

❖ **The Punjab Water Mission**

1. State Water Policy to be drafted to undertake an integrated water resource management at a basin level within the state for conserving water, minimizing wastage and for ensuring equitable distribution of the resource.
2. Undertake a focused approach to augment ground water especially in problematic/over exploited areas taking advantage of continued projection of excess rainfall with respect to base line scenario.
3. Enhance water use efficiency by at least 20% with respect to the present.
4. Augment surface water resources to accommodate excess rainfall and runoff projected for mid-century.
5. Manage floods in a future erratic and excess extreme rain fall scenario.
6. Abate continued pollution of underground and surface water sources which is likely to increase due to increase in industries and population.
7. Establish adequate institutional support for efficient water resource augmentation, conservation, distribution and governance through development of basin level Integrated Water Management plans.
8. Promote Research and monitoring activities for effective decision making.

❖ **Punjab Mission on Sustainable Agriculture**

• **Agriculture and Horticulture Crops**

1. Promote crop diversification in the state as per the suitability of production in its different agroclimatic zones and take advantage of efficiency of C3 vs C4 crops in the enhanced CO₂ environment
2. Sustainably manage agriculture crop residue to avoid the ill effects of on farm burning of crop residue in Punjab and benefit from management of the same.
3. Promote resource conservation of soil, water and energy.
4. Formulate Agriculture Market Intelligence Cell within the Department of Agriculture in order to adjust the production systems each year which have to be aligned according to the variable climate as well as to the demands of the markets after meeting the basic demand of food security of the state.
5. Develop cultivars and enhance germplasm base that are (a) thermal resistant, (b) can withstand water stress, (c) Can grow in water logged areas, (d) withstand emerging pests and diseases and (e) withstand enhanced levels of CO₂.
6. Manage new and emerging pests, diseases and weeds in crops.
7. Diversify into value addition activities to avoid waste of agriculture produce and increase storage capacity of grains to ensure farmer incomes in a changing climate scenario.

8. Promote cooperative farming amongst marginal, small and medium farm land owners to reduce input costs, and maximize productivity and farm incomes and hence ensure livelihood security and income for farmers.
9. Manage Climate Risk through insurance and by assessing the socio economic impacts of Climate change on Agriculture

- **Livestock**

10. Manage heat stress and ensure sustainable productivity of livestock in a climate change scenario.
11. Recover energy from livestock waste
12. Manage livestock health in the emerging pest and disease scenario.
13. Ensure adequate feed for livestock – green fodder.
14. Ensure cover for Climate Risk to livestock.

- **Fisheries**

1. Ensure sustainable production of Fish in the state to withstand the impacts of climate change and ensure livelihood security of people dependent on this sector
2. Renovation/rehabilitation of village ponds and development of new ponds/tanks in saline affected waterlogged land in the south-western districts of Punjab.
3. Develop Saline affected waterlogged area in the south-west districts of Punjab to make fisheries to grow there and become a major livelihood activity for the farmers.
4. Assess impacts of climate change on fisheries in Punjab.
5. Determine the hydrological and physico-chemical characteristics of water bodies and correlate them with fish productivity.
6. Supply of quality fish seed for table fish production.
7. Develop information and knowledge base vis a vis measures for water conservation, water use efficiency and disseminate the same amongst farmers.

- ❖ **Green Punjab Mission**

1. Add at least 8.13% more area under forest and tree cover by 2022 to the existing area bringing the total area under forest and tree cover in the state to 15% of its total geographical area leading to additional CO₂ sequestration over and above the current base line.

2. Enhance forest density in the Shivaliks. The aim is to improve green cover in the degraded forest area in this region by the end of 2020 and stabilise Shivalik tracts to prevent soil degradation, avoid unsustainable agriculture and empower communities enabling them to undertake diversified income generation activities.
3. Undertake capacity building activities to integrate scientific principles of forest management in working plans and management plans.
4. Strengthen biodiversity conservation measures in the forests.

❖ **Punjab mission on Sustaining Himalayan Ecosystems**

- **To understand the response of Himalayan glaciers to climate change and Protect, Preserve & Conserve Biodiversity of Shivalik Forests**

1. Undertake micro level assessment, analyse remote sensing data, undertake perspective planning and address livelihood issues.
2. Conserve existing forest resources and plantations through natural and artificial regeneration in degraded areas and also conserve soil and moisture in these areas
3. Analyse satellite maps at regular intervals to keep a check on the progress of the mission. Undertake insitu studies to check status of biodiversity of forest vegetation type, crops, wetlands, forest cover-density, soil Carbon, etc.
4. Continue maintenance of biodiversity registers by the communities.

- **Wetlands**

1. Conserve natural wetlands to enhance the capacity of wetlands to withstand the impacts of climate change by involving the communities. It is proposed to set up an Interpretation Centre on wetlands.
2. Continue conservation of manmade wetlands that include Ramsar sites and also nationally important wetlands by involving the communities.

- **Crop Biodiversity**

1. Promote crop diversification in Shivaliks by promoting indigenous crops having significant commercial value.
2. Support soil and water conservation activities in these areas.

❖ **Punjab mission on Sustainable habitat**

- **Mission on Sustainable Habitats- Avert heat island effect and promote self-sustainability in cities**

1. Develop policy and implement mandatory pursuance of ECBC norms for climate proofing building envelopes of both old and new commercial, public and residential buildings in cities.
2. All housing programmes/schemes of the government for the EWS's to make provision for compulsory inclusion of building designs with ECBC/GRIHA norms to protect this section from extreme heat and also to introduce energy efficiency in their houses.
3. Undertake capacity building/training activities for architects, builders, residence owners and other stakeholders including suppliers of material for making them aware about material to use for reducing energy absorption capacities of envelop of buildings.
4. Develop incentives for retrofitting building envelopes – subsidy in building material such as glasses, roof covering material, wall coatings.
5. Promote higher share of renewables in total energy consumed (e.g. solar, recycle waste, wind) in cities in its residential, commercial areas and public utilities.

- **Mission on Sustainable Habitats- Protecting habitats from extreme rainfall and ensuing floods**

1. Undertake a study to analyse the likelihood of recurrence of extreme events and their intensities
2. Reduce surface run off in urban areas by increasing infiltration.
3. Assess and address deficit in drainage system.
4. Increase drainage capacities of existing storm water drainage systems in towns in the flood plains.
5. Ensure mechanisms to separate sewer and storm water drainage.

- **Mission on Sustainable Habitats- Contain pollution in river water and air pollution in urban areas in a warming scenario**

1. Devise policy to ensure enough water flows at various check points to reduce the enhanced pollutant loadings with warming of river water in the river systems.
2. Revise, if necessary, the standard levels of pollutants that can be released from the industrial and domestic waste water discharges in order to make rivers less polluted in a climate change scenario.
3. Ensure cleaner air in a climate change scenario by assessing the saturation concentrations of air pollutants at higher temperatures, develop revised

standards for air pollutant in order for it to be safe for breathing, strengthen air quality monitoring protocol, assess the requirement and Deploy APCDs.

- **Mission on Sustainable Habitats - Ensure human health security vis a vis impacts of climate change**

1. Punjab IDSP to cover all medical health units including rural health centres, government and private hospitals and private clinics in all urban centres.
2. Create a State programme on heat and cold stress management in line with the other national programmes such as the National vector borne disease programme, Revised National TB programme, etc.
3. Develop capacities to generate short, medium and long term climate forecasts and different diseases occurrence probabilities keeping in view the topography and land use.

- **Mission on Sustainable Habitats – Developing sustainable Transport systems**

1. Policy shift to integrated public transport system as per the National Transport Policy, 2006
 - Extend Metro to 4 cities (Amritsar, Jalandhar, Ludhiana and Mohali) and provide Integrated feeder bus services to and from the proposed metro stations
 - Enhance density of public bus transport system
 - Create additional parking spaces based on projected passenger vehicle density by 2030s
 - Decongest roads by building separate tracks for non motorised transport.
2. Reduce congestion, improve operational efficiency, reduce noise and air pollution by Introducing intelligent traffic management systems
 - Develop real time passenger information systems
 - Install dynamic traffic lights that can operate on the basis of level of congestion on the roads at different times of the day and hence can divert traffic in advance and can adjust times for stopping traffic at signals according to the traffic flow.
3. Promote low C Transport system
 - Develop a fast moving freight corridor between the industrial towns of Punjab (Amritsar, Ludhiana and Jalandhar) to connect to the dedicated rail freight corridor being constructed linking Ludhiana to Kolkata in the east and Mumbai in the west.

- Introduce battery operated/SPV operated/ alternate fuel operated small bus services to travel small distances
 - Raise awareness about better driving practices and maintenance of trucks to enhance fuel efficiency
 - Promote car free days in different zones
 - Declare markets and heritage areas as no fossil fuel driven vehicle zones.
4. Enhance fuel efficiency and reduce emissions from transport sector
- Replace 700 old buses of Punjab Roadways with engines that can accept fuel with latest EURO—IV norms
 - Conduct training on Bus Simulator and other infrastructure in all workshops
 - Raise awareness of better driving practices and maintenance of buses to enhance fuel efficiency

• **Mission on Sustainable Habitats – Avail energy from municipal solid waste**

1. Realize 20% of 100 MW energy generation potential from waste in Punjab by 2022.
2. About 10 solid wastes to energy plants of 2 MW each can be installed in Punjab depending on the degradable organic content available in each of the disposal sites.

❖ **Punjab Solar Mission**

1. Increase the share of solar Power in the grid electricity - Target: At least 4 % of GOI target of 20000 MW i.e. 800 MW.
2. Use unproductive land in the state to generate 300 MW of electricity using SPV in line with the Charnaka model of Gujarat.
3. Use of International Border (553 KM) to generate 9 MW of solar power using Solar Photo Voltaics.
4. Promote Roof Top Solar PV Power to generate 200 MW of power.
5. Develop solar cities.
6. Increase coverage of solar street lightening in rural areas putting 3000 solar lighting systems each year.
7. Provide incentive for solar thermal water heating system in Urban/Rural residences.

❖ **Punjab Mission on enhanced energy efficiency**

1. Achieve 15-20% energy efficiency in small and medium enterprises (SMEs).

2. Achieve energy efficiency of the order of 15-35% in buildings (Commercial & Institutional buildings such as hotels, malls and government buildings) based on ECBC/GRIHA norms.
3. Achieve energy efficiency in street lighting by replacing conventional street lights with LEDs.
4. Promote energy efficiency in consumer appliances.
5. Achieve 3-7% improvement in energy efficiency in large energy consumers not designated by BEE under PAT scheme such as food processing, Chemicals and Ceramics.
6. Create demand for energy efficient appliances, technologies and programs by educating the public and private sector on their options.
7. Conduct education and training of key stake holders on implementation of energy conservation measures, e-filing on annual reporting energy data and e-learning in consonance with BEE's mission on the Energy Conservation Act, 2001 and for monitoring and evaluation.

❖ **Punjab Mission on Strategic Knowledge**

1. Develop a Centre of Excellence in an existing R&D body to address all research and technology development and demonstration issues related to climate change. And establish a climate change cell within the government that will coordinate and provide policy guidance on climate change in the state.
2. Develop a deeper understanding of climate change issues by running new climate projections that are based on plausible developmental scenarios of Punjab in the future and carry out impact and vulnerability analysis in priority sectors.
3. Undertake Research and Development of new and innovative Climate Friendly Technologies.
4. Undertake technology demonstration, field implementation & extension.
5. Address IPR issues.
6. Manage, interpret and disseminate data and information.