

Fodder and pastures

The farms producing seed and planting material of fodder species at Tarbod, Panchmahal, Randapalli and Chipilima are being strengthened. Addressing shortfalls in fodder is an important measure for adapting to climate change.



Introducing green fodder crops helps farmers adapt to shortfalls of animal feed due to climate change

Biogas

The Odisha Renewable Energy Development Agency has installed domestic biogas plants throughout the state under the National Biogas and Manure Management Programme.



Producing biogas from manure helps reduce methane emissions

Forestry

Reforestation and afforestation

Afforestation initiatives to increase the carbon stock in the state have boosted sequestration of greenhouse gases. Planting trees and regenerating forests have also helped to reduce air pollution and prevent soil erosion, made forest ecosystems more resilient, and helped conserve biodiversity and sustain the livelihoods of forest fringe communities. To date 392,759 hectare have been reforested or afforested.



Forest plantations prevent soil erosion

Sustainable mangrove shelterbelt plantations

Mangrove plantations have been established to reduce the impact of natural disasters in coastal areas. The mangrove plantations also sequester CO₂. The Integrated Coastal Zone Management Project has restored mangroves on 138 hectare of river banks.



Mangrove plantations established as shelterbelts

Integrated development of wildlife habitats

Integrated development of wildlife habitats has facilitated conservation of biodiversity. National parks and sanctuaries have been protected and preserved.



Conservation of wildlife habitat protects biodiversity

Avenue plantations

Avenue plantations are being established across cities and along highways. The plantations trap and absorb air pollutants, and bestow aesthetic benefits.

Urban

Municipal solid waste management

Bhubaneswar Municipal Corporation collects, transports and dumps solid waste, sweeps roads and streets, and cuts bush. Cuttack Municipal Corporation has implemented its Integrated Municipal Solid Waste Management Project.

Water metering system

A water metering system has been introduced and has improved water governance by reducing non-revenue water loss.



Introducing water meters helps save water when water availability declines because of climate change

Bus rapid transit

Odisha State has introduced city bus services that have the potential to significantly reduce the use of private vehicles. The services help induce a shift to a bus rapid transit from more emissions-intensive private use of cars and other vehicles. The city buses result in mixed traffic speeds, which increase fuel efficiency and help improve air quality.

Energy efficient LED street lighting

The introduction of light emitting diode (LED) street lighting has improved visibility and safety at night, and has resulted in energy savings of 40%–80% and savings in maintenance costs of 50%–75%. To conserve energy, LED street lighting has been taken up in Bhubaneswar and will be taken up in all urban areas.



Low-carbon LED street lighting is a key part of smart city infrastructure and helps combat climate change

Water resources

Odisha Community Tank Management Project

The Odisha Community Tank Management Project improves agricultural productivity by renovating irrigation tanks and strengthening water users' associations to manage the tanks effectively.

Rooftop rainwater harvesting

Odisha State has initiated implementation of rooftop rainwater harvesting and groundwater recharge in urban areas.



Rainwater harvesting uses water that would otherwise run away into sewers or storm water drains

Pani Panchayat programmes

The Pani Panchayat Support Unit (PPSU), Command Area Development-Participatory Irrigation Management (CAD-PIM) Directorate and Water and Land Management Institute (WALMI) conduct awareness programmes on water issues such as efficient water management, rainwater harvesting, water conservation and water quality. The programme creates awareness of the key concepts and themes in water issues among the general public and farming community.



Launch of the Report on Implementation of Odisha Climate Change Action Plan by the Honourable Chief Minister, Odisha, on 28th May 2015

Odisha Climate Change Action Plan:

Progress in building resilience and mitigating emissions

The Odisha Climate Change Action Plan, launched in 2010, provides an overarching framework for the state response to climate change. The Action Plan identifies 11 sectors that are particularly vulnerable to climate change and require sector-specific response plans.

The Progress Report on Implementation of Odisha Climate Change Action Plan, May 2015, describes the measures taken to adapt to climate change and to mitigate its effects. This brochure describes a few of these measures from the different sectors.

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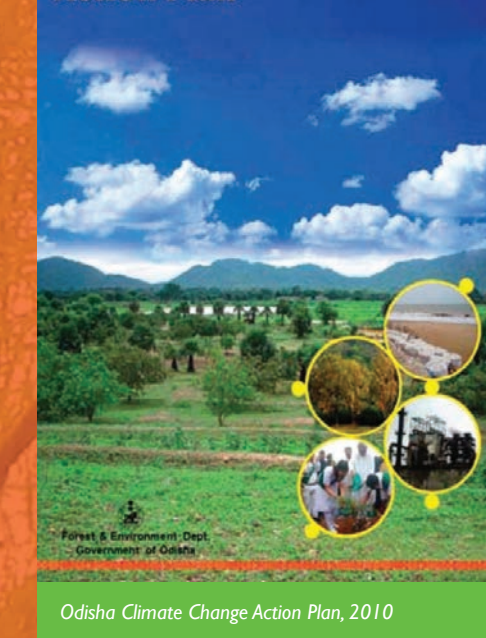


Government of Odisha

Anticipating the impacts of climate change

With temperatures expected to rise by 2° Celsius on average across India,¹ the Indian Network for Climate Change Assessment expects changes in climate to have a massive impact in many sectors. The Odisha Climate Change Action Plan provides an overarching framework for responding to the challenges that climate change poses. The Action Plan identifies 11 vulnerable sectors that require sector-specific plans.

Odisha Climate Change Action Plan



Odisha Climate Change Action Plan, 2010

¹ The Indian Network for Climate Change Assessment (INCCA) Report (2010)

Vulnerable sectors

The vulnerable sectors identified in the Action Plan are:

- Agriculture
- Coasts and Disasters
- Energy
- Fisheries and Animal Resources
- Forestry
- Health
- Industry
- Mining
- Transport
- Urban
- Water Resources

The 11 sector-specific plans identify 117 priority activities.

Progress

The Progress Report on Implementation of Odisha Climate Change Action Plan, May 2015, describes actions taken to date. The health, transport, industry and mining sectors allocate funds to other sectors for action on climate change and the report does not describe actions relating to these sectors separately.

Agriculture

Watershed Development Programme

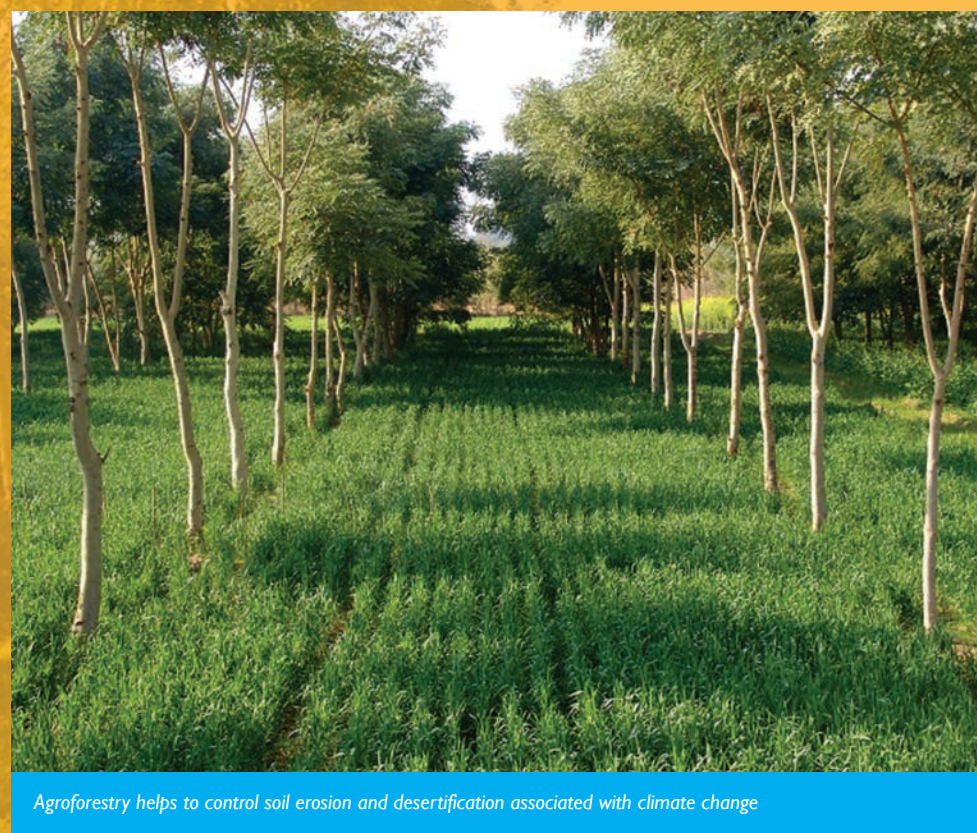
The Watershed Development Programme enhances groundwater recharge. By drawing on groundwater reserves, farmers can mitigate the effects of variable rainfall. Higher water tables reduce emissions. The area of watersheds developed under the programme is 98,328 hectare.



Plantations of perennial fruit trees enhance carbon stocks

Perennial fruit plantations

Plantations of perennial fruit trees have been established to enhance carbon stocks. The plantations also diversify income sources, helping farmers adapt to climate change, and enhancing nutrition security. Perennial fruit trees are relatively resistant to climate variability and change. Odisha State has piloted an initiative to encourage farmers to plant mango and guava in degraded areas. The area of perennial fruit plantations is 25,954 hectare.



Agroforestry helps to control soil erosion and desertification associated with climate change

Water-efficient micro-irrigation

Micro-irrigation saves substantial amounts of water and enhances productivity compared to flood irrigation. The water efficiency of drip irrigation is 90% or more. Micro-irrigation also reduces energy (electricity) use, weeds, soil erosion and cultivation costs. The area of micro-irrigation installed extends to 9458 hectare.

System of Rice Intensification (SRI)

The System of Rice Intensification involves sowing less seed, uses 30%–40% less water, and reduces pests and diseases. Emissions reductions of 2.94 tonnes CO₂

equivalent/hectare/year are possible for two crops of paddy rice a year. The area covered so far by the system is 4000 hectare out of a target of 10,000 hectare.

Agroforestry

Agroforestry improves soil structures by continuously adding organic matter from decomposed tree and shrub litter. Farming systems based on agroforestry raise farm incomes by improving and sustaining productivity. Agroforestry improves rural living standards by sustaining employment and incomes, and improves nutrition and health by upgrading the quality and diversity of food. During 2014–2015, farmers received 25 million saplings for planting on their farms.

Coasts and disasters

Geo-tube embankments

Geo-tubes made of high-grade polymer and filled with sand were placed to reinforce the erosion-hit Pentha embankment in Kendrapara District. The geo-tubes act as a protective barrier against tidal waves, check tidal ingress of seawater and prevent erosion of the embankment. Four lakh (400,000) people in 235 coastal villages will benefit.



Piloting the use of geo-tubes to reinforce the embankment at Pentha, Kendrapara District

Disaster risk reduction: response to Cyclone Phailin

Proactive management by the Government of Odisha meant that the state was well prepared to deal with Cyclone Phailin in 2013. In response to continuous updates from the India Meteorological Department, which tracked the path, intensity and magnitude of the cyclone, Odisha State launched a range of preparations to ensure zero casualties.



The Chief Minister reviews preparations for dealing with Cyclone Phailin



Construction of multi-purpose flood and cyclone shelter

In coastal areas, 365 multi-purpose cyclone shelters have been constructed and handed over to community-based cyclone shelter management and maintenance committees. The Odisha Integrated Coastal Zone Management Project is constructing 14 such shelters, each accommodating 1000 people. The shelters can withstand a wind velocity of 300 kilometre/hour and are equipped with basic amenities and communication devices such as satellite-phones, and ham and very high frequency radio sets.

Energy

Effective utilisation of fly ash

The energy sector continually facilitates initiatives to reduce the accumulation of fly ash and to optimise its use in manufacturing bricks, road-making and other activities.



Bricks manufactured with fly ash

Smart grid

The Odisha State Government has already begun setting up an ambitious smart grid power network in Chhatrapur and Gopalpur, towns in the Ganjam District.



Smart grid technologies will reduce greenhouse gas emissions by increasing efficiency and integrating renewable energy

Solar power

Odisha has made notable progress in maximising solar power generation. Initiatives include setting up solar power projects, determining a renewable purchase obligation for solar power and assessing the potential for solar power.



Solar array: zero emission power generation

Small and medium hydel plants

The Odisha Government announced a policy to promote the Small Hydro-Electricity Programme. The policy allows private sector investment. Three small hydroelectric plants with a total capacity of 57 megawatt were commissioned during the Eleventh Five-Year Plan 2007–2012.



Small and medium hydroelectric plants provide clean energy

Fisheries and animal resources

Alternative fishery activities and livelihood options

Alternative fishery activities introduced in Odisha include composite fish culture, polyculture (freshwater fish, freshwater prawn) and rearing fish seed (fingerlings). Allied fishery activities promoted as livelihood options included hygienic fish drying (both sun drying and solar drying), adding value to fish and fisheries products, and producing fish and prawn pickle and powder.



Farming crabs helps fishing communities adapt to climate change

Hardy animals

In southwestern Odisha, hardy animals that can withstand prolonged dry spells have been introduced.



Hardy local species are better adapted to climate variability and help farmers cope with climate change