

Ex-Ante Evaluation (for Japanese ODA Loan)

South Asia Division I, South Asia Department

Japan International Cooperation Agency

1. Name of the Project

- (1) Country: India
- (2) Project: Punjab Biodiversity and Natural Resources Conservation Project
- (3) Project site/Target Area: State of Punjab (Population: approximately 27.7 million (Census 2011))
- (4) Loan Agreement: March 27, 2025

2. Background and Necessity of the Project

(1) Current State and Issues of the Forestry and Biodiversity Conservation Sector /Development of Punjab and the Priority of the Project in India

India's ecosystems are rich in diversity due to their geographical characteristics. These diverse ecosystems perform a wide range of functions as “ecosystem services” for local residents, such as water source cultivation, sediment runoff control, soil conservation, flood control, and provision of forest resources to secure their lives and livelihoods. On the other hand, excessive consumption of forest products such as firewood and charcoal wood in the past has led to deforestation and degradation, with forest cover falling to about 19% in 1987 (Forest Survey of India (FSI), 1987). The Government of India (GOI) set the goal of restoring forest cover to 33% in the National Forest Policy formulated in 1988, and has worked to improve the legal system for forest conservation, the establishment of national parks and wildlife sanctuaries, etc., through the Wildlife Protection Act (1972, GOI), the ratification of the Convention on Biological Diversity (1994,GOI), the Biological Diversity Act (2002,GOI), etc. As a result, forest cover has recovered to about 22% by 2021 (FSI, 2021), but deforestation and forest degradation pressures remain in the context of rapid population growth and rapid urbanization. In addition, India is considered to be highly vulnerable to natural disasters in approximately 85% of its land area (according to the GOI's announcement on its “Nationally Determined Contribution (NDC)” under the Paris Agreement in 2015), and there are concerns that weather disasters will become more severe due to changes in rainfall caused by climate change. In its “Nationally Determined Contribution (NDC)” (2022), the GOI has set a target of reducing CO2 emissions by 45% by 2030 and increasing CO2 absorption by 2.5 to 3 billion tons through reforestation. Furthermore, there are around 700,000 wetlands in India (153,000 km², which is about 4.7% of the

country's land area), and it has been reported that the biodiversity of wetlands and riverside areas is under threat due to factors such as the extraction of surface water for agricultural production and drought in recent years (2021, USAID). In this way, the sustainable ecosystem services available to local people are being lost due to factors such as population growth, urbanization, and the degradation of forests and wetlands caused by agricultural practices.

The State of Punjab, located in northern India (population: approx. 27.7 million, 2011 Census) is known as “India's granary”, with around 84% of the state's area (50,362 km²) used for agriculture, and the tree and forest cover rate is only around 5.92% of the total. The geographical features of the state can be divided into three main areas: the mountainous region in the north, the alluvial plains in the center and east, and the semi-arid region in the west. The northeastern part of the state has a mountain range that rises between 300 and 800 meters and is home to a diverse range of vegetation and wildlife, with a relatively high average annual rainfall of around 900 mm. The majority of the state's forested land is located in this northeast area. In contrast, the central and eastern parts of the state are alluvial plains with abundant groundwater and an average annual rainfall of about 600 mm, and agriculture is thriving thanks to a well-developed irrigation system. The western part of the state is a semi-arid zone with a limited average annual rainfall of about 430 mm and vegetation typical of desert areas. In the same state, the Japanese ODA loan projects “Punjab Afforestation Project (I)” (L/A signed in 1997, amount approved: 6,193 million yen) and “Punjab Afforestation Project (II)” (L/A signed in 2003, amount approved: 5,054 million yen) (hereafter referred to as “previous projects”) were implemented, and the self-sufficiency rate for forest products in the state, which was one of the project's objectives, increased from 57% in 1993 to 83% in 2011.

However, from 2011 to 2019, the state experienced a decline in tree cover due to accelerated agricultural, economic, and urbanization activities associated with population growth. In addition to this situation, in recent years, climate change and the activities of local people dependent on forests have become the main factors causing soil erosion, flooding, groundwater depletion, water pollution, soil degradation, and conflicts between wildlife and humans, and as a result, the problems of ecosystem and wetland degradation and loss of biodiversity have become more serious. For example, in the mountainous regions of the north, unstable and heavy rainfall during the monsoon season and deforestation caused by climate change are causing soil erosion and flooding, and in the most

serious areas, soil loss is reaching 100 tons per hectare per year (Department of Forests & Wildlife Preservation, Government of Punjab (hereafter referred to as the “Forest Department”), 2023). It is also noted that the amount of groundwater used in the state is about 2.8 times the national average due to intensive agricultural activities, and the risk of groundwater depletion is said to be the highest in India. In addition, many of the wetlands in the state, including those designated as Ramsar Sites, have deteriorated due to factors such as water pollution caused by economic activities, and the number of waterfowl visiting these wetlands has decreased by approximately 10.5% in the period from 2021 to 2023 (Forest Department, 2023). Moreover, deforestation due to economic activities has continued to increase in recent years, and in just one year, 2019, 1,400 ha of forest land, or about 0.8% of the total forest area in the state, was converted to commercial and agricultural use. The current tree and forest cover in the state is 5.92%, but the state government has set a target of 7.50% by 2030.

In response to these issues, the Punjab government is aiming to improve the natural environment of the state by increasing the number of wetlands registered under the Ramsar Convention, enhancing wetland management, and promoting agroforestry to increase the tree and forest cover ratio. In particular, the planting of trees on part of the agricultural land (agroforestry), which makes up a large part of the state territory, is emphasized as a way to contribute to the improvement of the tree and forest cover. In addition, the planting of trees through agroforestry is also significant in that it uses less groundwater than rice and wheat, thus helping to alleviate the problem of groundwater depletion, and contributes to recharging water sources, preventing sediment runoff, and conserving soil. The Forest Department has promoted agroforestry using a central government scheme from 2016 to 2022, and the results have confirmed that farmers' profits have increased through additional sales of timber and other items compared to traditional agriculture, and the Forest Department plans to expand agroforestry further.

The “State Forest Action Plan” formulated by Punjab in 1997 set the goal of restoring the ecosystem in the northern mountainous region, where soil erosion and desertification are progressing. In addition, the “Draft State Forest Policy” formulated in 2008 set the goal of improving the state of natural resources in order to increase the tree and forest cover ratio and improve soil, air, and water quality. In 2014, the Punjab government also formulated the Punjab Climate

Change Action Plan, which states that community-based biodiversity conservation is important to reduce vulnerability and impacts of climate change. The Punjab Biodiversity and Natural Resources Conservation Project (hereinafter referred to as “the Project”), in line with the above policies, will incorporate the methods used in previous projects, such as tree planting to prevent soil erosion and the formation of community organizations such as Self Help Groups (SHGs), and will work to improve ecosystem services and promote measures to address climate change (adaptation and mitigation) through activities such as biodiversity conservation, wetland management, increasing tree cover, livelihood activities, and strengthening organizational structures. While the main activity of the previous project was tree planting in forest areas, the Project includes biodiversity conservation activities and tree planting outside forest areas through activities such as agroforestry, and is positioned as an important project in the forest and biodiversity conservation sector in India and in the state of Punjab. The Project is also consistent with the goals of India's Nationally Determined Contribution (NDC) under the Paris Agreement, which aims to achieve net zero GHG emissions by 2070.

(2) Japan's and JICA's Cooperation Policy and Operations in the the Forest and Biodiversity Conservation Sector/ Punjab and the Positioning of the Project (especially in relation to key foreign policies such as the Free and Open Indo-Pacific Partnership (FOIP))

At the 26th Conference of the Parties to the United Nations Framework Convention on Climate Change (COP26), held in November 2021, Japan announced its participation in the Glasgow Leaders' Declaration on Forests and Land Use, and stated that it would strengthen its efforts to halt deforestation and land degradation by 2030, and promote forest conservation and restoration. In addition, at the 15th Conference of the Parties to the United Nations Convention on Biological Diversity (COP15) held in December 2022, Japan and other countries adopted the Kunming-Montreal Biodiversity Framework, a new global biodiversity goal (Post-2020 Biodiversity Framework). The Project also aligns with “Addressing Challenges in an Indo-Pacific Way,” one of the pillars of the New Plan for a “Free and Open Indo-Pacific” from a climate and environmental perspective. In addition, Japan's Country Development Cooperation Policy for India (November 2023) also positions “Clean Socio-Economic Development” as one of its priority areas, and it states that it will support projects related to the conservation and use of forest resources. JICA Country Analysis Paper on India

(March 2018) also states it will promote cooperation to address environmental and climate change issues such as forests conservation and disaster risk reduction. JICA's Global Agenda for "Natural Environment Conservation" also calls for building a society that can continue to enjoy the blessings of the nature by pursuing the harmony between human and nature, preventing ecosystem loss or degradation. The Project implements climate change measures through forest and biodiversity conservation and is consistent with these policies and analyses.

(3) Other Donors' Activities

There are no other projects being implemented by other aid organizations in the biodiversity and forestry sector in Punjab. In other states in India, the World Bank, the United States Agency for International Development (USAID) and the French Development Agency (AFD) are supporting forest management and ecosystem restoration through improving the livelihoods of people living around forests, while the Global Environment Facility (GEF) is supporting the improvement of ecosystem services and the conservation of terrestrial and marine biodiversity.

3. Project Description

(1) Project Description

① Project Objective

The objective of the Project is to enhance ecosystem services and mitigate impacts on climate change through increased trees outside forest, biodiversity conservation, integrated wetland management, livelihood improvement and institutional strengthening, thereby contributing to sustainable socio economic development in Punjab.

② Project components

The following activities will be carried out in the northern mountainous areas, central and eastern alluvial plains, and western semi-arid areas of Punjab (hereinafter referred to as "the three zones") based on the characteristics of each zone.

1) Enhancing Trees outside Forest in Punjab (support for the establishment of agroforestry cooperatives, support for the implementation of afforestation, support for the creation of carbon credits, development of online timber trading platforms, etc.)

2) Component 2: Biodiversity Conservation and Conservation based

livelihoods (improvement of wildlife habitats, maintenance and repair of zoos, wetland management, measures to prevent conflicts between humans and wildlife, promotion of ecotourism, etc.)

3) Integrated Landscape and Livelihoods Improvement in Shivalik Hills (watershed management activities, support for marketing non-timber forest products in cooperation with local communities, etc.).

4) Institutional Strengthening (forest and wildlife research, human resource development and training, improvement of IT tools such as geographic information systems, monitoring and evaluation, etc.)

5) Consulting services (project management, etc.)

③ Project Beneficiaries (Target Group)

Direct beneficiaries: (Total number of local residents involved in activities through the Joint Forest Management Committee (JFMC), local residents involved in agroforestry, and forestry official receiving trainings, etc.) : approx. 68,000 people.

Final beneficiaries (the population of the state that will benefit from improved ecosystem services and climate change measures): approximately 27.7 million people.

(2) Estimated Project Cost:

13,609 million yen (Japanese ODA loan: 11,480 million yen)

(3) Schedule:

March/2025-March/2033 (97 months)

Completion of all activities (March 2033) is considered as the completion of the Project.

(4) Project Implementation Structure

1) Borrower: President of India

2) Guarantor: N/A

3) Executing Agency:

Department of Forests & Wildlife Preservation, Government of Punjab
(hereinafter referred to as “Forest Department”)

4) Operation and Maintenance System:

The Forest Department will be responsible for implementing the Project as the executing agency, but in order to improve the efficiency of project implementation and the flexibility and transparency of budget management, a Project Management Unit (PMU) will be established at the state level as an independent body from the Forest Department. As subordinate organizations

of the PMU, the Divisional Management Unit and the Range Management Unit will each establish a project management unit to implement activities on the site. Activities in each target village will be carried out jointly by the JFMC and the Self-Help Group (SHG), which is mainly made up of women, with the support of the Range Management Unit.

(5) Collaboration and Sharing of Roles with Other Donors

1) Japan's Activity:

The ODA loan project currently in the process of being formulated, “Project for Capacity Enhancement for Effective Forest Management”, is intended to strengthen the policy implementation capabilities of forest administrators by conducting research, project development, and training system development in the area of ecosystem conservation, with the Ministry of Environment, Forests and Climate Change of India as the executing agency. The results of the research and project development, as well as the content of the training, will be used by forest administrators in Punjab when implementing the Project. In addition, the participatory forest management approach adopted in the previous projects will also be applied in the Project. Furthermore, lessons and results learned from pioneering efforts in other states, such as the effective use of IT tools, as well as Japan's experience, are shared through the “JICA Annual Forestry Workshop,” which is held annually in the field by bringing together the executing agencies of the ODA loans for the forestry sector, and the Country-focused training “Sustainable Forest Management and Biodiversity Conservation” which is held in Japan. In addition to utilizing these in the Project, the results of the Project will be expanded through the “JICA Annual Forestry Workshop.”

2) Other Donors' Activity: None in particular.

(6) Environmental and social considerations:

① Category: C

② Reason for Categorization: The Project is likely to have minimal or no adverse impact on the environment under the JICA Guidelines for Environmental and Social Considerations (promulgated in January 2022)

(7) Cross-Sectoral Issues

① Climate change

The Project will contribute to disaster prevention and risk reduction, such as preventing soil erosion and mitigating flooding, through activities such as afforestation and biodiversity conservation, and will contribute to climate

change measures (adaptation) by reducing negative impacts on ecosystems. In addition, it is expected that afforestation is expected to reduce CO₂ emissions by at least 80,966 tons per year, contributing to climate change measures (mitigation).

② Poverty measures and consciousness

The Project will implement livelihood improvement activities for local residents who are highly dependent on forest resources, particularly in the northern mountainous region.

③ AIDS/HIV and other infectious disease control

None in particular

④ Participatory development

In the Project, JFMCs and SHGs will be formed by local residents mainly for “Integrated Landscape and Livelihoods Improvement in Shivalik Hills”, and they will formulate Project Planning (micro plans) for activities at the village level and implement them. In addition, participatory activities will be conducted for livelihood improvement, such as vocational training for JFMC and SHG members.

⑤ Disability considerations, etc.

In the infrastructure development of the Project, facilities will be constructed with universal design and barrier-free access in mind.

(8) Gender Category: ■GI(S) Gender Informed (Significant):

<Details of Activities/ Reason for Categorization>

Through discussions with the executing agency, the Project identified gender issues such as the fact that women in local community organizations are less likely to participate in activities and decision-making processes than men. As part of the Project, a gender action plan will be created, and women's participation will be ensured in capacity-building training, livelihood improvement support, and decision-making. The ratio of women in the JFMC and SHG will be used as an indicator. For these reasons, the Project is classified as a “gender activity integration project”.

(9) Other Important Issues

In the Project, research activities will be carried out with the main focus on forest management, biodiversity conservation and climate change measures by utilizing and strengthening existing research facilities and organizations. In addition, cooperation with Japanese research institutions has already been agreed with the executing agency. It is also planned to utilize the DX strategy

and system for forest management that JICA is promoting in other states, and to support the execution agency in integrating the data from the multiple systems that are scattered throughout the agency and building a comprehensive GIS/MIS system. Furthermore, it has already been agreed with the executing agency that the project will seek to further expand its impact by partnering with private companies in India and overseas.

Punjab is one of the regions in India that is considered to be at the greatest risk of groundwater depletion, and in order to protect groundwater resources, planting rice before the rainy season is prohibited in the state. For this reason, it is necessary to harvest the summer rice crop and sow the winter wheat crop in a short period of time. This forces many farmers to burn the rice straw in the fields, both in terms of cost and time, and as a result, it is one of the causes of the serious problem of air pollution in the state and the Delhi area. The Project contributes to the reduction of air pollution from the perspective of promoting a shift from rice cultivation to agroforestry. In addition, it has been agreed with the executing agency that air pollution mitigation activities will be implemented, including the planting of tree species with high carbon dioxide absorption rates and removal of pollutants, as well as awareness-raising activities for farmers to reduce field burning.

4. Target Outcomes

(1) Quantitative Effects

1) Outcomes (Operational and Effect Indicators)

Indicator	Baseline (Actual value in 2024)	Target (2035) [2years after project completion]
Target plantation area of agroforestry in the project (ha)	-	50,000
Carbon sequestered amount (in CO2 tons /year)	-	Over 80,966
Number of zoos to be strengthened in the project	-	4 locations (3 Species bred in Captivity)

Improvement in wetland water quality as a result of the Project (increase in dissolved oxygen due to the project (%))	(Note 1)	20
Increase in floral and faunal biodiversity in and around Project Site (%) (Note 2)	(Note 1)	20
The increase in annual income of community members* engaging in the Project. (INR/year) *JFMCs/EDCs/SHGs	(Note 1)	40,000
Crop damage rate (%) reduced by measures to prevent conflicts between humans and wildlife	(Note 1)	20
Percentage of female community members participating in the Project (percentage of women among the total number of JFMCs/SHGs members involved in biodiversity conservation, livelihood improvement activities, etc.)	-	40
Number of persons from the executing agency participating in the training implemented under the Project	-	3,534

(Note 1) The Baseline and Target values will be based on the results of the Baseline Survey to be conducted after the start of the project.

(Note 2) It is based on a measure of diversity called the Shannon-Wiener Index. This takes into account evenness (the equality of the population sizes of the various species present in the community) in addition to species richness. (For example, even if the number of species in each community is about the same, if the population of certain species is large and the population of other species is small, the diversity of that community will be

low).

(2) Qualitative Effects

Sustainable socio-economic development; restoration and enhancement of ecosystem services; climate change mitigation and adaptation; social participation of women, poor and vulnerable groups; mitigation of air pollution (from open burning of crop residues) and reduction of health hazards; and reduction of biodiversity-related challenges.

(3) Internal Rate of Return

Based on the assumptions listed below, the economic internal rate of return (EIRR) for the Project is 22.5%. The Project is not intended to generate business income, and the financial internal rate of return (FIRR) is not calculated.

【EIRR】

Cost: Project costs, operation and maintenance costs (all excluding taxes)

Benefits: Income from tree planting outside forest areas, income from non-timber forest products, CO₂ reduction, income from livelihood improvement activities, reduced crop damage through reduced wildlife conflict, income from ecotourism activities.

Project Life: 50 Years

5. External Factors and Risk Control

(1) Preconditions: None in particular

(2) External Factors: None in particular

6. Lessons learned from the Past Projects

In the case of the ODA loans for India, the Uttar Pradesh Participatory Forest Management and Poverty Alleviation Project (evaluation year 2019), it was assessed that there was a problem with the lack of sustained involvement of forestry officials in self-help groups after the project ended. As a lesson learned from the experience, it was recommended that the government should work with relevant ministries and agencies to provide continuous support to the self-help groups, making use of other government support schemes (e.g. the National Rural Livelihood Mission in the case of the state). Since the Project also requires continuous support to the SHGs after their participation in the project, it has already been agreed with the executing agency that a system will be put in place during the project implementation period to ensure follow-up by the state

government after the project ends.

7. Evaluation Results

The Project is consistent with the development agenda and policies of the Government of India and the Government of Punjab, as well as the cooperation policies and analysis of Japan and JICA, and will contribute to poverty eradication, gender equality, climate change measures, and the promotion of the protection, restoration and sustainable use of ecosystems through the promotion of biodiversity conservation, the improvement of tree cover rates, and livelihood improvement activities. It contributes to SDG Goals 1 (poverty eradication), 5 (gender equality), 13 (combat climate change), and 15 (promote sustainable use and management of terrestrial ecosystems and conserve biodiversity), and there is a high need to support the implementation of the Project.

8. Plan for Future Evaluation

(1) Indicators to be Used

As indicated in Section 4.

(2) Future Evaluation Schedule

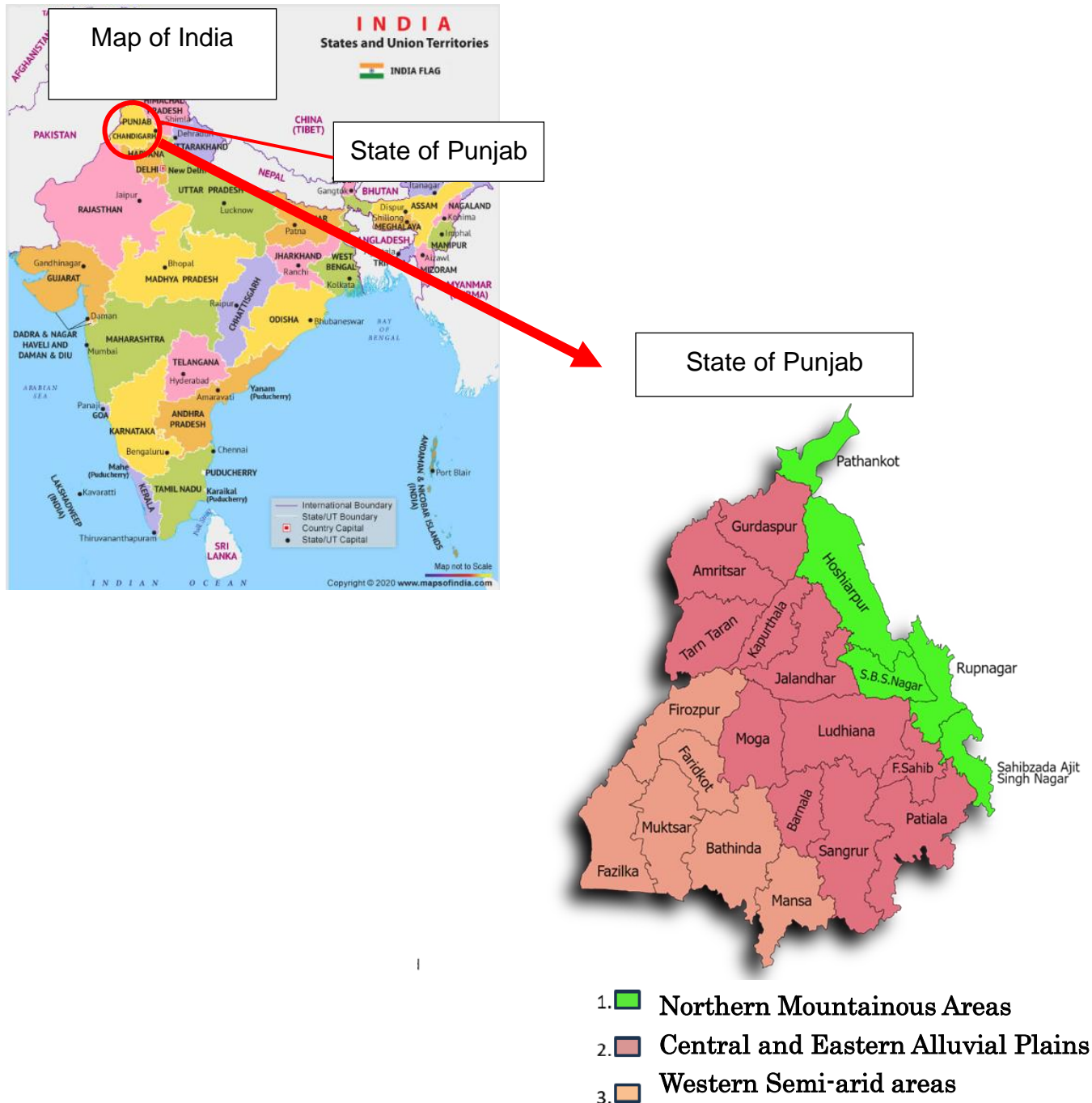
Ex-post evaluation: 2 years after the Project completion

END

Appendix: Map of the Punjab Biodiversity and Natural Resources Conservation Project

Appendix

Map of the Punjab Biodiversity and Natural Resources Conservation Project



Source:

Upper Map: Maps of India ([India Map | Free Map of India With States, UTs and Capital Cities to Download \(mapsofindia.com\)](http://www.mapsofindia.com))

Lower Map: Department of Forests & Wildlife Preservation, Government of Punjab