Help Document for “Wastelands Greening with Agroforestry - Suitability Mapping” portal

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	Abstract: This is a help document/user manual explaining the steps to use the “Wastelands Greening with Agroforestry - Suitability Mapping” portal.			

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BACKGROUND

Restoration, reclamation and optimisation of land use and natural resources is the key for achieving many National and International Commitments made by the Government of India for socio-economic and ecological sustainability. The commitments viz. Bonn Challenge, Nationally Determined Contribution (NDC) as part of the Paris Agreement on Climate Change, UN millennial goal, ecosystem restoration, doubling farmers income, increase in green cover, National Action Plan on Climate Change, Atma Nirbhar Bharat can be realised by transforming land use system.

India has 329 million hectare of geographical area (GA) and hold seventh position in world area and ranked first with 10.99% of recorded arable area and 10th in term of total world forest area (FAO,2017). Whilst, the country has 30 percent of degraded land (ISRO, 2016). As per the Wasteland Atlas published by Ministry of Rural development, 16.95 % of total GA falls under wasteland category.

There is huge potential of restore this underutilized and degraded wasteland into useful resource. The land use transformation approach with Agroforestry can play an instrumental role in greening of wasteland area and enabling land degradation neutrality vis-a vis carbon neutrality of the country. Agroforestry is one an agroecological practice and defined under National Agroforestry Policy (2014), is a land use system which integrates trees and shrubs on farmlands and rural landscape to enhance productivity, profitability, diversity and ecosystem sustainability (GoI, 2014). The scope of this policy covers barren community land/other non-forest wastelands for plantation of agroforestry tree species to provide opportunities of economic returns as well as contributing towards ecological benefits.

Under the leadership of Hon'ble Prime Minister of India, Promotion of Agroforestry was reiterated in the announcement made by Hon'ble Finance Minister during the budget speech of 2022-23 that "The policies and required legislative changes to promote agro-forestry and private forestry will be brought in. In addition, financial support will be provided to farmers belonging to Scheduled Castes and Scheduled Tribes, who want to take up agro-forestry". This announcement has earmarked the agroforestry mission in the country.

The Agriculture Vertical, NITI Aayog has started working on Promotion of Agroforestry in the year 2020-21. The primarily objective of the project is to delineate wastelands that are suitable for Agroforestry in India. Acting upon this, NITI Aayog, in collaboration with Indian Space Research Organisation through its constituent institutions, Space Application Centre, Ahmedabad, National Remote Sensing Centre, Hyderabad, has developed a Geographic Information System (GIS) to delineate wasteland suitable for greening with agroforestry across

the country. Under this project technical support was provided by ICAR-Central Agroforestry Research Institute, Forest Research Institute, ICRAF, WRI, TERI etc.

The total wasteland area in the country is 55.67 million hectares. The Wasteland is a consortium of 23 categories such as Gullied and/or ravinous land, Land with Dense Scrub, Land with Open Scrub, Waterlogged and Marshy land, and affected by salinity/alkalinity, Degraded pastures/grazing land, Under - utilised/degraded forest (Agriculture) etc (Wasteland atlas 2019).

1. Introduction

Agro forestry is defined as a land use system which integrates trees and shrubs on farmlands and rural landscapes to enhance productivity, profitability, diversity and ecosystem sustainability. Here, there are both ecological and economical interactions between different components. This helps the small holding farmers and other rural people to enhance their food supply, income and health. The main objective of this project is to utilize the wastelands for promoting agro-forestry in suitable areas for increasing the greenery.

2. User Roles

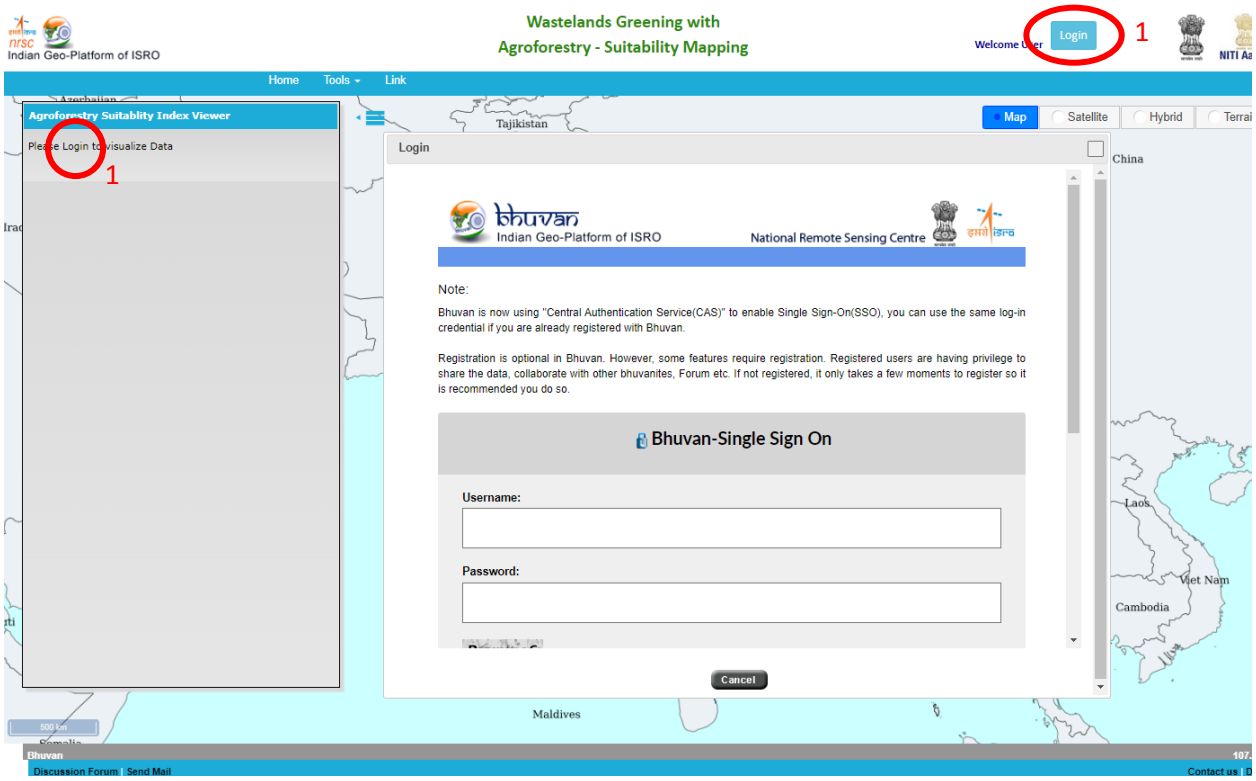
There are three user roles provided for login in the portal: -

a. Central
    a. The user can visualize all states/districts data.
    b. The user can view the statistics for State-wise, District-wise as well as Area to Class wise for district level.
b. State
    a. The user can visualize all districts data of the user's authorized state.
    b. The user can view the statistics for District-wise as well as Area to Class wise for district level.
c. District
    a. The user can visualize only the district's data for which the user is authorized.
    b. The user can view as Area to Class wise for the district.

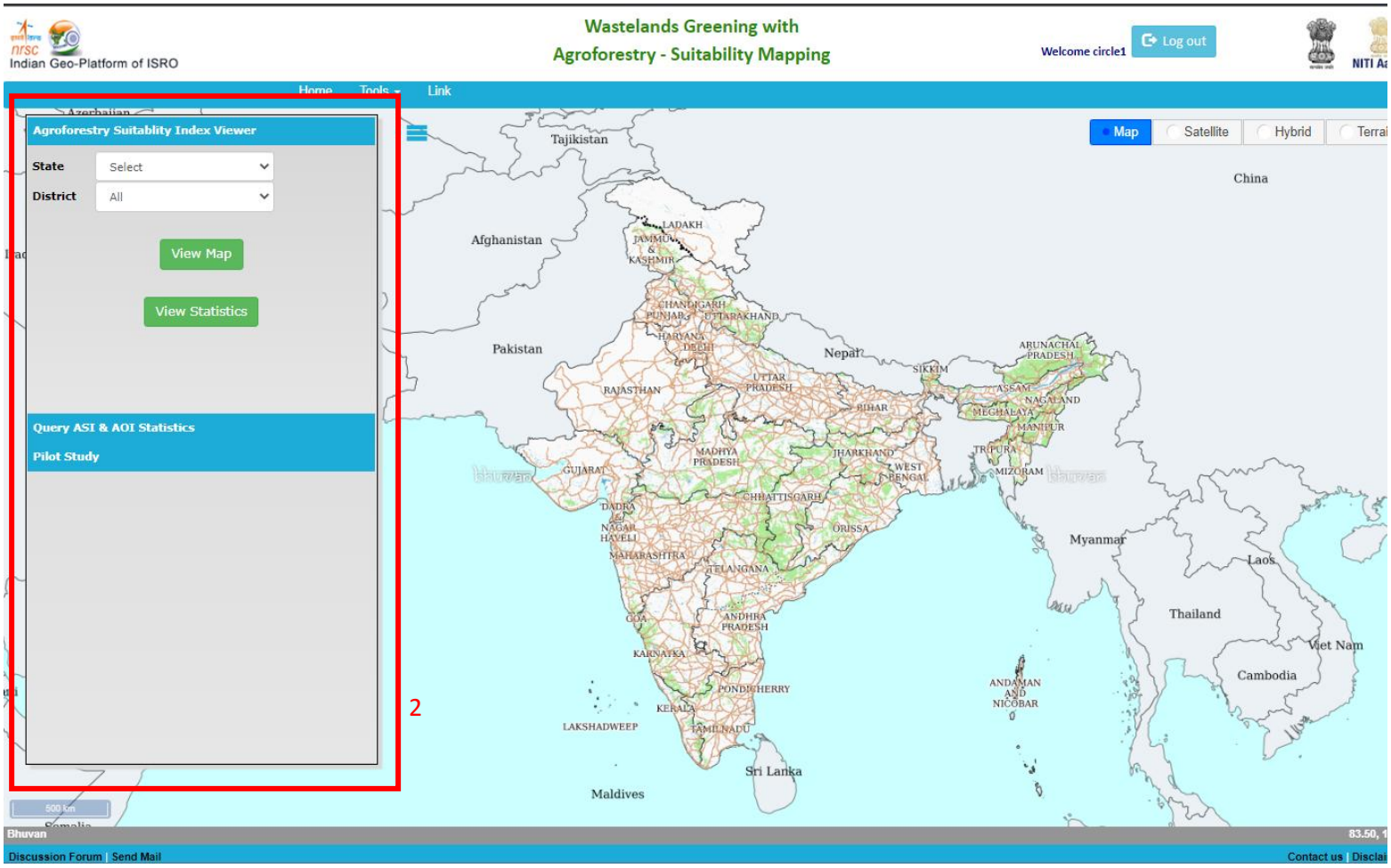
3. Login

The login page on the portal will look like given below.

1 – Upon click on “Login” the login page appears on the screen.



2 – After the authorized user logins, the user will be able to view the Agro Forestry Suitability Map can be visualized. Along with this user will be able to perform Query of ASI and fetch statistics for Area of Interest (AOI).

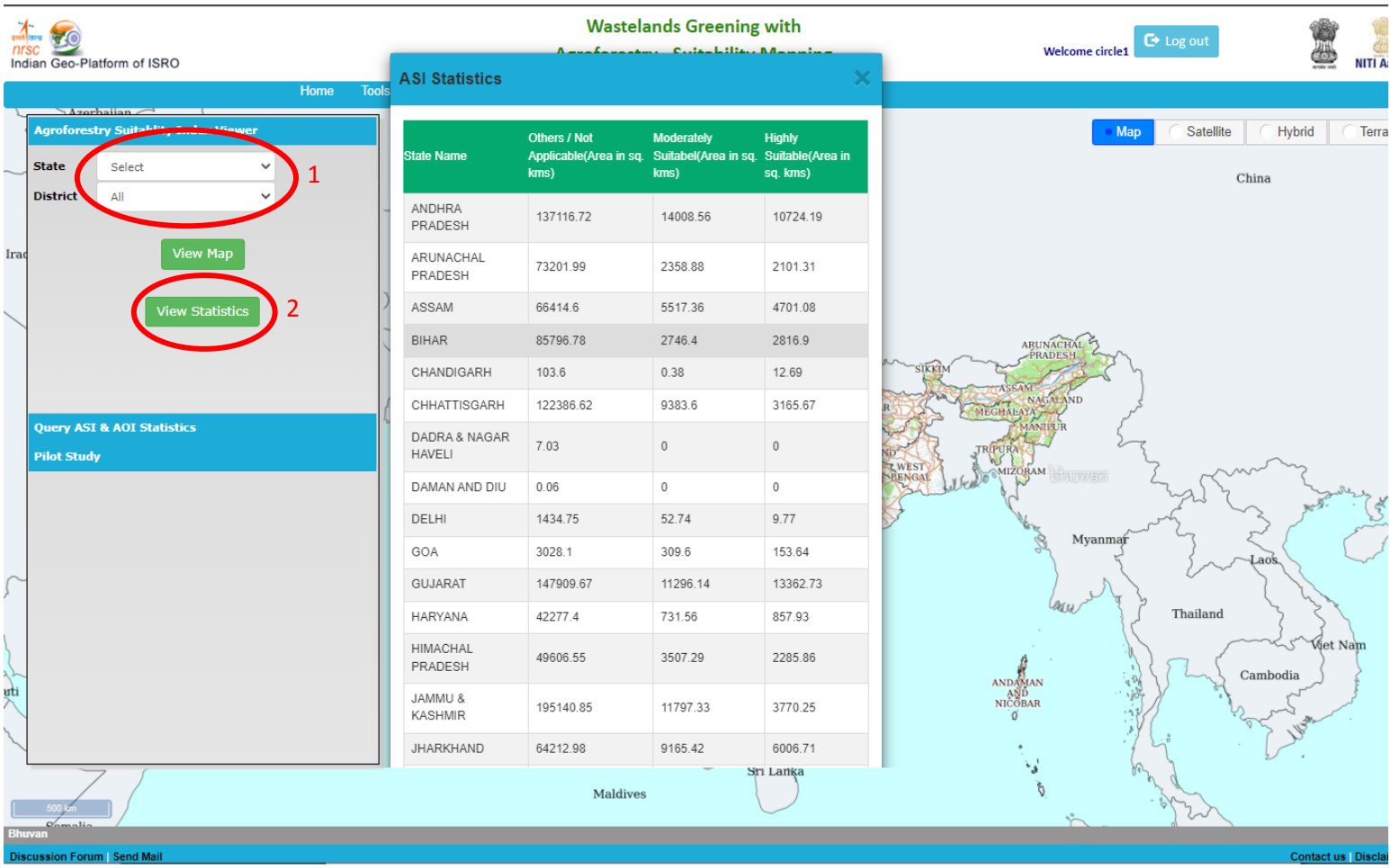


4. Visualization of statistics data

- For user with role as “Central”, statistics of all states can be viewed.

1 – Without selection of any state/district pan-India statistics can be obtained.

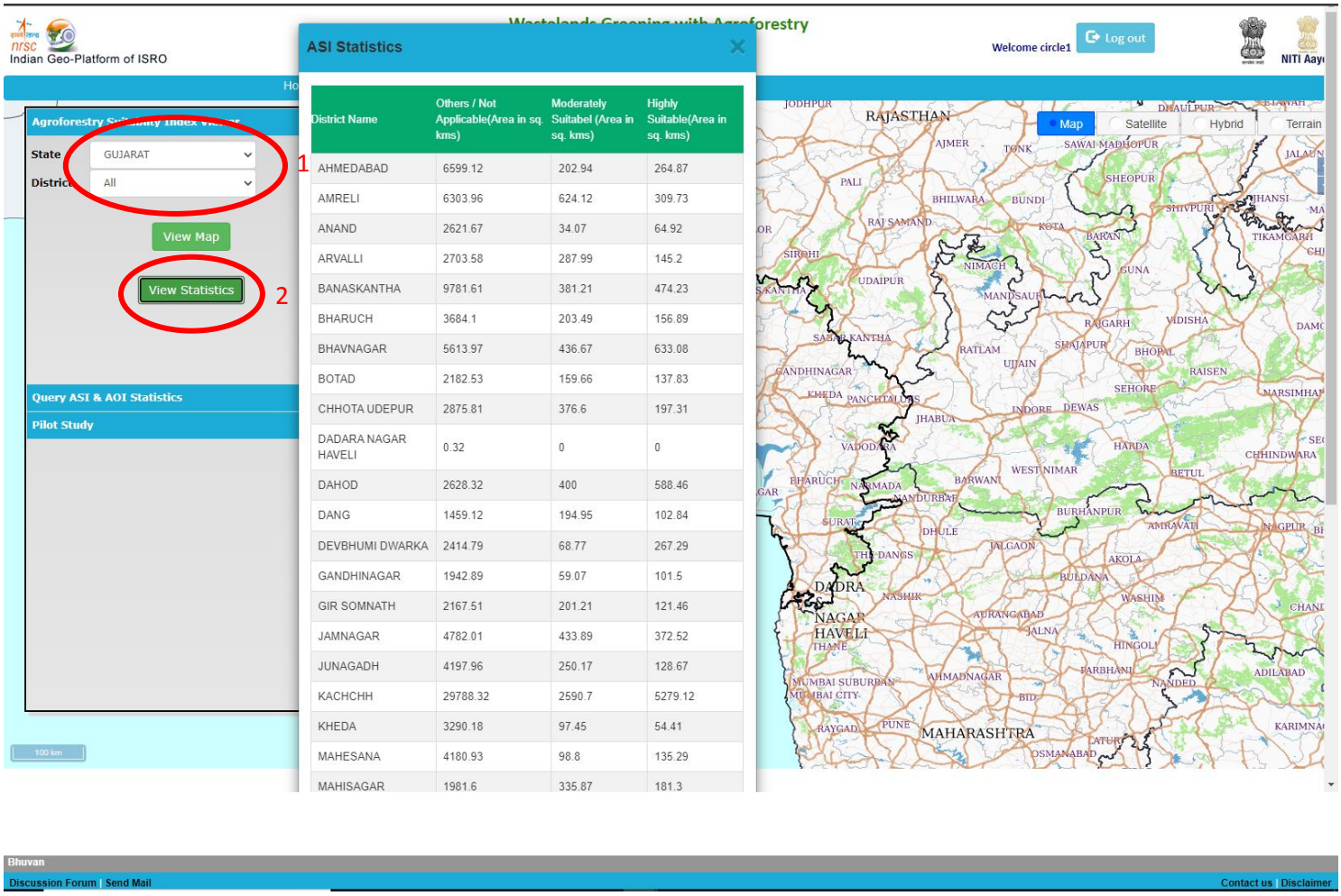
2 – Click on statistics for viewing the statistics on pan India state-wise.



State Name	Others / Not Applicable(Area in sq. kms)	Moderately Suitabel(Area in sq. kms)	Highly Suitable(Area in sq. kms)
ANDHRA PRADESH	137116.72	14008.56	10724.19
ARUNACHAL PRADESH	73201.99	2358.88	2101.31
ASSAM	66414.6	5517.36	4701.08
BIHAR	85796.78	2746.4	2816.9
CHANDIGARH	103.6	0.38	12.69
CHHATTISGARH	122386.62	9383.6	3165.67
DADRA & NAGAR HAVELI	7.03	0	0
DAMAN AND DIU	0.06	0	0
DELHI	1434.75	52.74	9.77
GOA	3028.1	309.6	153.64
GUJARAT	147909.67	11296.14	13362.73
HARYANA	42277.4	731.56	857.93
HIMACHAL PRADESH	49606.55	3507.29	2285.86
JAMMU & KASHMIR	195140.85	11797.33	3770.25
JHARKHAND	64212.98	9165.42	6006.71

- For user with role as “State”, statistics of all districts of the state the user belonging to, can be viewed.

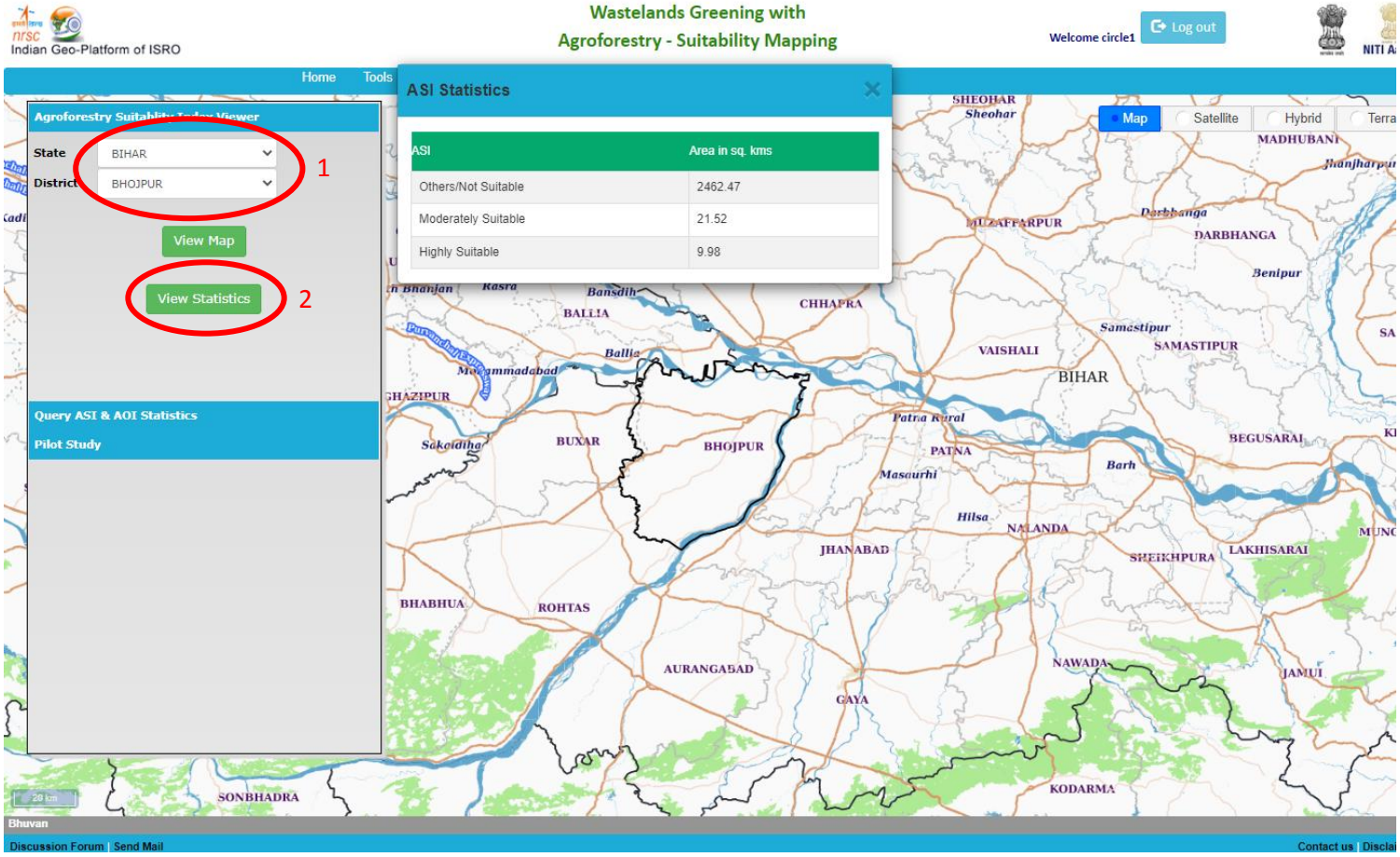
  1 –Upon selection of any state and keeping district as “All”, that state’s statistics can be obtained. Here Gujarat state is selected and district value is kept as “All”.
  2 – Click on statistics for viewing the statistics of the state district-wise.



District Name	Others / Not Applicable(Area in sq. kms)	Moderately Suitabel (Area in sq. kms)	Highly Suitable(Area in sq. kms)
AHMEDABAD	6599.12	202.94	264.87
AMRELI	6303.96	624.12	309.73
ANAND	2621.67	34.07	64.92
ARVALLI	2703.58	287.99	145.2
BANASKANTHA	9781.61	381.21	474.23
BHARUCH	3684.1	203.49	156.89
BHAVNAGAR	5613.97	436.67	633.08
BOTAD	2182.53	159.66	137.83
CHHOTA UDEPUR	2875.81	376.6	197.31
DADARA NAGAR HAVELI	0.32	0	0
DAHOD	2628.32	400	588.46
DANG	1459.12	194.95	102.84
DEVBHUMI DWARKA	2414.79	68.77	267.29
GANDHINAGAR	1942.89	59.07	101.5
GIR SOMNATH	2167.51	201.21	121.46
JAMNAGAR	4782.01	433.89	372.52
JUNAGADH	4197.96	250.17	128.67
KACHCHH	29788.32	2590.7	5279.12
KHEDA	3290.18	97.45	54.41
MAHESANA	4180.93	98.8	135.29
MAHISAGAR	1981.6	335.87	181.3

- For user with role as “District”, statistics of the district the user belonging to, can be viewed.

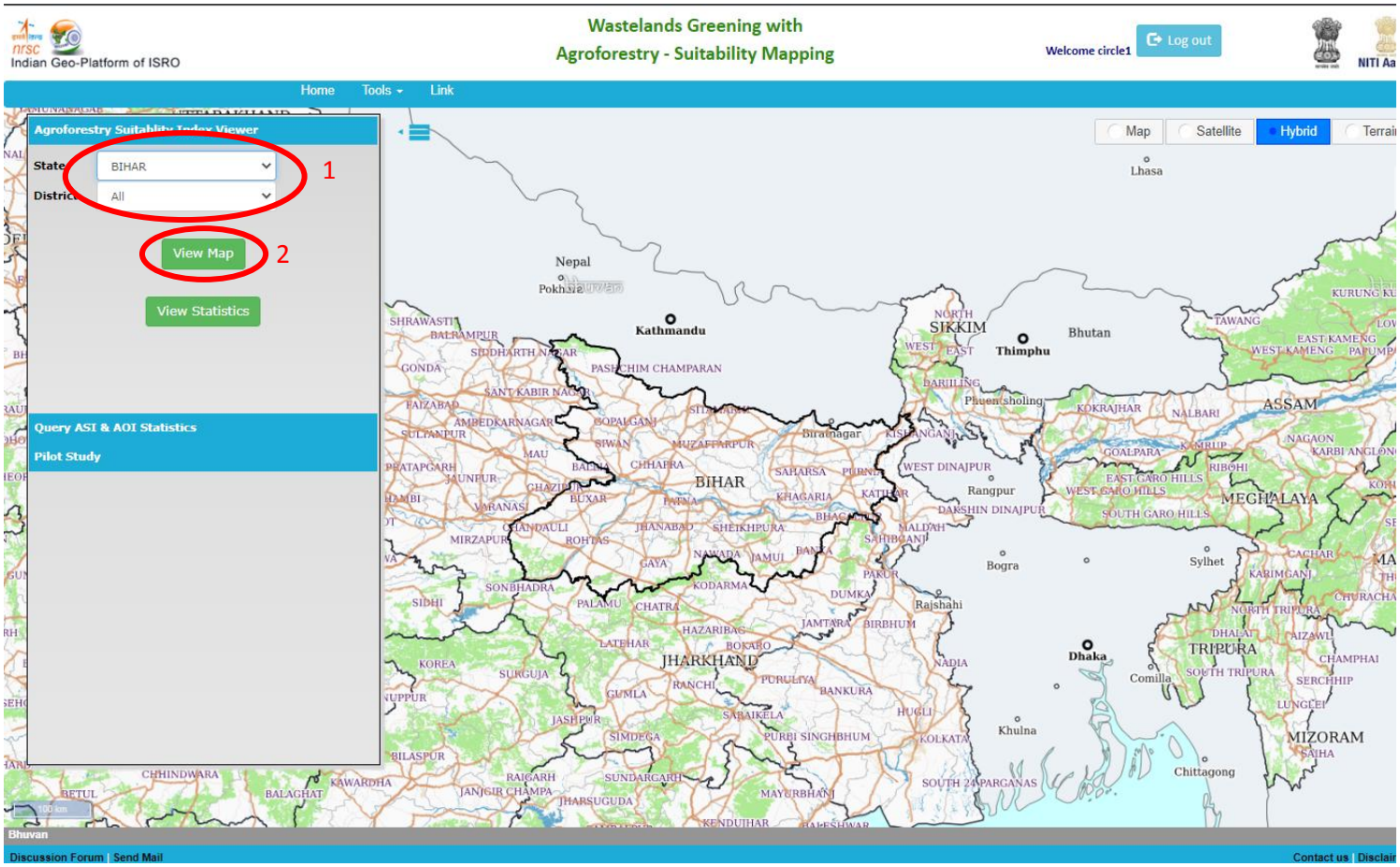
  1 – Upon selection of any state and a district, that district’s statistics can be obtained. Here Bihar state is selected and Bhojpur is selected.
  2 – Click on statistics for viewing the statistics of district class-wise.



5. Map visualization

1 – For visualizing state data, select a state from the dropdown and keep district value as “All”. Here, Bihar state has been selected and district value is kept as “All”.

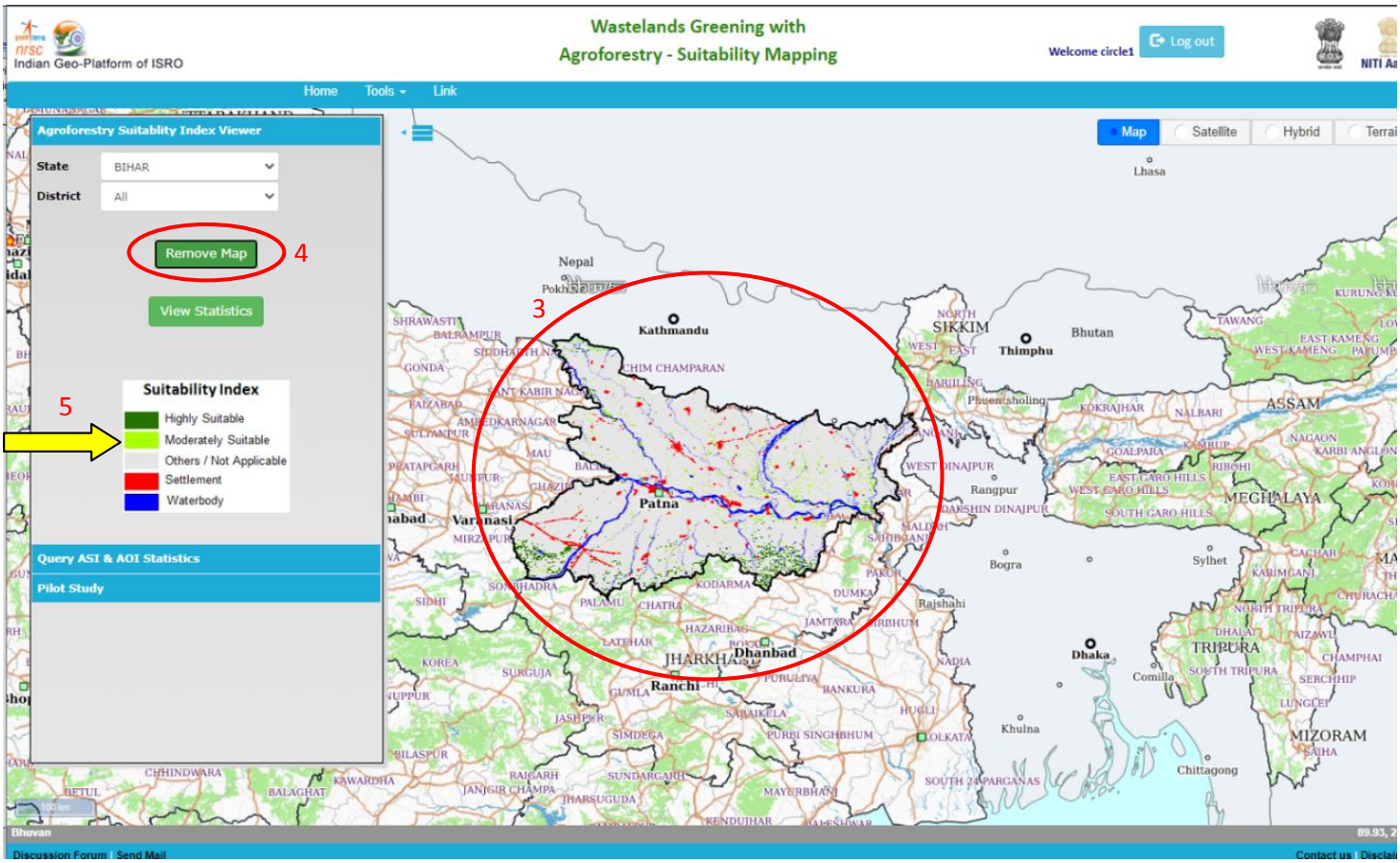
2 – Upon clicking on “View Map” button, agro forestry suitability map can be visualized on the map.



3 – The agro forestry suitability map of Bihar state appears on the map.

4 – “View Map” button changes to “Remove Map” button. Once the user clicks on “Remove Map” the map gets removed from the map.

5 – Legend appears on the left panel.

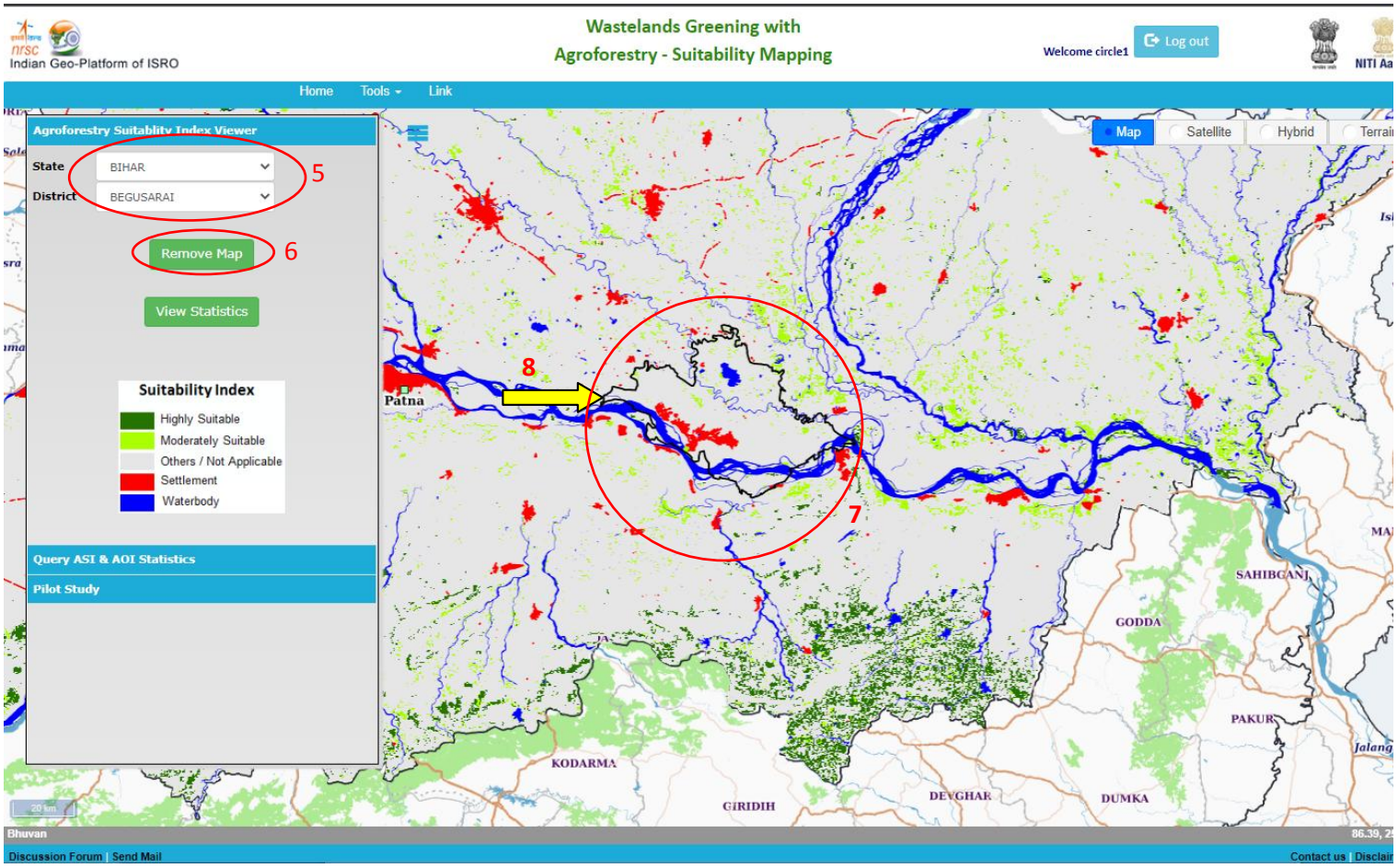


5 – For visualizing district data, select a state as well as a district from the dropdown. Here, Bihar state and Begusarai district has been selected.

6 – Upon click on the “View Map” button, the agro forestry map appears on the map

7 – “View Map” button changes to “ Remove Map”.

8 –District boundary will be highlighted when map for district is to be visualized.



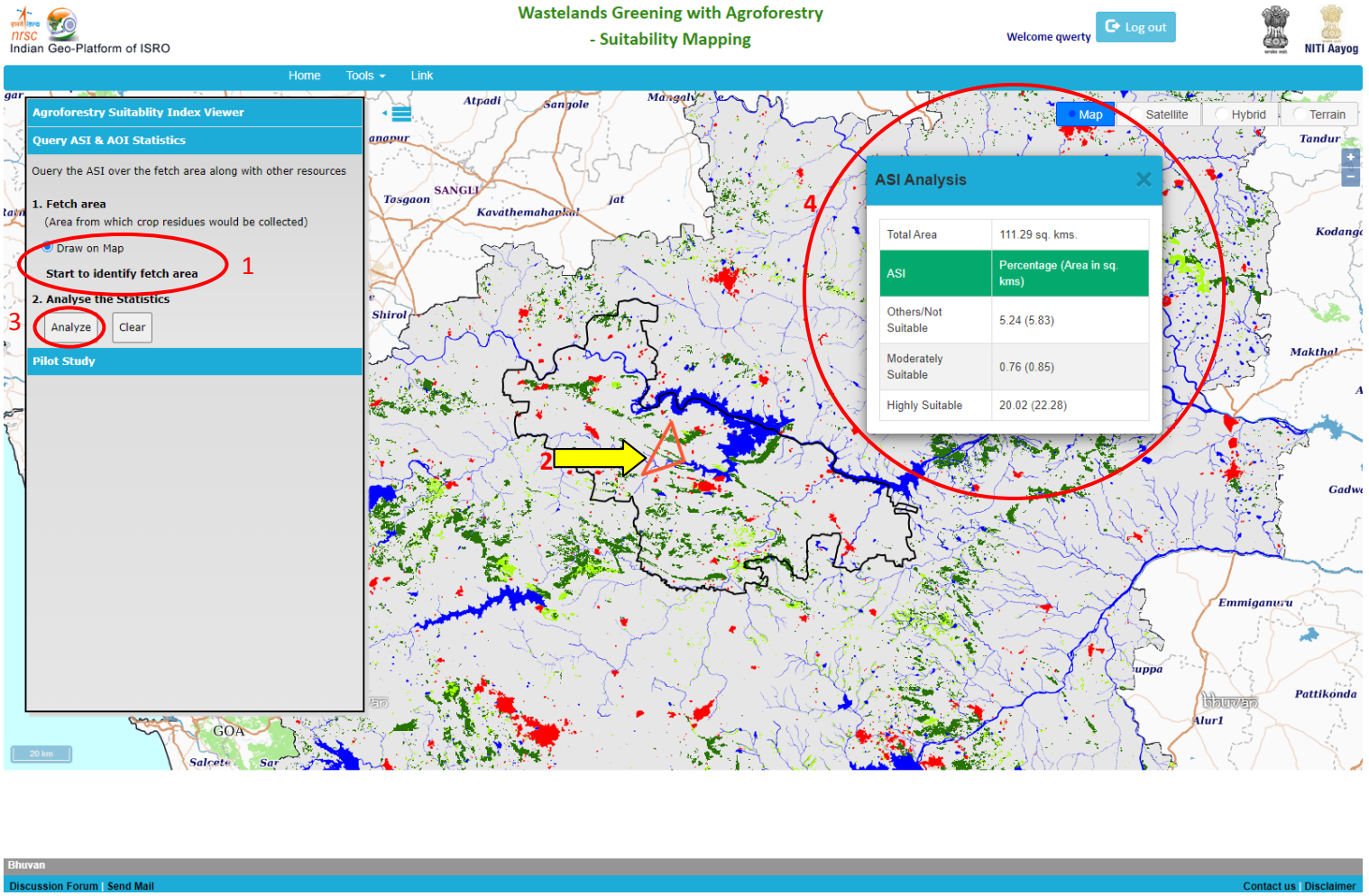
6. Statistics for Area of Interest (AOI) of the user.

1 – User can draw AOI on the map. Upon clicking on “Start to identify fetch area”, the user will be able draw an AOI upon the map. And to finish the drawing click on “Finish Drawing”.

2 – Below an example of AOI is drawn on the map.

3 – Upon clicking on the “Analyze” button, the analysis is performed.

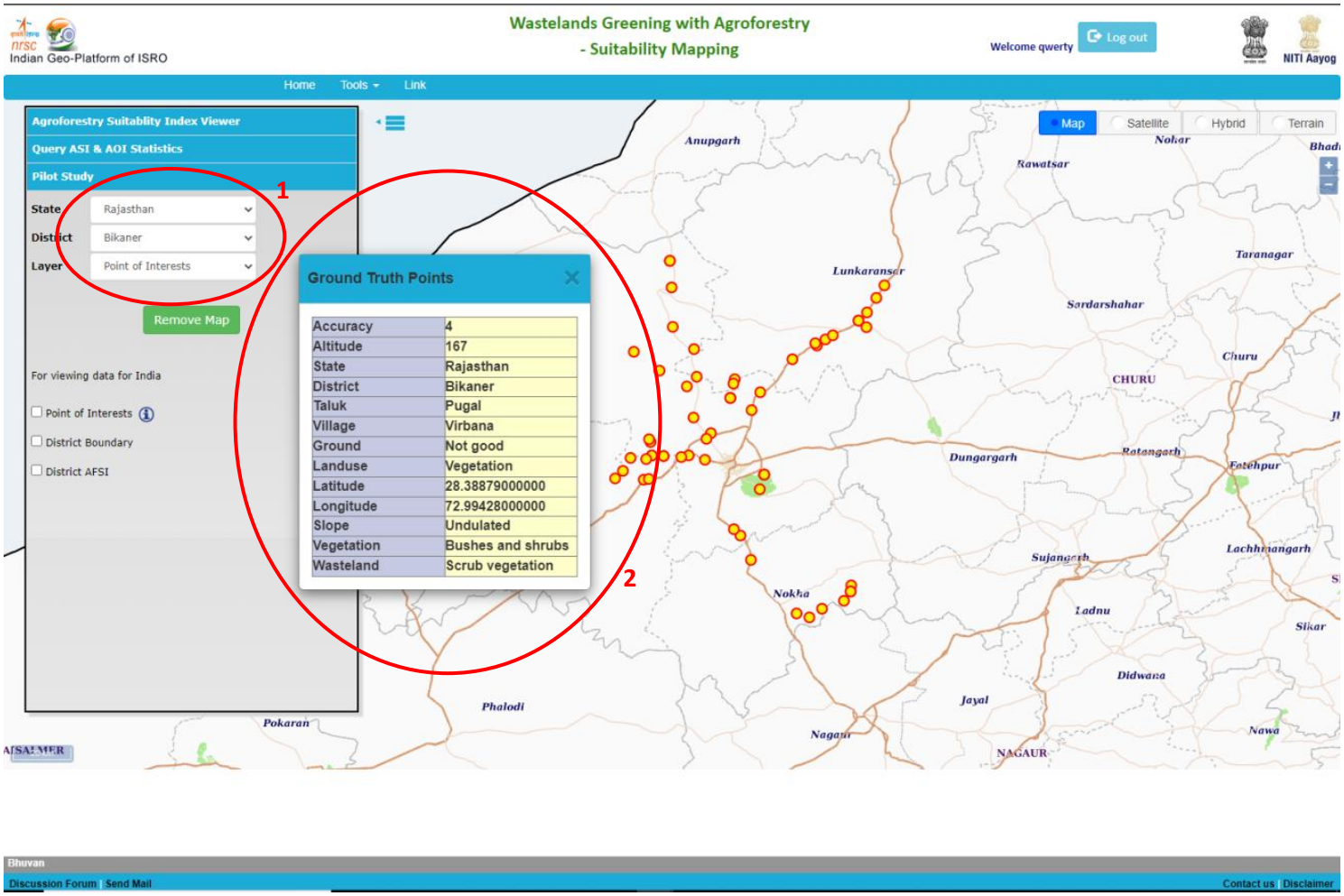
4 – Once the analysis is over, it will be displayed in the popup.



7. Pilot Study – This module is available for allauthorized user roles.

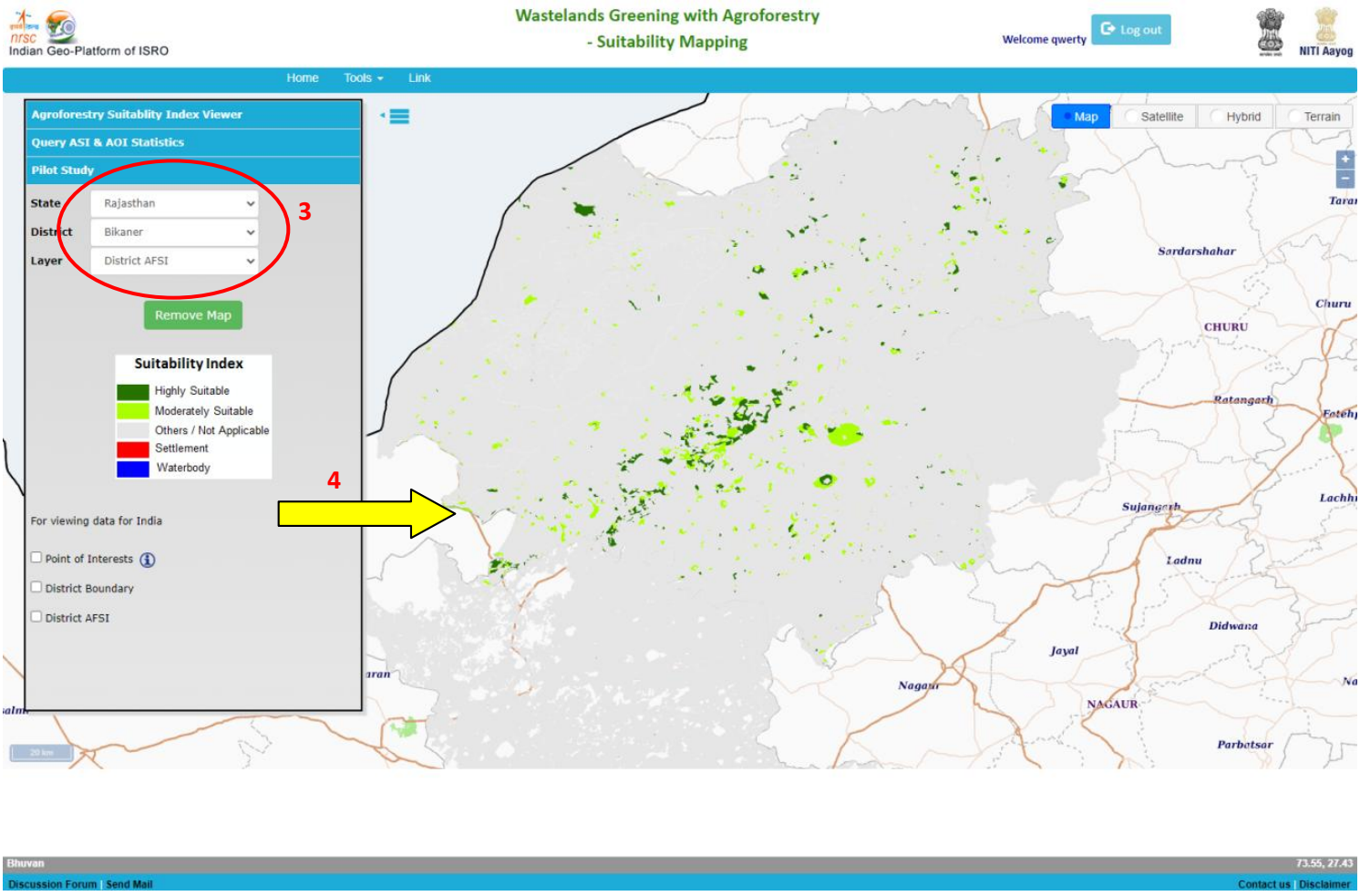
1 – State, district and layers (ground truth points, agroforestry suitability map, district boundary) can be selected for visualizing the data. Here, Rajasthan state, Bikaner district and Point of Interests layer has been selected.

2 – On click on the point data upon the map, information related to agro forestry suitability for that location comes in the popup.



3 – Similarly, other layers also can be visualized. Here, Rajasthan state, Bikaner district and District AFSI layer has been selected.

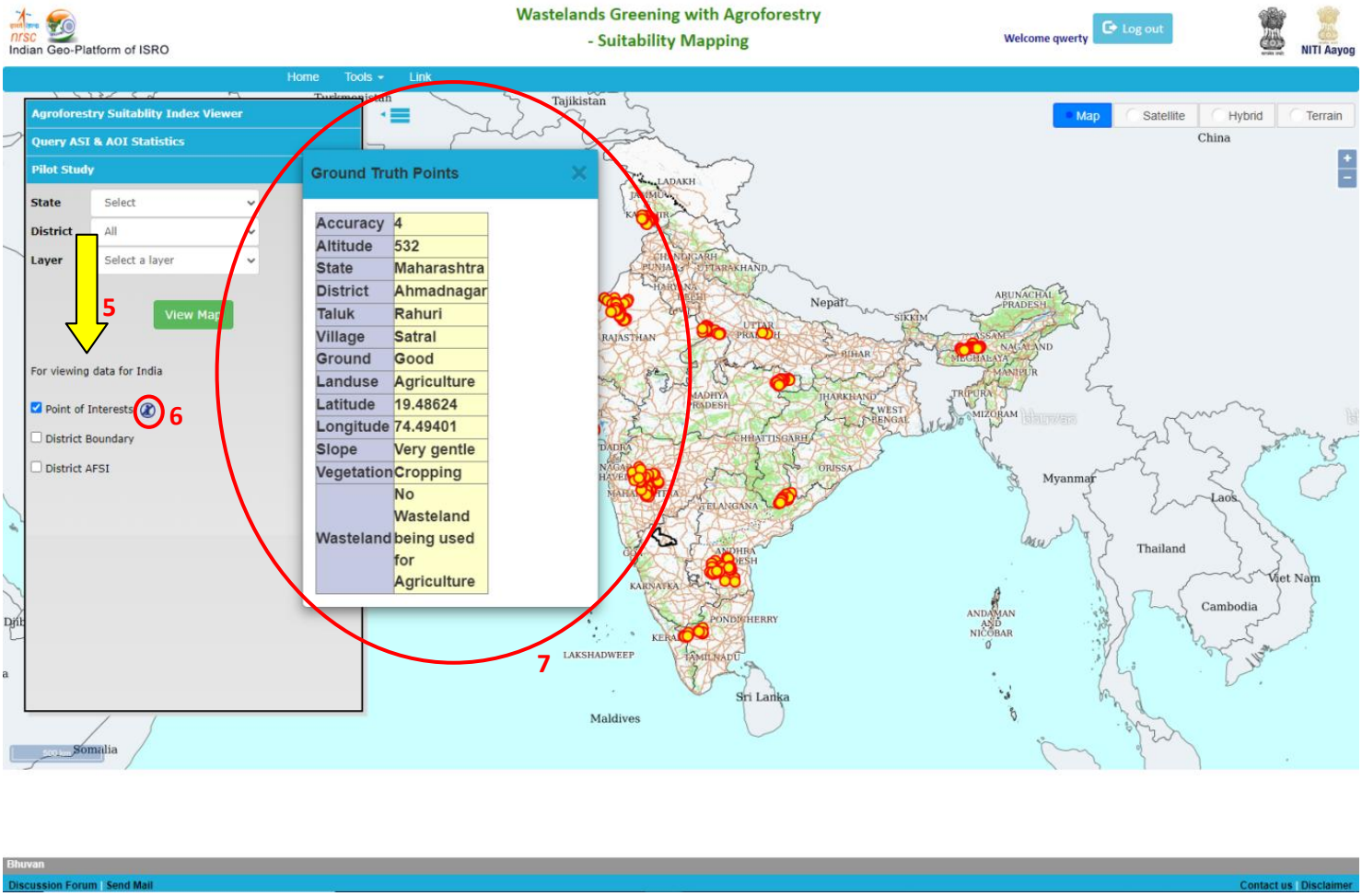
4 – The agro forestry suitability map as per pilot study will appear on the map.



5 –Complete data for the layers for the pilot study can also be viewed by selecting the check boxes.

6 – On click of “i" button; user can enable viewing information on click in the ground truth point.

7 – Information of the point data appears as a popup.



8 – Similarly pan India agro forestry suitability pilot study maps can be visualised by clicking on the check box.

9 – Agro forestry suitability maps user pilot study appears on the map.