable development activities, allocations within ministries dedicated to climate related actions need to increase. In Vietnam, there are established processes in place during budget preparation for the Ministry of Natural Resources and Environment (MONRE), the Ministry

of Finance (MoF) and the Ministry of Planning and Investment (MPI) to allocate a proportion of the resources provided through its budget support operation to dedicated climate change schemes and projects. First, the Ministry of Natural Resources and Environment (MONRE) develops prioritized duties and criteria to guide other ministries in the formulation of projects which are potentially eligible for financing. Appropriate ministries and localities then formulate those project outlines and send them to the appropriate natural resources and environment agencies for comments (i.e., at a national or local level). Based on these comments, ministries and localities prepare a finalized prioritized list of potential projects for financing. Finally, MoF and MPI decide which projects to finance based on the available resource envelope identified for new initiatives on climate change, in consultation with MONRE (Ministry of Finance, Vietnam 2012).

## **6. Recommendation of the Thirteenth Finance Commission for Environment in Punjab**

In India, the central government typically assumes responsibility for national public goods (defence, foreign affairs, money and banking, national infrastructure, legislation) while the local government structures provide local public goods and services, including water and sanitation, local health and education facilities, local roads and recreational facilities. The Government of India had constituted the Thirteenth Finance Commission for the period 2010–2015. The Commission submitted its report in December 2009 and had made recommendations with regard to distribution of net proceeds of taxes between the union and the states and to evolve principles which should govern the grants-in-aid of revenue of the state out of the consolidated fund of India.

Environment is an integral part of the social and economic system. It is important to note that the Thirteenth Finance Commission report made an attempt to identify and support critical environmental and resource management issues. This should be taken by Punjab as “good practice” and while preparing the expenditure budgets, it should take this exercise in-house and make allocations accordingly. It should also make assessments of environmentally harmful subsidies and take decisions on phasing these out—in other words, on one hand free up resources for developmental expenditures and on the other, reduce adverse impact on environment. This is discussed in detail in Chapter 12 of the Thirteenth Finance Commission Report.

The Commission has specified environment related grants and considers environment sector as a critical sector for the overall development of the nation. The grants-in-aids for the environment sector according to the recommendations of the Thirteenth Finance Commission covers:

1. Protection of forests
2. Renewable energy
3. Water sector management

**Protection of Forests**

The Commission has recommended grants of INR 5000 crore for the period 2010–15 which can be used by all states for the protection of forests under environment related grants. For Punjab, the Commission has recommended a grant of INR 9.2 crore under forests for the period 2010–15. The grants for the first two years are untied. Of the total released, 75% can be used by the states for development purposes. The remaining 25% in the three years is for preservation of forests wealth and is an addition to the states’ budget for development of forestry and wild life. The year-wise allocation is given in Table 8.

**Table 8:** Thirteenth Finance Commission grants for forests sector (INR crore)

Year	Total transfers recommended for all states	Total transfers recommended for Punjab
2010–11	625	1.15
2011–12	625	1.15
2012–13	1250	2.30
2013–14	1250	2.30
2014–15	1250	2.30
<b>Total</b>	<b>5000</b>	<b>9.20</b>

Source: TFC (2009)

**Renewable Energy**

Coal based thermal generation accounts for 66% of the total electricity generation in India and is a major contributor to carbon dioxide emissions. In terms of commercial energy flows, the supply side continues to be dominant with fossil-fuel based energy sources (TERI 2014). Additionally, Indian coal has a high ash content. The second of the three environmental grants is a forward looking incentive for generation of grid electricity from renewable sources. The grant is so structured as to reward states for renewable generating capacity that comes on stream into the grid during the first four years of our projection horizon. The reward falls due in the fiscal year 2014–15, after having allowed enough time for the states to respond to the incentive. The incentive will be based on the states’ achievement in renewable energy capacity addition in MW from April 1, 2010 to March 31, 2014.

The Commission has recommended a grant of INR 5000 crore for renewable energy for the period 2010–15. The power sector has great potential for reduction of greenhouse gases. Hence a need was realized to incentivise states to promote clean energy. With this objective in mind, an incentive grant for generation of grid electricity from renewable resources was created.

The detailed break-up for the power sector cannot be shown since the incentive is due in 2014–15 after assessing the performance of the state in terms of renewable energy capacity addition in MW from April 1, 2010 to March 31, 2014.

### *Water Sector Management*

The third of the grant provisions is for the purpose of incentivising states to establish an independent regulatory mechanism for the water sector and improve maintenance of irrigation networks. With improved maintenance and delivery, simultaneous enhancement of recovery is necessary for an input which is publicly provided, but is excludable and rival, and therefore, amenable to user charges that cover (normatively assessed) maintenance. Since so many of the problems in this sector stem from lack of systematic attention by technically qualified people to the issue of the structure and level of user charges, the grant provision is conditional on setting up of an independent Water Regulatory Authority.

**Table 9:** Thirteenth Finance Commission grants for water sector (INR crore)

Year	Total transfers recommended for all states	Total transfers recommended for Punjab
2011–12	1250	80
2012–13	1250	80
2013–14	1250	80
2014–15	1250	80
<b>Total</b>	<b>5000</b>	<b>320</b>

*Source: TFC (2009)*

The Commission has recommended an incentive grant of INR 5000 crore for water sector management for four years (2011–15) for all states and an incentive grant of INR 320 crore in aggregate for Punjab. This amount shall be released in two equal instalments over the four year period 2011–12 to 2014–15. States are given one year to make the necessary preparation to absorb these funds. Year-wise allocation is given in Table 9.

## 7. Electricity and Fertilizer Subsidies in Punjab

This section of the report discusses the key inputs subsidies for agriculture—fertilizers and electricity in the context of agriculture in Punjab and the fiscal scenario in the state. Subsidies can be a powerful welfare augmenting instrument of fiscal policy, however such subsidies are efficient only when they are transparent, well targeted and suitably designed for practical implementation. In India, subsidies are generally input based and generally inefficiently administered; improper subsidies exert pressure on the fiscal deficit of the state.

Electricity subsidy is a contentious issue. In this section, we will discuss arguments both for and against electricity subsidy and conclude that this policy question should be considered in a holistic manner. The question of electricity subsidy is an important policy question for at least two reasons:

Firstly, electricity subsidies are widely perceived to be one of the main causes of groundwater over-exploitation. Let us put this question in the larger context of irrigation subsidies. In the case of surface water based irrigation, the entire cost of development is borne by the state. A very small portion of operational expenses are recovered from the farmers. In groundwater irrigation, most of the development cost is borne by the farmers. More scientific studies are required to get a better idea of the costs of the two sources of irrigation to the state and the farmers. Secondly, it can also be argued that the increase in the power subsidy costs in recent decades is the result of the increasing inability of farmers to bear the full costs of pumping from decreasing groundwater levels (Shah 2009; Dubash 2007).

Chandrakanth (2002) indicates that the negative externalities faced by the farmers due to cumulative interference of irrigation wells are largely responsible for well failures in hard rock aquifers. The electricity subsidy is only a tip of the iceberg of over-extraction. Farmers using groundwater bear a much higher proportion of irrigation cost (77%), compared to surface water irrigation farmers. However, the groundwater situation varies across districts/basins etc. Therefore the question of subsidy on energy, cost of groundwater irrigation, and water table situation should be considered together and not in isolation.

Meenakshi et al. (2013) measured the impact of metering agricultural tube wells (from a flat rate to a metered tariff) on groundwater users (pump owners and water buyers) and informal groundwater markets in West Bengal. Overall, the findings do not show any significant impact on any of the outcomes assessed. On the contrary, Badiani and Jessoe (2011) show that reducing electricity subsidies can potentially affect groundwater extraction rates.

A low flat tariff and the resulting electricity subsidy have also been criticized from an equity perspective because much of the agricultural electricity subsidy goes to big farmers who own a major proportion of the water extraction mechanisms fitted with electric pumps (Howes and Murgai 2003).

Detailed scientific studies are required to study the impact of reduction in energy subsidies on the cropping pattern, land and water productivity. There is also need to put some basic data in order. For instance, Chandrakanth et al. (2010) indicate that there are conflicting estimates of the use of electricity for irrigation and also on proportion of land irrigated by groundwater and surface water at the country level. Data at a more disaggregated level pose further problems. Subsidized/free agricultural power supply is putting an unsustainable burden on state budgets and is the prime cause of bankruptcy of the state boards in India.

Until the early 1970s, the state electricity boards charged tube well owners based on metered consumption. However, as the number of tube wells increased manifold in the next two decades, the transaction costs of metering were found to be prohibitively high compared to the total revenue generated from the agricultural sector. In response, most states introduced flat tariffs for agricultural electricity supply (Shah et al. 2007). Many states started using electricity tariff as an appeasement of voters; thus, keeping it perpetually low or supplying it free of any charge. As a result, the quality of power deteriorated and rationing became the norm. This affected the small farmers more as, unlike big farmers who had the resources, they could not afford to substitute diesel and generators for free electricity. There were equally serious implications for the groundwater sector. Since the marginal cost of extracting groundwater was close to zero, it provided an incentive for over pumping. In many areas,

this spawned active groundwater markets. These markets emerged in response to the unmet demand for irrigation and the flat tariff system (Meenakshi et al. 2013).

However, the main drawbacks of the flat tariff system/free electricity are the total lack of energy accounting, no accurate estimates of the total electricity consumed by the agricultural sector and the subsidy provided by the electricity utilities. The total annual economic cost of subsidized power remains contested—mainly due to varying assumptions of transmission and distribution losses, the use of off peak power, and the unreliability or intermittence of the supply (Shah et al. 2007). There are also equity issues in subsidy. Free electricity has implications for the poor quality and rationed supply of electricity.

The problems facing the electricity sector due to unmetered supply to agriculture and the consequent lack of incentives among farmers to make efficient use of electricity and among the utilities to do robust energy accounting is now widely acknowledged and is at the top of the policy agenda including India's Five Year Plan documents.

A more general argument against energy subsidies is that they encourage farmers to extract groundwater at unsustainable rates which causes lowering of water tables, which in turn requires that more energy be used to extract groundwater, thus raising the cost of agricultural production. Further, use of free/cheap electricity may make electricity more expensive to non-farm users.

The expenditure on subsidies in Punjab has shown a decline with subsidy being 16% of the revenue receipts in 2007–08 as compared to 12% in 2011–12 (Table 10).

**Table 10:** Subsidies in Punjab

Year	Subsidy (in INR crore)
2007–08	3021
2008–09	2806
2009–10	2919
2010–11	3780
2011–12	3215

Source: CAG (2012) CAG Report on State Finance 2011–12<sup>11</sup>

Punjab's revenue deficit to GSDP ratio was 2.63% in 2011–12 against the target 1.8% according to the Fiscal Responsibility and Budget Management Act, 2011. If the state failed to meet targets of revenue deficits, fiscal deficit and debt to GSDP ratio, it would lose INR 500 crore every year from the centre. The percentage share of electricity subsidies in the fiscal deficit witnessed a decline in 2006–07 and 2008–09, increasing thereafter, and in 2010–11 it constituted 48.81% of the revenue receipts (Table 11).

**Table 11:** Electricity subsidy for Punjab farmers and fiscal deficit in the state

Year	Electricity subsidy for Punjab farmers (INR crore)	Fiscal deficit (INR crore)	Percentage share of electricity in the fiscal deficit
2005–06	1386.00	2653.97	52.22
2006–07	1768.86	4383.58	40.35
2007–08	2159.84	4603.84	46.91
2008–09	2294.90	6690.45	34.30
2009–10	2804.94	6170.00	45.46
2010–11	3487.00	7143.00	48.81

Source: Kaur (2012) and Economic Survey 2012–13

The district-wise trend of electricity subsidy indicates a secular increase in the quantum of subsidy (Table 12). Fazilka (previously in Ferozpur) and Pathankot (previously in

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<sup>11</sup>Report of the CAG on State Finances for the Year 2011–12, Government of Punjab, Report No.1 for the Year 2012.

Gurdaspur) are newly built districts in Punjab in 2013 and by the total number of districts has become 22. The number of districts in 2010 in Punjab was twenty.

**Table 12:** District-wise distribution of electricity subsidy in Punjab (in INR crores)

District	1990–91	1996–97	2000–01	2009–10
Gurdaspur	42.82	79.59	104.48	88.64
Amristar	76.02	140.24	213.08	110.02
Taran Taran	-	-	-	121.96
Kapurthala	25.61	46.62	60.82	55.24
Jalandhar	55.22	80.13	120.87	107.66
S.B.S. Nagar	-	23.65	36.03	37.66
Hoshiarpur	23.67	38.30	57.30	57.69
Rupnagar	12.20	21.05	37.80	25.91
SAS Nagar	-	-	-	27.66
Ludhiana	53.13	89.73	126.28	123.76
Ferozepur	58.62	106.55	138.51	110.84
Faridkot	30.88	20.52	32.45	37.19
Muktsar	-	7.94	21.54	30.73
Moga	-	31.67	85.68	111.12
Bathinda	10.94	11.88	43.30	61.41
Mansa	-	-	21.55	33.93
Sangrur	58.27	7.99	199.44	226.68
Barnala	15.18	104.15		49.91
Patiala	-	53.11	74	164.15
Fategarh Sahib	-	26.49	45.96	46.37
<b>Total</b>	<b>462.56</b>	<b>889.02</b>	<b>1419.03</b>	<b>1628.56</b>

Source: Kaur (2012)

The figures in table 11 and table 12 for total electricity subsidies for 2009-10 do not tally as at the district level, the subsidy number is calculated from the combined generation and distribution utilities and will lower than the state level subsidy estimates (which comprises of subsidies incurred by both the generation and distribution and the transmission entity).

Another explanation is that over the years in Punjab, subsidies have been enjoyed by agriculture, domestic and other segment of consumers. Consumers from industrial and commercial segment over the years have cross subsidized the agriculture, domestic sector as the average revenue requirement realized from commercial, industrial consumers have been

higher than the average cost of supply to these consumers. Moreover past arrears may be included in the state numbers.

Increase consumption of electricity in the agriculture sector in turn has led to groundwater exploitation reaching 145%<sup>12</sup> in the state with the most exploited districts being Jalandhar (254%), Kapurthala (204%), Moga (178%) and Mansa (175%), while the least exploited district is Mukatasar (62%). Extraction through electricity pumpsets is the predominant mode of extraction with 86.95% of the pumps electrified while diesel was used to extract water from 12.95% of the pumps (Table 13).

**Table 13:** Groundwater structures, water extraction mechanism, irrigated area and ground-water extraction status Punjab

District	Total tube wells (unit)	Extraction using electricity pump (unit)	Extraction using diesel pump (unit)	Other modes of extraction (unit)	Area irrigated through groundwater structures (ha)	Stage of groundwater development (%)
Amristar	85671	79900 (93.26)	5771 (6.74)	0 (0.00)	392416	152
Barnala	34441	32582 (94.60)	1848 (5.37)	11 (0.03)	219667	NA
Bathinda	46772	31361 (67.05)	15207 (32.51)	204 (0.44)	253457	93
Faridkot	37566	35123 (93.50)	2438 (6.49)	5 (0.01)	204066	106
Fatehgarh Sahib	35814	33865 (94.56)	1949 (5.44)	0 (0.00)	220429	161
Ferozepur	96269	81569 (84.73)	14489 (15.05)	211 (4.90)	543645	105
Gurdaspur	85028	76727 (90.24)	8301 (9.76)	0 (0.00)	386891	107
Hoshiarpur	58445	38925 (66.60)	16658 (28.50)	2862 (1.07)	308746	85
Jalandhar	78312	77402 (98.84)	908 (1.16)	2 (0.00)	441278	254
Kaparthula	54164	47747 (88.15)	5840 (10.78)	577 (0.00)	294372	204
Ludhiana	119521	100919 (84.44)	18601 (15.56)	1 (0.04)	665077	144

<sup>12</sup> The latest data states that this is now 170% (CGWB 2012).

District	Total tube wells (unit)	Extraction using electricity pump (unit)	Extraction using diesel pump (unit)	Other modes of extraction (unit)	Area irrigated through groundwater structures (ha)	Stage of groundwater development (%)
Mansa	44680	26333 (58.94)	18347 (41.06)	0 (0.00)	184326	175
Moga	64233	63425 (98.74)	785 (1.22)	23 (0.03)	398381	178
Mohali	11636	10418 (89.53)	1217 (10.46)	1 (0.001)	87964	NA
Muktsar	29127	12096 (41.53)	17023 (58.44)	8 (0.02)	141932	62
Nawanshar	26291	20569 (78.24)	5722 (21.76)	0 (0.00)	154144	175
Patiala	80034	78673 (98.30)	1361 (1.70)	0 (0.00)	555472	165
Ropar	25160	16764 (66.63)	8367 (33.26)	29 (0.11)	110105	93
Sangrur	105528	101008 (95.72)	4520 (4.28)	0 (0.00)	644169	183
TaranTaran	59580	59058 (99.82)	522 (7.59)	0 (0.00)	315798	NA
<b>Total</b>	<b>1178272</b>	<b>1024464 (86.95)</b>	<b>149874 (12.72)</b>	<b>3847 (0.32)</b>	<b>2051480</b>	<b>145</b>
Note: Figures in parenthesis refers to percentage						

Source: Minor Irrigation Census (2006–2007), Ministry of Water Resources, Government of India

The subsidy mechanisms for fertilizers, the other major input in agriculture, are leading to over usage and inappropriate application<sup>13</sup>. There has been an increased subsidy burden on fertilizers in Punjab—a greater increase in the 2005–06 to 2009–10 period (Table 14 and 15).

<sup>13</sup> The recommended ratio according to which nitrogen, phosphate, and potash should be used in Indian soil conditions is 4:2:1

**Table 14:** District-wise distribution of fertilizers subsidies in Punjab (in INR crores)

District	1990–91	1996–97	2000–01	2005–06	2009–10
Gurdaspur	32.72	41.57	77.24	79.07	277.65
Amristar	48.34	60.05	109.28	142.35	244.84
Taran Taran	-	-	-	-	186.79
Kapurthala	17.48	22.07	32.87	49.20	171.64
Jalandhar	32.7	36.44	59.98	86.10	300.37
S.B.S. Nagar	-	12.83	21.36	37.78	108.54
Hoshiarpur	15.62	18.48	31.22	58.86	169.82
Rupnagar	12.64	16.42	22.19	45.69	68.15
SAS Nagar	-	-	-		45.43
Ludhiana	53.55	57.48	106	144.97	391.24
Ferozepur	51.69	87.76	124.07	138.82	492.20
Faridkot	53.18	25.66	35.33	57.99	164.07
Muktsar	-	25.15	57.52	85.22	277.65
Moga	-	26.69	55.05	82.59	252.41
Bathinda	39.79	34.90	55.87	99.28	307.94
Mansa	-	18.48	46.84	67.65	214.55
Sangrur	47.60	69.29	120.79	143.21	403.86
Barnala	-	-	-		159.02
Patiala	48.71	52.86	98.60	115.97	348.33
Fategarh Sahib	-	13.86	25.47	46.56	126.21
<b>Total</b>	<b>454.03</b>	<b>619.99</b>	<b>1079.68</b>	<b>1481.31</b>	<b>4710.71</b>

Source: Kaur (2012 p.164–165)

**Table 15:** District-wise distribution of fertilizers subsidies in Punjab(INR/ha)

District	1990–91	1996–97	2000–01	2005–06	2009–10
Gurdaspur	697.22	844.57	1563.49	1590.36	5486.96
Amristar	792.30	792.30	1328.38	3346.48	5801.90
TaranTaran	-	-	-	-	4705.03
Kapurthala	695.60	768.61	1251.91	1818.45	6241.16
Jalandhar	626.15	903.80	1445.89	2024.41	7134.35
S.B.S. Nagar	-	758.88	1261.54	2187.28	5898.48
Hoshiarpur	392.42	495.12	851.37	1651.54	4633.10
Rupnagar	629.00	804.71	1054.29	3268.57	4765.59
SAS Nagar	886.52	-	-	-	3786.00
Ludhiana	556.00	956.01	1751.32	2420.00	6575.13
Ferozepur	581.43	931.24	1371.21	1620.51	5618.49
Faridkot	-	1086.86	1427.53	2295.65	1351.59
Muktsar	-	592.85	1353.77	1980.51	6183.52
Moga	-	857.75	1766.56	2295.65	6590.08

Bathinda	472.43	644.81	992.17	1791.71	5538.27
Mansa	-	527.66	1273.57	1871.82	5814.09
Sangrur	533.33	774.66	1337.85	1635.58	6513.55
Barnala	-	-		-	6386.02
Patiala	667.63	915.75	1653.78	2155.10	6498.36
Fategarh Sahib	-	725.18	1310.31	2441.88	6505.15
<b>Total</b>	<b>7356</b>	<b>13717.75</b>	<b>22994.93</b>	<b>36210.08</b>	<b>112026.82</b>

*Source: Kaur (2012, p.169)*

An implication of the subsidy regime (along with the MSP policy) in Punjab has been the emergence of the dominant cropping pattern of wheat and rice. The problems that have emerged are increased groundwater exploitation, inappropriate application of fertilizers and various health problems. The aspect of reationalizing subsidies along with propmoting agro-ecological practices needs policy deliberation and action.

## 8. Budget Indicators in Key Environmental Sectors in Punjab

According to the annual plan, INR 16123 crore was earmarked for 2013–14 against INR 14000 crore for 2012–13 representing an increase of 15%<sup>14</sup>.

Table 16 shows the share of key sectors in the total revenue disbursements for environmental protection in the state. In 2011–12, approximately 17% of the total revenue disbursements took place in the sectors relevant to the environment and rose to 21.87% in 2012–13. It is expected to be 23.39% in 2013–14. In percentage share, fund disbursement for FY 2012–13 has decreased over 2011–12 for water supply, irrigation, science, ecology and environment. Fund disbursement for agriculture, rural development and energy have increased.

**Table 16:** Percentage share of key sectors in total fund disbursement (revenue account)

Sectors	% share of the sectors in total fund disbursement of 2011–12	% share of the sectors in total fund disbursement of 2012–13	% share of the sectors in the total fund disbursement of 2013–14*
Water supply, sanitation and urban development	1.30	1.27	1.58
Agriculture and allied activities	3.13	3.39	3.99
Rural development	0.53	1.32	1.71
Irrigation and flood control	3.18	2.72	3.02
Energy	8.77	13.14	13.03
Other scientific research (Science & Technology)	0.0144	0.0100	0.0309
Ecology and environment	0.0192	0.0029	0.0178
<b>Total</b>	<b>16.95</b>	<b>21.87</b>	<b>23.39</b>
*Provisional			

Source: Annual Budget of Punjab 2013–14

<sup>14</sup> Key features of Budget 2013–14, Govt. of Punjab

***Agriculture and Allied Activities (including forestry and wildlife)***

A major part of the disbursements in agriculture and allied activities is towards crop husbandry and animal husbandry (Table 17).

**Table 17:** Percentage share of agriculture sector in total fund disbursement (revenue account)

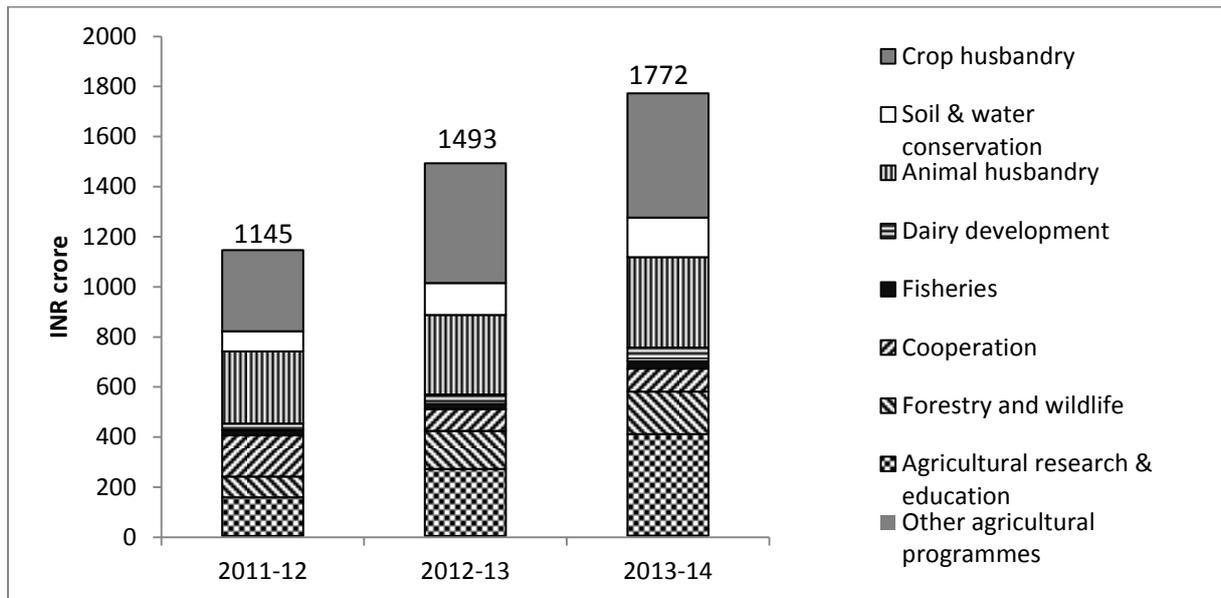
<b>Agriculture and allied activities</b>	<b>2011–12</b>	<b>2012–13</b>	<b>2013–14</b>
Crop husbandry	28.21	32.01	27.99
Soil and water conservation	7.05	8.56	8.92
Animal husbandry	25.14	21.26	20.35
Dairy development	2.29	2.60	3.07
Fisheries	1.82	1.36	1.68
Forestry and wildlife	7.27	10.19	9.55
Agricultural research and education	13.42	17.90	22.90
Cooperation	14.35	5.76	5.20
Other agricultural programmes	0.46	0.36	0.33
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>

*Source: Annual Budget of Punjab 2013–14*

INR 200 crore was earmarked for diversification of agriculture into horticulture and other alternate crops. The support to Punjab Agricultural University (PAU) increased from INR 124 crore in 2011–12 to INR 270 crore in 2012–13 and INR 300 crore in the year 2013–14. Additionally, INR 90 crore was earmarked for Mission for Green Punjab for a period of three years (Punjab Annual Budget 2013–14). The state, under the State Forestry Action Programme has set a target to increase area under forest and tree cover to 15% by 2017. This is envisaged to be achieved through agro-forestry on farm lands and by raising trees plantations on all kinds of land in the state which may be available for this purpose (DRAFT State Forest Policy and Strategic Plan 2008–2017).

Figure 5 shows the revenue account disbursements for agriculture and allied activities in the last three years from the revenue account.

**Figure 5:** Revenue account disbursements in agriculture and allied activities



Source: Annual Budget of Punjab 2013–14

At present, the alarming depletion of ground water in Central Punjab, the soil degradation due to erosion in the Shivalik foothills and the water-logged and salted soils in South-western Punjab are focus areas in the state. Early plantation of paddy has been banned and efforts are being made to shift from paddy to alternate crops. Specific schemes have been launched for conservation of ground water including the following:

- INR 48 crore – for judicious use of available water and harvesting of rainwater enhancing irrigation potential in Punjab;
- INR 38 crore – for micro irrigation;
- INR 28 crore – for assistance to farmers for underground pipeline system for canal based irrigation and sewage treatment plants;
- INR 12 crore – for construction of check dams and gabion structures in Talwara;
- INR 10 crore – for construction of low dams for water harvesting and recharge.

Animal husbandry sector has a lot of potential for boosting the agriculture income of the farmers in the state. The allied activities of agriculture like animal husbandry and dairy have in recent years become an independent economic activity. The contribution of this allied sector to state GDP has reached 8.15%. The most notable success has been the establishment of commercial dairy farms. The number has increased from 6000 in 2011–2012

to 7600 in 2012–2013. The annual milk production of 96 lakh tonne and per capita milk availability at 944 gm/day are the highest in the country.

To boost the milk production of cows, the state has imported 5000 sexed semen straws of very high genetic merit and 3.82 lakh semen straws of cows. These straws are supplied at subsidized rate to the farmers to increase the female population of the cattle. The state is a part of the National Dairy Plan Phase I for enhancing milk production through semen production, progeny testing and fodder production.

The National Livestock Mission with an outlay of INR 307 crore was announced in the union budget 2013–14 to assist states like Punjab to diversify into livestock activities in a big way.

The outlay of animal husbandry, dairy development and fisheries was INR 110 crore for 2013–14. The important schemes are –

- INR 83 crore – for strengthening of GADVASU<sup>15</sup>;
- INR 46 crore - for upgradation of veterinary institutions in the state;
- INR 14 crore – for strengthening of Punjab Dairy Development Board;
- INR 12 crore – for strengthening infrastructure to produce quality and clean milk;
- INR 11 crore – for development of fisheries in the state.

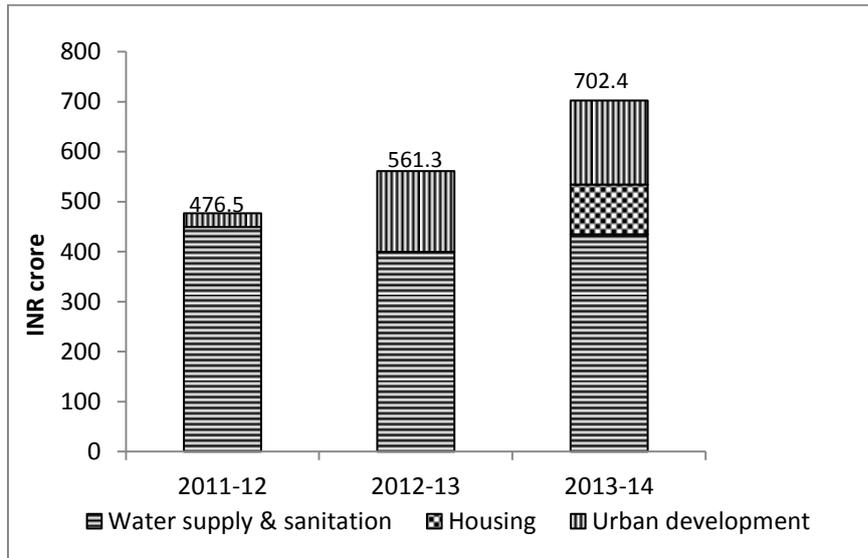
### ***Urban Development, Water Supply and Sanitation***

Figure 6 shows the total revenue disbursements for the last three years from the revenue account for urban development, water supply and sanitation. The disbursements increased from INR 476.51 crore in 2011–12 to INR 561.26 crore in 2012–13 at a growth rate of 18% and was estimated at INR 702.38 crore in 2013–14.

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<sup>15</sup>Guru Angad Dev Veterinary and Animal Sciences University

**Figure 6:** Revenue account disbursements in urban development, water supply and sanitation



*Note: Data on expenditure on housing is available for 2013–14 only.*

*Source: Annual Budget of Punjab 2013–14*

Major allocations in urban development include:

- INR 495 crore has been earmarked for 2013–14 for the scheme of urban development.
- The Local Government Department had an ambitious plan of INR 8888 crore for providing 100% basic civic amenities to the urban townships.
- Houses for the Poor – The state government sought to construct one lakh houses during next two years for poor families. The government envisaged an adequate land pool in urban areas from the 10% land earmarked for EWS (economically weaker sections) in housing projects. INR 100 crore was proposed for purchase of land in villages where there was no Panchayat land.

The plan allocation for water supply and sanitation increased by 35% to INR 393 crore in 2013–14. Out of 15170 habitations, 11980 are fully covered, 2263 are partially covered and 927 do not have any rural water supply. The important schemes under this budget head include

- INR 335 crore – for the Punjab Rural Water Supply and Sanitation project with World Bank assistance;

- INR 20 crore – for NABARD<sup>16</sup> aided sanitation project;
- INR 20 crore – for NABARD aided rural water supply schemes; and
- INR 10 crore – for Rajiv Gandhi National Drinking Water Mission.

### *Irrigation and Flood Control*

Figure 7 shows the total revenue disbursements for the last three years from the revenue account for irrigation and flood control. The disbursements increased from INR 1165.41 crore in 2011–12 to INR 1198.43 crore in 2012–13 at a growth rate of 3% and was INR 1342.57 crore in 2013–14.

To reduce dependence on groundwater and utilize surface water for irrigation purposes, the strategy of the government is to increase the canal capacity, lining of unlined water courses and construction of low cost dams in hilly areas.

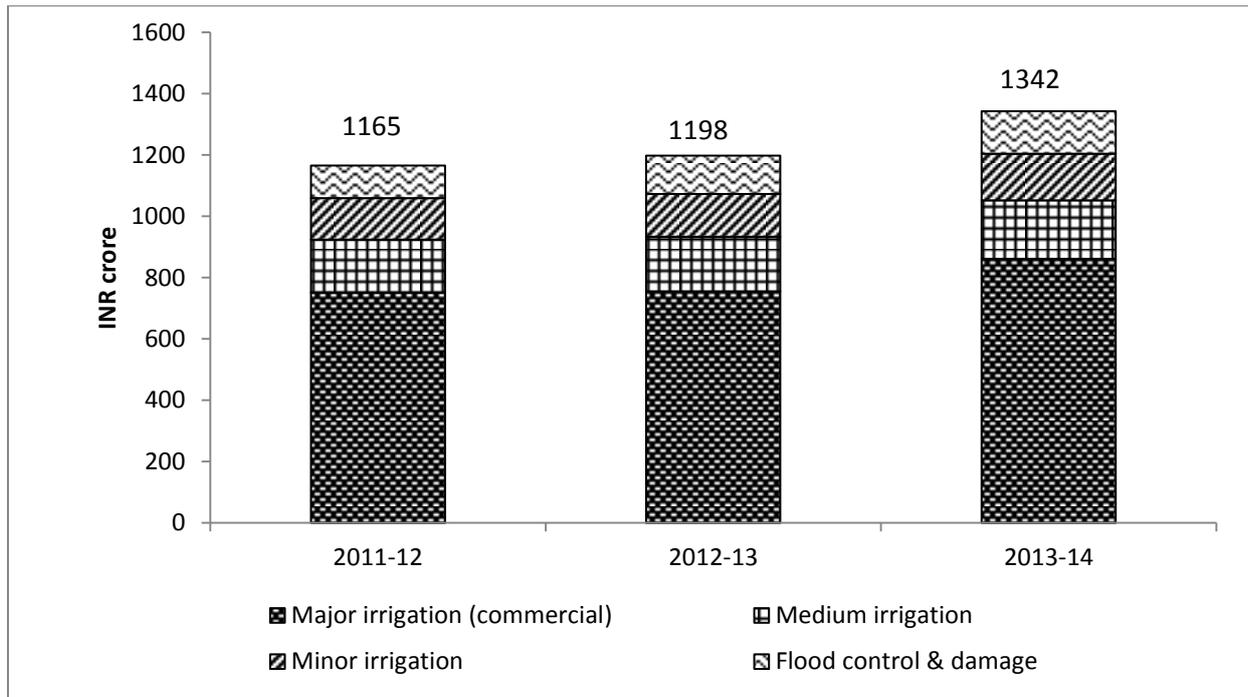
The important schemes in irrigation and flood control include:

- INR 40 crore – for relining of Sirhind feeder project (project cost was INR 614 crore to be completed in four years from 2013–17);
- INR 40 crore – for rehabilitation of first Patiala feeder and Kotla branch (project cost was INR 199 crore; INR 120 crore already spent);
- INR 156 crore – for completion of remaining 14 km of Kandi Canal Phase II project;
- INR 100 crore – for construction of Shahpurkandi Dam Project (project cost is INR 2286 crore including the power component to be completed in four years from 2013–17);
- INR 310 crore – for construction/lining of water courses;
- INR 145 crore – to address the problem of water logging and flood protection.

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<sup>16</sup> National Bank for Agriculture and Rural Development

**Figure 7:** Revenue account disbursements in irrigation and flood control



Source: Annual Budget of Punjab 2013–14

The state government will focus on the completion of accelerated irrigation benefit programme (AIBP) projects. The projects under implementation are Kandi Canal Stage II, rehabilitation of the first Patiala Feeder and the Kotla Branch and Shahpurkandi Dam project. Out of a total length of 70 km, construction is complete upto 56 km. The remaining 14 km length was envisaged to be completed in the last fiscal year. With the completion of this project, irrigation facilities would be provided to 29527 ha area of 218 villages.

A sum of INR 595 crore was spent under the Command Area Development and Water Management Programme during the last five years and 6050 km of water courses were lined. An outlay of INR 310 crore was earmarked for this programme for the year 2013–14 and with this, 2400 km of water courses would have been lined.

A sum of INR 282 crore was allocated for NABARD projects involving lining of canals and construction of channels and distributaries, installation of 280 deep tubewells in Kandiarea and other anti-water logging activities in the state.

### Energy

The state government during the last tenure launched an ambitious plan to make Punjab a power surplus state by March 2014. Three thermal power projects of 3920 MW generation capacity were allotted to private developers in 2007–09. The power sector with an outlay of INR 3209 crore constitutes 20% of the total outlay of the Annual Plan. The major allocations include:

- INR 1,209 crore – for transmission;
- INR 750 crore – for generation;
- INR 500 crore – for the Re-structured Accelerated Power Development Reforms Programme;
- INR 50 crore – for providing 24 hour urban pattern supply to left out dhans.

The 1980 MW Talwandi Sabo Thermal Project (83% work completed), 540 MW Goindwal Sahib Thermal Project (86% work completed), and 1400 MW Rajpura Thermal Plant (79% work completed), was envisage to be completed by May 2014<sup>17</sup>.

Table 18 shows the revenue disbursements in the energy sector in Punjab as a percentage of the total disbursements. It is evident from the table that the percentage amount on conventional sources of energy increased while the percentage share of non-conventional sources of energy decreased from 2011–12 to 2013–14.

**Table 18:** Percentage share of energy sector in total fund disbursement (revenue account)

Percentage allocation in the energy sector in Punjab	2011–12	2012–13	2013–14
% allocation to power	99.96	99.99	99.98
% allocation to non-conventional sources of energy	0.04	0.01	0.02
Energy	100	100	100

Source: Annual Budget of Punjab 2013–14

Figure 8 shows the total revenue disbursements for the last three years from the revenue account for the energy sector. The disbursements increased from INR 3208.21 crore in 2011–

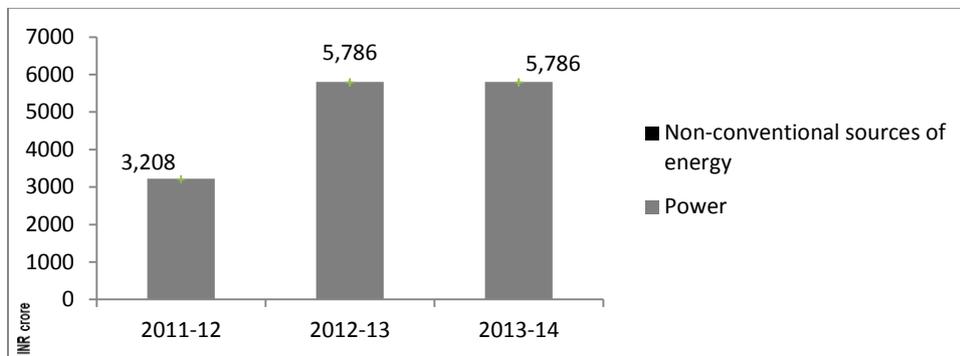
<sup>17</sup><http://www.nripunjab.gov.in/achive-sadbjp.htm>

12 to INR 5785.80 crore in 2012–13 at a growth rate of 80% and is INR 5785.90 crore in 2013–14.

The Government of Punjab has notified a policy for “New and Renewable Sources of Energy (NRSE) – 2012”, which incentivizes solar and biomass based technologies. The Punjab Energy Development Agency (PEDA) is a regulatory authority with all the legal powers for use of renewable energy and energy efficiency concepts by the government and other private establishments. Incentives are to be given to private individuals for use of power saving devices.

PEDA has drawn up an ambitious plan to prevent burning of paddy straw and disposal of municipal solid waste. It aims to generate 800 MW of power from biomass including paddy straw. The farmers will be given subsidy of 50% for purchase of balers and reapers. It will enable the farmers to earn extra income and check environmental pollution. The agency would also facilitate setting up 200 MW of power from municipal solid waste for which an attractive subsidy of INR 3 crore per MW was to be given. Besides, tenders for 300 MW of solar power have been floated. Lastly, 200 MW of power is proposed to be generated from co-generation in sugar mills/distilleries. The entire above proposal involved an estimated investment of INR 8600 crore.

**Figure 8:** Revenue account disbursements in energy sector

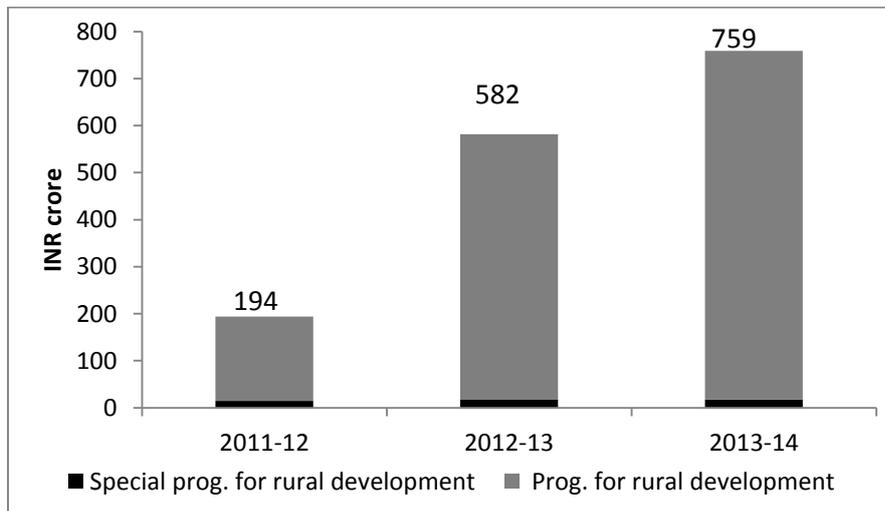


Source: Annual Budget of Punjab 2013–14

### Rural Development

Figure 9 shows the total revenue disbursements for the last three years from the revenue account for the rural development sector. The disbursements increased from INR 194.08 crore in 2011–12 to almost thrice to INR 582.02 crore in 2012–13 and was INR 758.72 crore in 2013–14.

**Figure 9:** Revenue account disbursements in rural development

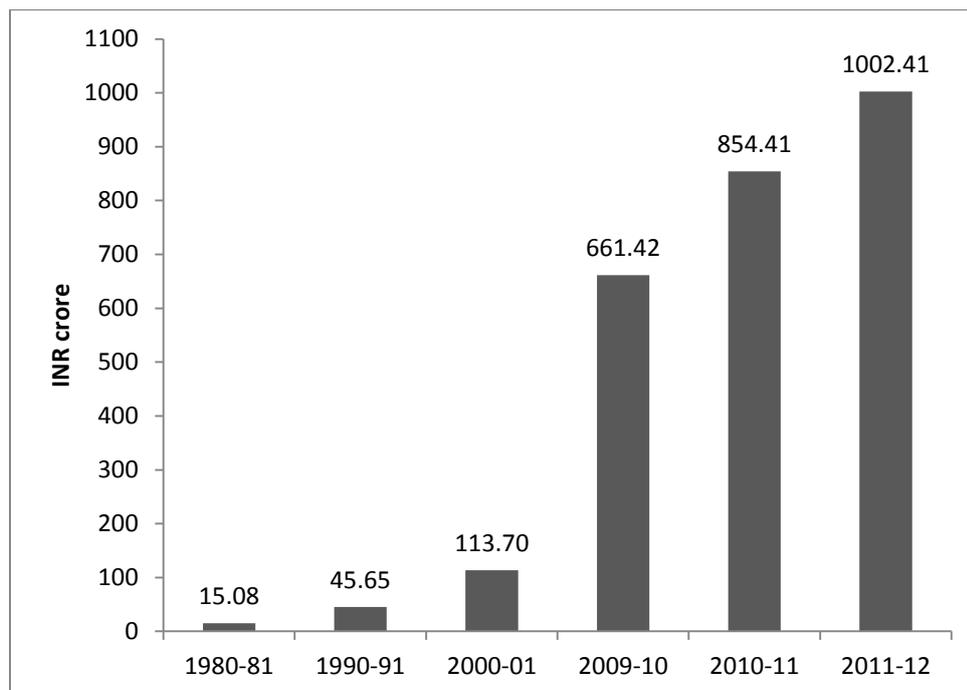


Source: Annual Budget of Punjab 2013–14

The plan budget for 2013–14 mainly focused on creation of rural employment and rural livelihood, construction of rural toilets. The important schemes include:

- INR 400 crore - for Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS);
- INR 100 crore – for construction of toilets in rural areas;
- INR 60 crore – for Indira AwaasYojana (IAY);
- INR 50 crore - for construction/brick paving of passages in villages/dhanis;
- INR 20 crore - for National Rural Livelihood Mission (NRLM);
- INR 18 crore – Backward Regions Grant Fund for infrastructure and training.

**Figure 10:** Government expenditure for rural development programmes



Source: *Statistical Abstract Punjab (2012)*

The strategy for rural development in the state can be observed from the expenditure pattern for various development schemes from 1980–81 till 2011–12 (Figure 10). As can be seen from the figure, the government expenditure increased from INR 15.08 crore in 1980–81 to over INR 1000 crore in 2011–12. The compound annual average growth rate from 1980–81 to 2000–01 was 11% and from 2000–01 to 2009–10 was 22% which clearly shows the growing importance of rural development programmes in the total expenditure of the state government. This increase can also be attribute to the growing number of centrally sponsored rural development schemes in India.

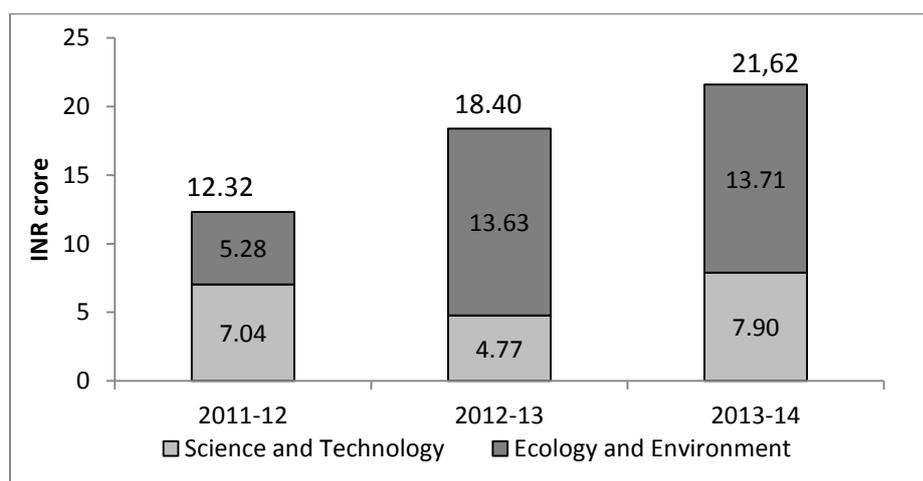
For strengthening the Panchayati Raj system and its institutions, the state must take initiatives in: transfer of functions, finances and functionaries to the Panchayati Raj institutions; empowerment of the Gram Sabha; replacement of the District Development Planning Boards by District Planning Committees; integration of development funds allotted to MPs with the funds of Zila Parishads; decision of the state government on the recommendations of the State Finance Commissions within a specified period; ensuring

training of all newly elected representatives within a year of their election and organizing refresher courses periodically<sup>18</sup>.

*Science, Ecology and Environment*

Figure 11 shows the total revenue disbursements for the last three years from the revenue account for the science, ecology and environment sector.

**Figure 11:** Revenue account disbursements in science and technology and ecology and environment



Source: Annual Budget of Punjab 2013–14

The disbursements in Science and Technology decreased from INR 7.04 crore in 2011–12 to INR 4.77 crore in 2012–13 and then again increased to INR 7.90 crore in 2013–14. This includes allocations for science popularization and S&T projects including those for Science City, Punjab State Council for Science and Technology, and Punjab Biotechnology Incubator. The allocation for environment and ecology includes programmes by the Punjab State Pollution Control Board and PSCST, and excludes allocations for forestry<sup>19</sup> and wildlife preservation. However, the total allocation for this sector is miniscule. Data analysis for longer time period is required to make firmer conclusions.

<sup>18</sup> Punjab Development Report 2013

<sup>19</sup> Forestry and wildlife are included in the agriculture and allied sector

## 9. Working towards an Action Plan for Green Budgeting in Punjab

The process of developing these recommendations will be consultative and iterative, involving representatives from various departments of the government of Punjab and other stakeholders. As explained before, in order to ensure effectiveness of green budgeting, it is highly essential to adopt an ex-ante planning and then ex-post monitoring and evaluation of environmental expenditures and resulting outcomes.

Table 19 depicts department-wise priority issues and activities to be considered in green budgeting for Punjab based on a brainstorming exercise.

**Table 19:** Department-wise priority issues and activities to be considered in preparing green budget statements

No.	Departments	Priority issues to be considered for environmental sustainability	Activities around environmental sustainability				
			Programmes/ schemes	Research and development (information and data systems)	Act enforcement	Information education and communication (IEC)	Training and capacity building of department
1	Science, Technology and Environment	Overall role in encouraging green think among departments, bio-energy, air pollution, water pollution, waste management, research and development for environmental issues (including pollution control and monitoring), renewable energy, fuel switching (from fossil fuel based to clean/ renewable), recycling technologies, waste-to-energy, environment education and awareness, promoting eco-drives, wet-land preservation, awareness regarding carbon credits and climate change	✓	✓	✓	✓	✓
2	Finance	Overall role in encouraging green think among departments. Issuing pro-forma and guidelines for green budget statement.					✓
3	Planning	Overall role in encouraging green think among departments					✓
4	Agriculture	Crop diversification, address paddy straw burning, input use (pesticide and fertilizer), groundwater, resource conservation, soil erosion, horticulture, fuel switching (from fossil fuel based to clean/	✓	✓	✓	✓	✓

No.	Departments	Priority issues to be considered for environmental sustainability	Activities around environmental sustainability				
			Programmes/ schemes	Research and development (information and data systems)	Act enforcement	Information education and communication (IEC)	Training and capacity building of department
		renewable), farmer training, climate change and adaptation, agro-forestry, reduce paddy cultivation, reduce area under rice cultivation					
5	Forest & Wild Life Preservation	Increase green cover as per state forest policy, biodiversity conservation, soil erosion, rainwater harvesting and recharging (including in Kandi areas), crop diversification (including non-timber forest produce), tree plantation, agro-forestry, wet-land preservation, eco-sensitive zone around sanctuaries, enforcement of Act to deter the wildlife offenders	✓	✓	✓	✓	✓
6	Health & Family Welfare	Climate change and adaptation infrastructure, research on environment and health,	✓	✓		✓	✓
7	Housing and Urban Development	Waste management, recycling, energy efficiency, water efficiency, solid waste management and sewage treatment	✓	✓	✓	✓	✓
8	Information & Public Relation	Awareness programmes on environmental sustainability, encouraging sustainable consumption, environment education and awareness, promoting eco-drives	✓	✓		✓	✓
9	Local Government	Awareness programmes on environmental sustainability, encouraging sustainable consumption, farmer training				✓	✓
10	Power	Bio-energy, demand side management, increase use of CFL, renewable energy (including decentralized electrification using renewable energy), fuel switching (from fossil fuel based to clean/ renewable)	✓	✓	✓	✓	✓
11	Rural development and Panchayat	Crop residue management (collection through MG-NREGS), address soil erosion, soil preservation, rainwater harvesting, farmer training, roadside plantation, agro-forestry, village pond cleaning and maintenance	✓	✓	✓	✓	✓

No.	Departments	Priority issues to be considered for environmental sustainability	Activities around environmental sustainability				
			Programmes/ schemes	Research and development (information and data systems)	Act enforcement	Information education and communication (IEC)	Training and capacity building of department
12	Tourism and Cultural Affairs	Eco-tourism, sustainable consumption, waste management, tree plantation in tourist spots	✓			✓	✓
13	Animal Husbandry, Dairy Development & Fisheries	Dung management, crop residue management (use of wheat straw), waste to energy, Crop diversification activities	✓	✓	✓	✓	✓
14	Cooperation	Crop diversification activities, social enterprises around paddy straw, strengthening allied sectors for crop diversification, farmer training	✓			✓	✓
15	Industry & Commerce	Develop industry in green technologies (including biotechnology), encourage public-private cooperation for environmental sustainability, encourage green R&D in industry and business, green products, steps to reduce pollution (promote APCDs and ETPs)	✓	✓		✓	✓
16	Information Technology	Public sensitization on environmental sustainability through ICT	✓			✓	✓
17	Irrigation	Groundwater, resource conservation, clean energy based pump-sets, rain water harvesting, flood control and management of water logging	✓		✓	✓	✓
18	Printing and Stationary	Resource conservation and sustainable consumption, sustainable procurement, recycle	✓			✓	✓
19	Public works	Green buildings, energy efficiency, water efficiency	✓			✓	✓
20	School Education	Education on environment through school curriculum, environment education and awareness, promoting eco-drives	✓			✓	✓
21	Technical Education and Industrial Training	Training on environment through programmes, farmer training for sustainable resource management	✓			✓	✓
22	Transport	Public transport, fuel efficiency, fuel-switching (including encouraging CNG), pollution control, implementing emission standards, education regarding sustainable consumption, clean fuel technologies	✓		✓	✓	✓

No.	Departments	Priority issues to be considered for environmental sustainability	Activities around environmental sustainability				
			Programmes/ schemes	Research and development (information and data systems)	Act enforcement	Information education and communication (IEC)	Training and capacity building of department
23	Water Supply and Sanitation	Water quality, improve sanitation, solid waste management and sewage treatment, bio-energy	✓			✓	✓
24	Soil and Water Conservation	Water conservation, improve soil quality, water harvesting	✓	✓	✓	✓	✓
25	Civil Aviation	To be deliberated with department/ experts in subsequent phase					✓
26	Defense Welfare Services	To be deliberated with department/ experts in subsequent phase					✓
27	Employment Generation and Training	To be deliberated with department/ experts in subsequent phase					✓
28	Governance Reforms	To be deliberated with department/ experts in subsequent phase					✓
29	Investment Promotion Department	To be deliberated with department/ experts in subsequent phase					✓
30	Labour	To be deliberated with department/ experts in subsequent phase					✓
31	NRI Affairs	To be deliberated with department/ experts in subsequent phase					✓
32	Personnel	To be deliberated with department/ experts in subsequent phase					✓
33	Program Implementation	To be deliberated with department/ experts in subsequent phase					✓
34	Removal of Grievance	To be deliberated with department/ experts in subsequent phase					✓
35	Sports and Youth Services	To be deliberated with department/ experts in subsequent phase					✓
36	Vigilance	To be deliberated with department/ experts in subsequent phase					✓
37	Welfare of Schedule Caste & Backward Classes	To be deliberated with department/ experts in subsequent phase					✓
38	Elections	To be deliberated with department/ experts in subsequent phase					✓

No.	Departments	Priority issues to be considered for environmental sustainability	Activities around environmental sustainability				
			Programmes/ schemes	Research and development (information and data systems)	Act enforcement	Information education and communication (IEC)	Training and capacity building of department
39	Excise and Taxation	To be deliberated with department/ experts in subsequent phase					✓
40	Food and Civil Supplies	To be deliberated with department/ experts in subsequent phase					✓
41	General Administration	To be deliberated with department/ experts in subsequent phase					✓
42	Grievance Cell	To be deliberated with department/ experts in subsequent phase					✓
43	Home Affairs and Justice	To be deliberated with department/ experts in subsequent phase					✓
44	Legal and Legislative Affairs	To be deliberated with department/ experts in subsequent phase					✓
45	Medical Education and Research	To be deliberated with department/ experts in subsequent phase					✓
46	Parliamentary Affairs	To be deliberated with department/ experts in subsequent phase					✓
47	Revenue and Rehabilitation	To be deliberated with department/ experts in subsequent phase					✓
48	Social Security & Development of Women & Child	To be deliberated with department/ experts in subsequent phase					✓
<p><b>Note:</b> List of departments obtained from <a href="http://www.punjabgovt.gov.in/">http://www.punjabgovt.gov.in/</a> ; Added Department of Soil and Water Conservation</p>							
		Shaded cell denotes departments/ agencies that could play a role in coordination for developing green budget statements					

Developing green budget statements for Punjab will include the following steps:

**Step 1:** Identify key departments concerned with environmental sustainability based on priority areas to address environmental issues in Punjab (see 1-24 in Table 18). These departments will participate in preparing Green Budget Statement FY 2015-16.

**Step 2:** A capacity building process will enable the departments to identify budget heads based on the gender budgeting process in India. From the visits in March 2014 (see Annexure 3), departments were supportive of the idea of green budgeting but need further capacity building to enable them to prepare Green Budget Statements.

**Step 3:** Draft guidelines and pro-forma will be developed by the identified departments facilitated by PSCST and TERI. The guidelines will help in identifying budget heads – PART A – which reflects schemes where the allocations for environmental sustainability constitute 100% of the provision. The following template can be followed.

Budget head	Relevance for environmental sustainability	Amount allocated		
		Plan	Non-Plan	Total

Given below is an illustration for Part A (100% provision for environmental sustainability for Punjab). The source is the document “Detailed Estimates of Expenditure on Plan Schemes, Government of Punjab for the Year 2013–2014”

**Box 7:** Example of budget head where 100% provision for environmental sustainability

**Sector:** (C) Economic Services

**Sub-sector:** (a) Agriculture and Allied Activities

**Major Head:** 2402 Soil and Water Conservation

**Head of Department:** Chief Conservator of Soils, Punjab

Sr No	Minor head/ sub-head	(In INR '000)
1.	Scheme for soil and water conservation on watershed areas in Kandionon-project area	1,35,00
2.	Scheme for harvesting of rain water/base flow for groundwater recharge and lifesaving irrigation in rain-fed area	1,80,00
3.	Centrally sponsored micro-management work plan for Soil Conservation Departments scheme 100%	40,00
4.	Centrally sponsored macro management work plan for Soil Conservation Department	1,00
5.	Restoring the capacity of existing water harvesting structures and construction of new water harvesting structures	7,52
6.	Centrally sponsored scheme for national mission on micro irrigation	3,55,00
7.	Scheme for soil and water conservation on watershed areas in Kandionon-project Area	1,42,50
8.	Provision for Machinery Division at HQ	50,00
9.	Project for promotion of micro irrigation in the state NABARD Assistance (95:5) (RIDF XIII)	1,00
10.	Scheme for rain water harvesting in the state	1,90,00
11.	Scheme for strengthening of State Land Use Board (SLUB)	35,00
12.	Assistance to farmers for underground pipe system (UGPS) to promote farm water conservation	14,25,00
13.	Project promotion of micro irrigation in the Punjab (RIDFXVI)(NABARD)(95:5)	1,00
14.	Project on judicious use of available water and harvesting of rainwater for enhancing irrigation potential in Punjab (RIDF-17((NABARD)(95:5)	45,60,00
15.	Community micro irrigation project in Kandi belt of Talwara and Hajipur blocks of District Hoshiarpur ( NABARDRIDF-18)	12,00,80
16.	Scheme for construction of check dams and gabion structures in Talwara of Hoshiarpur district	11,36,20
17.	<i>Special component plan for scheduled castes</i>	6,63,70
	<b>Soil and water conservation</b>	<b>1,09,62,00</b>
Accounts (2011–12)		
Budget estimates (2013–14)		

**Note:** This is a sample plan expenditure for Soil and Water Conservation. With inputs from the Planning Department and Finance Department, a pro-forma will need to be developed subsequently.

A sample Plan expenditure for ‘Soil and Water Conservation’ is illustrated in box 7. Also the guidelines will aim to help identify budget heads – PART B – which reflects schemes where the allocations for environmental sustainability constitute at least 30% of the provision. The guidelines will have to developed with further inputs from the departments in Step 2.

Budget head	Relevance for environmental sustainability	Amount allocated		
		Plan	Non-Plan	Total

Step 2 will further help to refine the above table based on the current budget statement formats prepared by the departments.

**Step 4:** Consolidate and submit for review by Department of Finance and finalize guidelines and pro-forma.

**Step 5:** Department of Finance issues a circular to identified departments for submitting a separate Green Budget in accordance with guidelines and pro-forma.

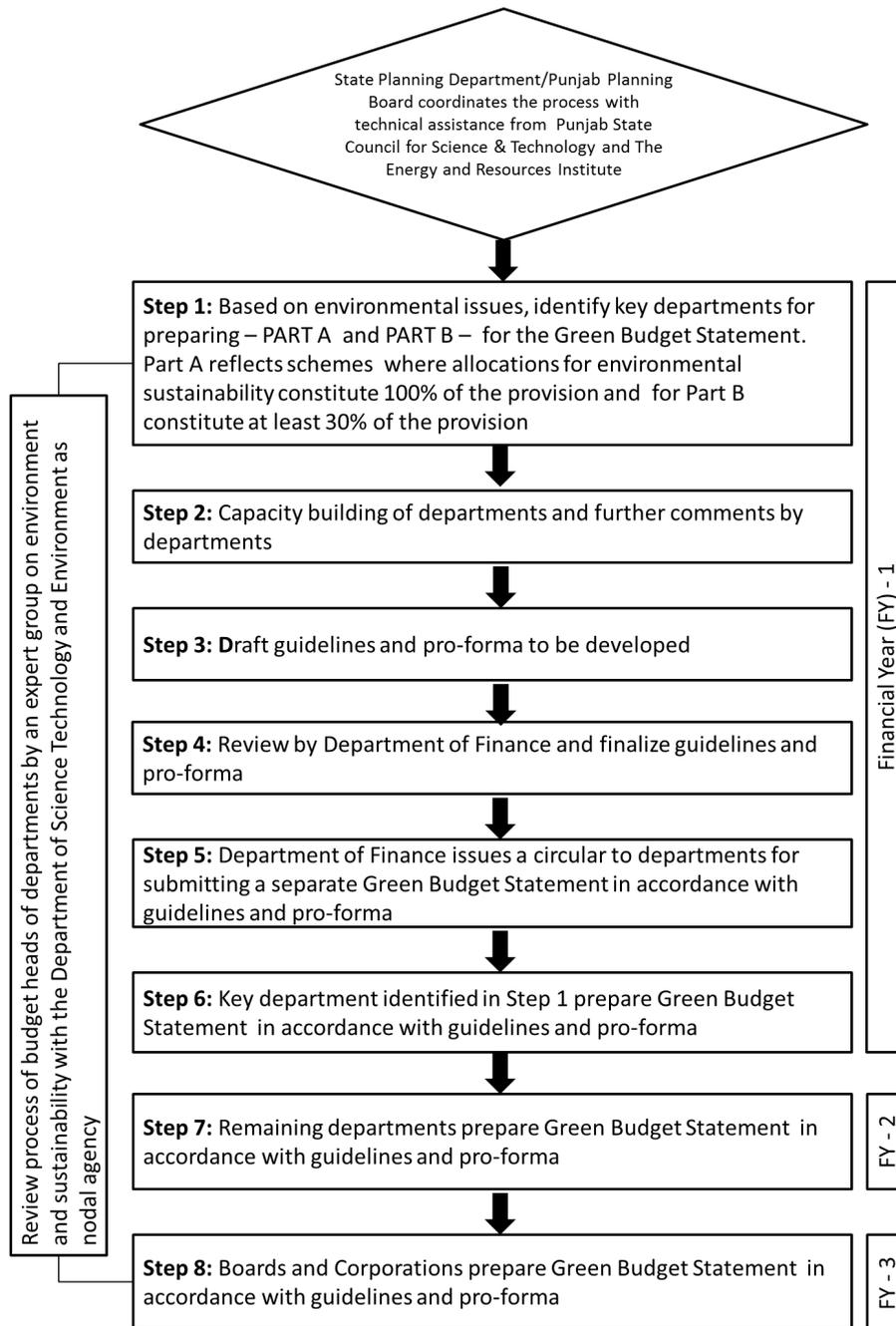
**Step 6:** Key departments identified in Step 1 prepare Green Budget Statement that will be submitted with the Budget statements.

**Step 7:** Other departments prepare Green Budget Statement that will be submitted with the Budget statements.

**Step 8:** Any other Boards and Corporation prepare Green Budget Statement that will be submitted with the Budget statements.

The process is explained in a schematic diagram (Figure 12).

**Figure 12:** Flow chart for Action Plan for Green Budgeting in Punjab



## 10. Policy recommendations

The study brings out that public finance tools such as fiscal stimulus packages have not been applied to enhance finance in sectors around environmental sustainability until now in India (TERI-NCSC-CUFE-ZU-UNDP 2014). Given that Indian stakeholders<sup>20</sup> attach importance to public finance (including measures such as subsidies) – in a limited fiscal space, it is essential that the government through measures in the public finance space sends signals to other actors. In this context green budgeting could prove to be an important initiative within the existing fiscal space.

The present study also recommends that a review process of budget heads of departments by an expert group on environment and sustainability with the Department of Science, Technology and Environment as nodal agency may be initiated.

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<sup>20</sup> Preliminary findings based on questionnaire based needs assessment as a part of TERI India low carbon development study (supported by UNDP and Shakti Sustainable Energy Foundation); see - <http://www.teriin.org/projects/loci/>

## Annexures

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**Annexure 1:** Concept note and agenda for workshop on Action Plan for Green Budgeting for Punjab held on January 30, 2014

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The Energy and Resources Institute

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## Workshop on Action Plan for Green Budgeting for Punjab

Green budgeting is a philosophy and approach which can transform budgeting exercises into more effective mechanisms of sustainable development so that economic, social and environmental aspects are duly considered. This results in policy signals from the government to the entire spectrum of actors who would play a key role in sustainable development activities. The objective of the project titled, “Action Plan for Green Budget for Punjab” is to give an overview of key issues and trends around green budget indicators. The project is a first step which would lead towards preparation of an action plan in consultation with stakeholders in the state.

With the above background, the Punjab State Council for Science and Technology (PSCST) and The Energy and Resources Institute (TERI) organized a one day stakeholder consultation in Chandigarh. The discussion during the event will be centered around the

questions: (1) What are the key issues around environmental sustainability and sustainable development in Punjab? (2) What are the current budgetary provisions and processes available to address the concerns around sustainability? (3) How can current processes in budget planning consider the interventions around environmental sustainability? (4) What priority areas can be considered in the green budgeting process? (5) How can such an action plan be inspired by models around the world and similar processes in India?

The Agenda for the workshop is mentioned below.

**Date:** 30 January 2014 (Thursday)

**Venue:** Punjab State Council for Science and Technology (PSCST)

**Time:** 10 AM to 4:30 PM

**Agenda**

10:00 AM – 10:30 AM	Registration and refreshments
10:30 AM – 10:40 AM	Welcome by PSCST and TERI
10:40 AM – 11:10 AM	Presentation by TERI study team
11:10 AM – 11:30 AM	Question and answers
11:30 AM – 1:00 PM	Participatory exercise for priorities
1:00 PM – 2:00 PM	Lunch
2:00 PM – 2:30 PM	Presentation and discussion on participatory exercise
2:30 PM – 4:00 PM	Round-table discussion
4:00 PM – 4:15 PM	Summing up
4:15 PM – 4:30 PM	Vote of thanks

## Annexure 2: Participants in the Brainstorming Session held on January 30, 2014

No.	Name	Designation	Organisation
1	Dr. S. S. Ladhar	Additional Director	PSCST
2	Mr. Davinder Singh	Director - ACC (F&A)	State Transport Punjab, Chandigarh
3	Er. M. L. Bansal	Executive Engineer - Punjab Irrigation	Punjab Irrigation Dept. Chandigarh
4	Er. Veenakshi	Executive Engineer	Dept. of WS & S
5	Dr. Jasvir Singh	Dy. Director	Punjab Forest Dept.
6	Er. Baljinder Singh	SCO (Planning),	Dept. of Soil and Water Conservation
7	Dr. S. S. Bains	Consultant	Punjab State Farmers Commission
8	Dr. Rita Pandey	Professor	NIPFP, New Delhi
9	Mr. Anupam	Research Officer (Planning)	Local Government Punjab
10	Dr. Shersingh	Executive Engineer	Punjab Irrigation
11	Mr. Narinder Singh	Superintendent	Tourism Punjab
12	Mr. Rakesh Sharma	AC (F&A)	Treasury & A/cs Punjab, Chandigarh
13	Dr. Sonia Chaman	Assistant Professor Biotechnology	SGGS College, Chandigarh
14	Er. I. S. Sandhu	General Manager	Punjab Roadways (State Transport Punjab)
15	Dr. Preeti Singh	Sr. Executive, Dept. of Animal Husbandry	Punjab Livestock Development Board
16	Dr. K. P. S. Pasricha	Veterinary Officer	Dept. Of Animal Husbandry
17	Mr. Atul Thakur	Junior Engineer	DWSS, CCDU
18	Mr. Gulab Singh Gill	Assistant Director - Horticulture	Horticulture Dept.
19	Mr. Praveen Kumar	Conservator of Forest and Wildlife, Punjab	Punjab Forest Dept.
20	Mr. D. S. Sondhi	Section Officer	Health of Family Welfare, Punjab
21	Dr. S. Soodh	Director, School of Energy Studies	Punjab Agriculture University, Ludhiana
22	Er. R. Soni	Professor	Punjab Agriculture University, Ludhiana
23	Dr. K. P. S. Pasricha	Sr. E O	Dept. of Animal Husbandry
24	Mr. Kuldip Singh Banwait	Deputy Controller (Finance & Accounts)	Local Government, Punjab
25	Mr. S. K. Goyal	Senior Environment Engineer	Punjab Pollution Control Board, Patiala
26	Mr. Sandeep	ACFA	Industries & Commercial
27	Mr. Gurpreet Singh	ACFA	Industries & Commercial
28	Mr. Upreet Grewal	Senior Project Officer	PSEB
29	Mr. S. S. Kalsi	Senior Assistant	Director of Land, Punjab, Chandigarh
30	Mr. Aseem K Sharma	DCF	Punjab Forest Dept.
31	Mr. Anand Gupta	Subject Expert - Chemistry	SCSE, Punjab, Chandigarh
32	Mr. B. R. Gambhir	Dy. Controller - Finance & Accounts (Rtd.)	Finance
33	Mr. Garima Prabhaker	Lecturer, Chemistry, SISE, Punjab	State Institute of Science Education
34	Dr. Sunil	Scientist 'C'	CGWB, NWR, Chandigarh
35	Dr. Suman Mor	Assistant Professor	Punjab Univeristy
36	Dr. Navpreet	Asst. Professor	Dept. Of Community Medicine
37	Dr. Ravinder Khaiwal	Assistant Prof. of Environment Health	School of Public Health, Chandigarh
38	Dr. Anil Sood	Head, Agro-Ecosystems and Crop Modelling	Punjab Remote Scanning Centre
39	Mr. Baljeet	Subject Expert	SCERT

**Annexure 3: Department Summary from visits in March 28–29, 2014**

No.	Department	General impression of green budgeting	Relevance of activities to environmental sustainability	Issues flagged
1	Punjab Energy and Development Agency (PEDA)	Feels that since their schemes aim at promoting renewable energy, they are already undertaking activities for environment protection	Government intends to add new and renewable energy generation capacity of 100 MW by the year 2020; aims to maximize and improve the share of new and renewable sources of energy to 10% of the total installed power capacity in the state by 2022.	Only 5% of the installed capacity is renewable energy based in comparison to 13% of the national average.
2	Department of Finance	Quite supportive and understands the need for incorporating green budgeting measures	Allocation of funds to the relevant departments helps in carrying out schemes and policies for environmental conservation	--
3	Department of Planning	Interested in the subject but feels that to incorporate green thinking, all departments need to make inter-budget adjustments	Proper funds in accounting heads of each department can be earmarked for planning, monitoring and evaluation of environment activities	“Pollution generating” factors need to be looked at and strict laws for environment needs to be enforced.
4	Department of Irrigation	Not very well versed with the subject; capacity building needed	Activities like use of treated sewage water of cities/towns for irrigation and use of solar power for agricultural pumps	The canal irrigated area in Punjab has declined from 16.6 lakh hectares in 1990–91 to 11.13 lakh hectares in 2010–11 primarily due to decrease in surface water availability and poor maintenance of the canal system. There is over exploitation of groundwater resources in the central region as indicated by the alarming decline in groundwater levels.
5	Department of Agriculture	Understands the problem that is plaguing agriculture and do realize the need for green budgeting measures	The over dependence on wheat and rice and intensive use of farm land with more than 200% cropping intensity have led to a crisis in terms of over exploitation of natural resources, viz., soil and ground water. Greening the agriculture sector would result in long-term sustainability of agriculture in the state.	Predominant rice–wheat system in Punjab has resulted in rapid depletion of groundwater. Rice straw burning is another issue that needs immediate attention.
6	Department of Horticulture	Very supportive of the idea of green budgeting	Horticulture should get high priority to improve farm economy and promote crop diversification.	Infrastructure and markets to encourage cultivation of vegetable; horticulture plants should be promoted.

7	Department of Soil and Water Conservation	Very supportive of the idea of green budgeting	Groundwater quality and quantity was recognized as a key environmental intervention that was required in Punjab	Lack of timely and sufficient funds have caused a big lag in delivering much needed outputs. Also fund availability for soil and water conservation activities need to increase.
8	Local Government	Supportive of the idea of green budgeting and willing to cooperate	Local government office can play an important role in enhancing the sustainability aspect of municipal corporations as it releases the funds to them.	Solid waste management is one issue they specified.
9	Forest Department	Very supportive of the idea of green budgeting	The department has a key role in maintaining the forest cover. Moreover, forests provide many ecosystem services apart from economic benefits.	Apart from the key environmental issues listed in the 'Guidance Sheet', the following issues were highlighted: Pollution of natural rivers, wetlands and wildlife and agroforestry. Convergence activities in terms of fund release between state departments needs to be smoothened.
10	Department of Rural Development	Supportive of the idea of green budgeting but needs further capacity building	Since majority of the population of Punjab resides in rural areas, the potential and scope of bringing a change lies in rural development and natural resource management.	-

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## Notes

# ACTION PLAN FOR GREEN BUDGETING IN PUNJAB

## Concepts, Rationale and Ways Forward

Mainstreaming environmental sustainability in development processes becomes important for realizing sustainable development. “Green budgeting” is a specific tool which involves preparing separate environment budget statements while preparing annual budgets – state budgets in this case. Preparing green budget statements can be an opportunity to encourage proactive mind-sets among government departments regarding environmental sustainability. Green budgeting process can also send signals to other actors in the economy including citizens and industry. This document is meant to facilitate a process through which Punjab government officials can develop an Action Plan for Green Budgeting for the state of Punjab.

