

Ex-Ante Evaluation (for Japanese ODA Loan)

South Asia Division 1, South Asia Department

Japan International Cooperation Agency

1. Name of the Project

Country: India

Project: Tamil Nadu Biodiversity Conservation and Greening Project for Climate Change Response

Loan Agreement: March 31, 2022

2. Background and Necessity of the Project

(1) Current State of and Issues of the Biodiversity and Forest Sector and the Priority of the Project in Tamil Nadu, India.

Eighty-five percent of India's land is said to be highly vulnerable to natural disasters (such as cyclones, floods, and landslide disasters), and there are concerns that such disasters may become more severe due to climate change. India is the third-largest generator of greenhouse gases, one of the causes of climate change, after China and the U.S., and is expected to emit more greenhouse gases as its economy grows (according to a 2015 announcement by the Indian government about its nationally determined contribution ("NDC") under the Paris Agreement).

On the other hand, India has diverse ecosystems thanks to its broad range of geography. These diverse ecosystems, as "ecosystem services," are benefits provided by nature and perform a wide range of functions that help mitigate and adapt to climate change, such as carbon storage, water recharge, soil erosion control, soil conservation, and flood mitigation. However, recently it is considered problematic that urbanization, population growth, rapid economic development, and other socio-economic changes have reduced the country's biodiversity, which is an important element for maintaining the diverse ecosystems (State of Environment Report, India 2015).

Under these circumstances, at the 26th Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP26), the government of India set an NDC target of creating forests that would absorb 2.5 to 3 billion tons of carbon dioxide from 2021 to 2030 and promised to cut its greenhouse gas emissions to net zero by 2070. In the Green India Mission established by the Ministry of Environment, Forest and Climate Change in 2014, the government also set a target of increasing ecosystem services, such as carbon storage and water recharge, covering ten million hectares over ten years

as climate change measures. In addition, in the Draft National Forest Policy 2018, the ministry set contribution to climate change mitigation and adaptation as one of the major goals of the country's forest and biodiversity regeneration and conservation activities to strengthen concrete efforts toward this end.

Tamil Nadu, a southern state of India with a population of about 72 million, is endowed with rich and diverse ecosystems owing to its 1,076-km coastline, 14.3% of the country's total coastline, and being home to one of the world's 36 biodiversity hotspots (regions with significant levels of biodiversity that are threatened by human habitation). These diverse ecosystems have provided local residents with a wide range of ecosystem service benefits, such as forest and marine resources, habitats for wildlife, and tourism resources.

In that state, a Japanese ODA loan project entitled the "Tamil Nadu Afforestation Project" (the loan agreement ("L/A") for the first phase was signed in FY1996, and that for the second phase in FY2004) was conducted to increase forest coverage. A subsequent Japanese ODA loan project, called the "Tamil Nadu Biodiversity Conservation and Greening Project" (the L/A was signed in FY2010; the "Previous Project") further increased forest coverage by planting trees outside forest areas and conserved biodiversity by improving wildlife habitats in sanctuaries and undertaking other activities. These projects helped lift the state's forest coverage from 13.1% in 1995 to 20.3% in 2019 (India State of Forest Report (ISFR) 1995 and 2019).

Although JICA's past assistance led to some achievements as shown above, the state's ecosystems keep deteriorating. Examples of such deterioration include excessive loads on forest resources brought by local residents' use of forest products and other resources to earn a living, the spread of highly fertile exotic plants (areas penetrated by exotic plants extend across about 3,000 square kilometers (Tamil Nadu Forest Department, 2019)), and a decrease in marine resources caused by increased fishing activities. In addition, the state has confirmed that more than 500 animal and plant species are on the brink of extinction (Tamil Nadu Department of Environment), coral bleaching is occurring (in 2010, about 10% of local coral reefs were bleached due to a rise in ocean temperatures (NABARD Consultancy Services Ltd., 2015)), seaweed beds are decreasing (Tamil Nadu Forest Department), as is mangrove coverage (in 2019, mangrove coverage fell about 8% from the 2017 level (ISFR 2017 and 2019)). Such ecosystem degradation also impacts on the local society and economy. For example, rapid economic development and urbanization (the state's urban

population ratio increased from 34.2% in 1991 to 48.5% in 2011 (the national censuses 1991 and 2011)) has brought human activity areas and wildlife habitats closer, causing increased friction between humans and wildlife (such as human deaths (an annual average of 60 deaths) and injuries, crop damage, and wildlife deaths (Tamil Nadu Forest Department)) and resultant annual compensation of INR 50 million (about JPY 76.5 million) for victims (Tamil Nadu Forest Department).

The emerging impacts of climate change have prompted the state to take action for the biodiversity and forest sector from the following perspectives. First, Tamil Nadu is committed to contributing to climate change adaptation. The state has experienced frequent and severe natural disasters caused by climate change, including landslides, droughts, heat waves, high tides, and floods, which have annually affected about 5,000 households over the last few years (Tamil Nadu State Disaster Management Authority, 2021). Since reducing such natural disaster risks is a pressing task, the state is working to control and reduce disasters not only by building artificial structures, but also by instigating biodiversity and forest conservation activities that also help build land resilience, such as soil erosion control, flood mitigation, and tide control. Second, the state is committed to helping mitigate climate change. Climate change seriously affects the entire world as well as India. Therefore, in line with the targets of the NDC and the Green India Mission mentioned above, the state government is also implementing the national policy by taking climate change mitigation measures such as regenerating and conserving forests (which absorb and store carbon dioxide), increasing production of sustainable forest products, and strengthening forest product supply chains.

Tamil Nadu has formulated concrete plans and strived to improve ecosystems and tackle climate change, which have made the state a role model in India. In the State Forest Policy 2018 (2018), the state government identified climate change measures through strong and resilient forests as one of its top priorities, and has shown its commitment to providing necessary resources to the Forest Department. In the Draft State Action Plan on Climate Change 2.0 (2019), the state government also demonstrated its commitment to climate change measures, including increasing forest coverage (mitigation and adaptation measures), strengthening biodiversity conservation efforts (adaptation measures), and improving the livelihoods and building the climate change capacity of residents who depend on forest resources (adaptation measures). Furthermore, in line with

the Draft State Action Plan on Climate Change 2.0 (2019), the state government launched the Tamil Nadu Climate Change Mission (2021) to implement an effective climate change strategy.

In line with the state's policies outlined above, the Tamil Nadu Biodiversity Conservation and Greening Project for Climate Change Response (the "Project") aims to take climate change measures (mitigation and adaptation) and improve local ecosystems in areas not targeted by the Previous Project, using proven methods tested in the Previous Project. To achieve this aim, the Project will conduct activities to conserve biodiversity, mitigate friction between humans and wildlife, strengthen forest product supply chains, improve livelihoods, and strengthen the organizational structure of the Forest Department. For this reason, the Project is considered an important project in the country's biodiversity and forest sector.

(2) Japan's and JICA's Cooperation Policy and Operations in the Biodiversity and Forest Sector

The Country Assistance Policy for India (March 2016), formulated by the Japanese government, sees "supporting sustainable and inclusive growth" as a priority area and shows the Japanese government's support for the biodiversity and forest sector in tackling environmental and climate change issues. The JICA Country Analysis Paper for India (March 2018) shows JICA's commitment to promoting cooperation in addressing environmental and climate change challenges, including forest and disaster management. The Project is therefore consistent with this policy and analysis. Additionally, at the G7 Cornwall Summit that took place in June 2021, the Japanese government promised to strengthen its support for a transition to a low-carbon society and climate change adaptation.

The Project will also help achieve some of the Sustainable Development Goals, namely: Goal 1 (eradication of poverty), Goal 13 (action against climate change), Goal 14 (sustainable development of marine resources, including coastal areas), and Goal 15 (promoting the sustainable use and management of terrestrial ecosystems, and biodiversity conservation). For this reason, JICA's support for implementing the Project is crucial.

(3) Other Donors' Activities

The World Bank provided financial assistance (a loan of about USD 15.36 million and a grant of about USD 8.14 million) to the Biodiversity Conservation and Rural Livelihoods Improvement Project (from 2011 to 2018), which aimed to

mainstream biodiversity conservation outcomes. In Tamil Nadu, a landscape conservation capacity-building program was provided to foresters and other officials.

In addition, the Global Environment Facility (GEF) helped India formulate its biodiversity conservation plan and action plan, and provided it with financial assistance (a grant of about USD 968,000) (from 1998 to 2008). In the Project for Conservation and Sustainable Use of the Gulf of Mannar Biosphere Reserve's Coastal Biodiversity (from 2001 to 2008), the GEF also helped establish the Gulf of Mannar Biosphere Reserve Trust, an organization promoting environmental understanding about the reserve.

3. Project Description

(1) Project Objective

The Project aims to take climate change measures (mitigation and adaptation) and improve ecosystems in Tamil Nadu by conducting activities to conserve biodiversity, mitigate friction between humans and wildlife, strengthen forest product supply chains, improve livelihoods, and reinforce the organizational structure of the Forest Department, thereby contributing to the state's sustainable socio-economic development.

(2) Project Site/Target Area

State of Tamil Nadu (with a population of about 72 million (2011))

(3) Project Components

- 1) Biodiversity conservation (including planting trees, developing mangrove forests, restoring coral reefs and seaweed beds, eliminating invasive alien species, conducting research, and raising the awareness of residents)
- 2) Human wildlife conflict measures (including developing corridors for wildlife, establishing barriers against wildlife, and taking other measures against animal damage)
- 3) Strengthen forest product supply chains (including conducting market research for forest products and creating a portal site for supply chain use)
- 4) Livelihood improvement activities (including providing vocational training to residents near forests, raising their awareness, and promoting ecotourism)
- 5) Management capacity development (including training its staff and conducting a pilot study on biodiversity)
- 6) Provide consulting services (including assisting with project management and monitoring, promoting cooperation with research institutes and other stakeholders, giving technical guidance to the Forest Department, and

supporting environmental and social considerations)

The Forest Department will select subprojects related to project components (1) to (4) that meet certain requirements, such as not negatively affecting local ecosystems or indigenous people, considering the requests of local residents who will actually be involved in the operation, maintenance, and management of the subprojects.

(4) Estimated Project Cost

14,083 million Yen (Japanese ODA loan: 10,535 million Yen)

(5) Schedule

March 2022 to July 2030 (101 months in total)

It is deemed to be completed once all the activities are completed (July 2030).

(6) Project Implementation Structure

1) Borrower: President of India

2) Guarantor: None

3) Executing Agency: Tamil Nadu Forest Department, Government of Tamil Nadu

4) Operation and Maintenance System: Same as above Agency

(7) Collaboration and Sharing of Roles with Other Donors

1) Japan's Activities:

The Project will use the exotic plant elimination strategy and manual formulated in the Tamil Nadu Biodiversity Conservation and Afforestation Project. In addition, through the National Workshop, annually hosted in turn by agencies executing Japanese ODA loan projects in the forest sector, and the Sustainable Forest Management and Biodiversity Conservation Training Course for India, good practices and lessons from other projects in India's forest sector and Japanese experience will be used to improve the Project's implementation and methods.

2) Other Donors' Activity:

In cooperation with the World Wildlife Fund and the Wildlife Institute of India, the Project will conduct research to formulate policies on mitigating friction between humans and wildlife, and other issues.(8) Environmental and Social Consideration/Cross-Sectoral Issues/Gender Category

1) Environmental and Social Considerations

Category: FI

Categorized under the JICA Guidelines for Environmental and Social Considerations (published in April 2010) because subprojects cannot be

identified before JICA's approval for financing, and such subprojects may produce environmental impacts.

□ Other/Monitoring: In the Project, the executing agency will categorize each subproject and take the necessary measures for each category under India's domestic laws and the JICA Guidelines for Environmental and Social Considerations, with the help of consultants employed using the Japanese ODA loan. The subprojects will not include Category A projects.

2) Cross-Sectoral Issues

- ① Climate Change: The Project will boost disaster management and reduction efforts, including soil erosion control and flood mitigation, by conducting afforestation and other activities. As a result, the Project will reduce the negative impacts of climate change and assist with climate change measures (adaptation measures). Since the Project is expected to annually reduce carbon dioxide emissions by about 243,000 tons through afforestation, restoration of coral reefs and seaweed beds, and other activities, it will also be helpful in taking climate change measures (mitigation measures).
- ② Poverty Alleviation/Poverty Considerations: Mainly for designated communities who are mostly poor and highly dependent on forest resources, the Project will conduct activities to improve living standards, such as activities to improve livelihoods and promote ecotourism. The executing agency had meetings about these activities with residents in some target areas, and has confirmed that these activities will not negatively affect their lives or cultures. The executing agency will formulate guidelines on the activities together with residents in other target areas before the Project starts, and will conduct the activities in accordance with the guidelines.
- ③ Measures against Infectious Diseases Including HIV/AIDS: To prevent the spread of COVID-19 infections, during screening, the executing agency agreed to the list of measures to taken when formulating and implementing the project (a total of 36 measures) and has clarified what to do. Measures include: improving working conditions, such as supplying materials and equipment for epidemic prevention, and promoting the understanding of a code of conduct; supervising project work; and raising workers' awareness of infectious diseases. JICA will carefully observe the impacts of COVID-19 through the Project's implementation phase by receiving quarterly

reports on implementation of the measures from the executing agency, and monitor the executing agency's commitment to ensure it takes flexible and appropriate action.

3) Gender Category:

■ Gender Informed (Significant) (Gender activity integration project)

<Details of Activities/Reason for Categorization> The women in the target rural areas have limited opportunities for training and employment. Therefore, the Project's livelihood improvement activities will involve efforts led by self-help groups, consisting mainly of women, and readily reflect the wishes of women.

(9) Other Important Issues: The Project will pursue academic collaboration in biodiversity conservation studies between Japanese universities and research institutes, Indian universities, and the Tamil Nadu government's research institutes. The Forest Department will formulate, implement, and assess plans for biodiversity conservation and other activities in cooperation with local NGOs.

4. Targeted Outcomes

(1) Quantitative Effects

Outcomes (Operation and Effect Indicators)

Indicator	Baseline (Actual value in 2021)	Target (2032) [2 years after project completion]
Increase in carbon storage through afforestation in urban and peri-urban areas (metric tonnes)	N/A	400,000
Increase in the area of trees outside forests (TOF) (ha)	N/A	60,000
Area of mangrove forests planted along the eastern coastline (ha)	N/A	1,050
Area of coral reefs restored in the Gulf of Mannar (ha)	N/A	3.6
Area of seaweed beds restored in the Gulf of Mannar (ha)	N/A	300
Rate of increase of incidents/damage from contact with wildlife (%)	(Note 1)	<10
Rate of increase of annual household income in the villages targeted by the livelihood improvement activities (%)	(Note 1)	25
Number of Forest Department officials participating in training during the Project period (people)	N/A	5,400

(Note 1) The baseline will be determined from the results of a baseline survey conducted after the Project starts.

(2) Qualitative Effects

Restored and strengthened functions of ecosystem services, enhanced resilience against climate change, mitigation of climate change, and social participation of women, the poor, and the vulnerable.

(3) Internal Rate of Return

Based on the assumptions listed below, the economic internal rate of return (EIRR) for the Project is 13.3%. Since generating revenue is not an objective of the Project, the financial internal rate of return (FIRR) has not been calculated.

[EIRR]

Cost: Project cost, and operating and maintenance expenses (excluding tax)

Benefit: Reduction in carbon dioxide emissions and income from farmers' production of forest products

Project Life: 40 years

5. External Factors and Risk Control

(1) Preconditions: None

(2) External Factors: None

6. Lessons Learned from Past Projects

The ex-post evaluation (FY2018) of a technical cooperation project for China, the "Project on Forest Restoration after the Earthquake in Sichuan Province," found that establishing technical guidelines and model technology related to forestry and forest conservation had helped the executing agency secure a government budget and promote application of the project's outcomes. This Project will establish a system that enables the Forestry Department to maximize the Project's outcomes on its own by establishing model technology and improving existing technology through research, development, and implementation of biodiversity conservation technology.

The ex-post evaluation (FY2017) of a Japanese ODA loan project for India, the "Tamil Nadu Afforestation Project (Phase 2)," found that an effect indicator of "forest coverage of the afforestation areas (tree crown density)" needed to be improved to determine project outcomes more accurately. This is because the data on forest coverage and tree crown density included data from other areas. The lesson from that project was that indicators should be those that can accurately show project effectiveness and be monitored by the executing agency. In addition, interim research on the Previous Project's impact indicates the need to promote marketing to further support the afforestation activities, specifically by organizing farmers and strengthening connections with market consumers. The Project will assess its outcomes as accurately as possible by using remote sensing and other technologies to measure carbon storage, forest coverage, and other data in detail. Furthermore, the Project will strengthen forest product supply chains and support marketing promotion by organizing farmers, establishing a system that enables consumers and suppliers to share market information, and taking other measures.

7. Evaluation Results

The Project is consistent both with India's development challenges and policies

and with Japan's and JICA's cooperation policies and analyses. The Project aims to take climate change measures (mitigation and adaptation) and improve ecosystems in Tamil Nadu by conducting activities to conserve biodiversity, mitigate friction between humans and wildlife, strengthen forest product supply chains, improve livelihoods, and reinforce the organizational structure of the Forest Department, thereby contributing to the state's sustainable socio-economic development. The Project will also help achieve some of the Sustainable Development Goals, namely: Goal 1 (eradication of poverty), Goal 13 (action against climate change), Goal 14 (sustainable development of marine resources, including coastal areas), and Goal 15 (promoting the sustainable use and management of terrestrial ecosystems, and biodiversity conservation). Therefore, JICA's support for implementing the Project is crucial.

8. Plan for Future Evaluation

(1) Indicators to be Used

As shown in Section 4.

(2) Future Evaluation Schedule

Ex-post evaluation: 2 years after the project's completion