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MAPTENURE: ENABLING TENURIAL CLARITY FOR ORANGE AREAS OF CENTRAL INDIA

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EXECUTIVE SUMMARY

Overlapping claims by the state revenue and forest departments to 1.2 million hectares of land in the central Indian states of Madhya Pradesh and Chhattisgarh (Garg 2016) have impacted at least 1.5 million families (ELDF 2018) that depend on land resources for food, fuel, and income. This lack of tenurial clarity as to whether land is revenue land or forest land is known as the "orange area" issue in the two states, previously unified as Madhya Pradesh (Figure 1), and includes areas where tenure has been ambiguous for decades. A large part of the problem is that the data required to resolve the uncertainty are dispersed, fragmented, and dated. Today, technology provides the means to collate and analyze necessary historical and spatial information and inform resolution of the orange area problem. MAPTenure, the first web-based platform of its kind, aims to bridge the gap by methodologically recording requisite data and leveraging the best available technology to enable tenurial clarity in the orange areas. The platform aims to play a key role in not only collecting the information but also in establishing one central, recognized, go-to source for information on the orange areas.

CONTENTS

Technical notes document the research or analytical methodology underpinning a publication, interactive application, or tool.

INTRODUCTION

Globally, there is evidence that secure tenure and resource rights are essential for ecological security and economic well-being. Secure tenure in forests, for instance, protects them from deforestation, fragmentation, and degradation. Secure tenure in agricultural lands catalyzes investments in improved methods of farming (Ding et al. 2016). Tenurial security strengthens the livelihoods of communities that depend on these lands and forests for food, fuel, fodder, nontimber forest produce, and wage opportunities (Gray et al. 2015).

In the states of Madhya Pradesh and Chhattisgarh in central India, one impediment to tenurial security is posed by the "orange area" issue. This problem emerges from concurrent recording of land as legally designated forest land in forest records and revenue land in revenue records.[1] The orange area ambiguity affects more than 1.2 million hectares of land and an estimated 1.5 million mostly tribal and poor households. More than 70 percent of the districts and nearly 50 percent of the villages in present-day Madhya Pradesh are affected by the orange area issue (Figure 1). In addition to undermining the livelihoods of these households, ambiguity on the status of land constrains decision-making for sustainable land management since legitimacy of land uses, institutional structures for governance, and benefit flows are determined by whether land is forest or revenue.

Over the last two decades, the Governments of Madhya Pradesh and Chhattisgarh have made several efforts to resolve the orange area issue. Since 2003, hundreds of questions have been raised in Madhya Pradesh's State Legislative Assembly. Between 2008 and 2015, senior government officials sent numerous letters to the Revenue and Forest Departments (Chief Secretary 2015), directing them to clarify the status of land (Garg 2016). Since the 1980s, Forest Settlement Officers (FSOs) have been appointed at different times to reconcile the discrepancies in forest land records (Garg 2005). At the same time, activists and social movements such as Ekta Parishad have campaigned extensively for recognition of tenure in orange areas. These efforts have raised awareness, generated political and administrative will, and brought in necessary policy spaces for resolving the issue (Department of Land Resources 2008). Nevertheless, the problem persists. One reason is that data necessary to identify the areas affected by the orange areas are fragmented, dated, and not easily accessible. For instance, essential government notifications and orders are dispersed among forest and revenue archives at state and district levels. Furthermore, information that identifies the location of orange areas dates to the 1960s and 1970s, and since then state, district, *tahseel* (subdistrict), and village boundaries have changed. Village survey numbers that at any time serve as unique identifiers have also been altered. There is no repository of these changes. Moreover, the information is textual and not spatial. As a result, it is extremely challenging to identify which areas in present-day Madhya Pradesh and Chhattisgarh are impacted by the orange area issue.

MAPTenure fills this critical gap by compiling the information essential for resolving the orange area dispute. The platform will support efforts by government agencies, civil society organizations working on land and resource rights, and organizations working on land use projects, including landscape restoration, so they can better attend to tenurial challenges. This technical note explains how the platform's beta version works and describes the methodology for data collection, collation, and analysis.

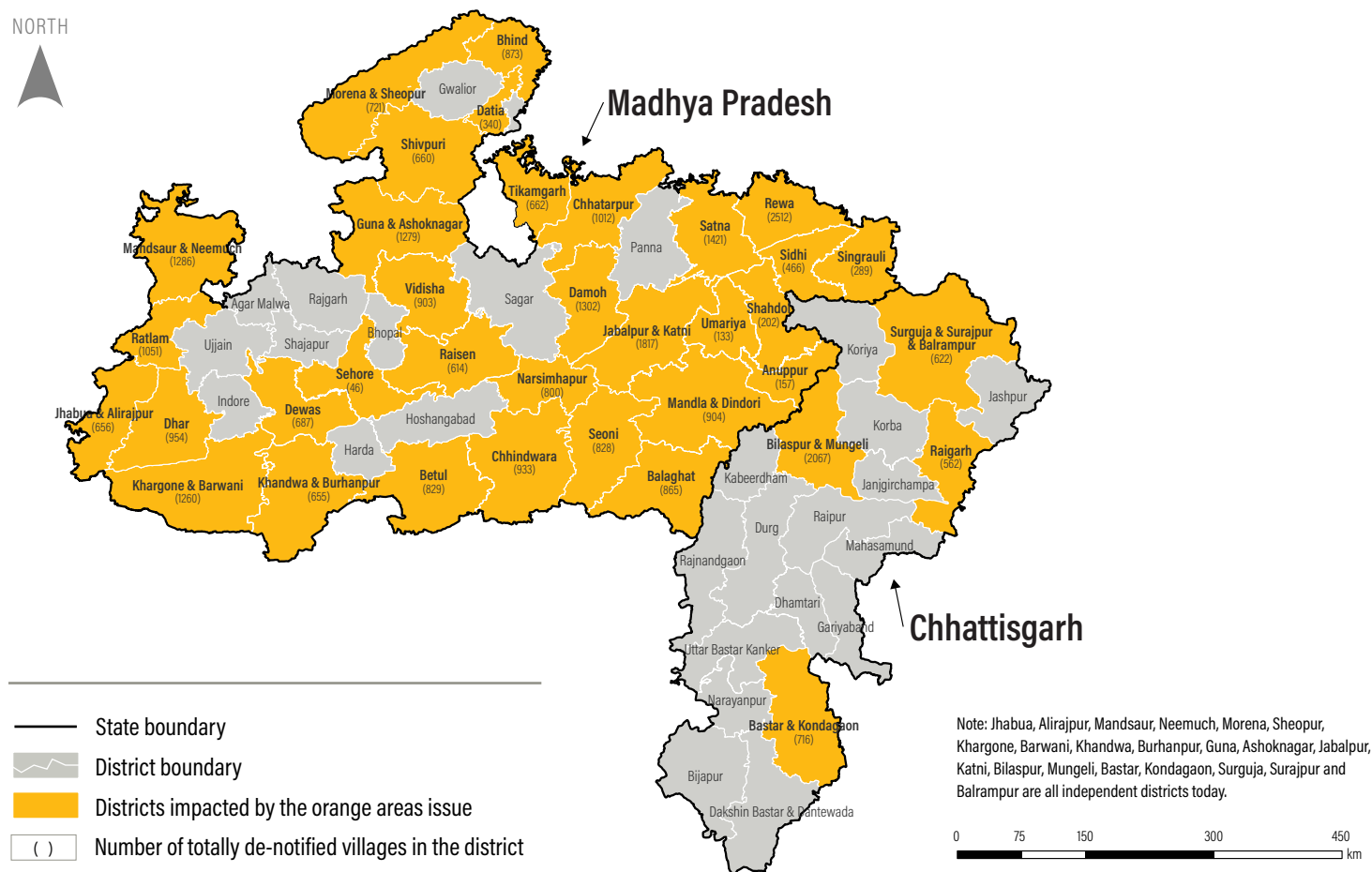For a brief history of the orange area issue, see Appendix A.

In its current version, MAPTenure provides a database of over 5,000 villages in the Madhya Pradesh districts of Sidhi, Singrauli, Shahdol, Anuppur, Umaria, and Betul. For the totally de-notified villages in these districts, MAPTenure indicates whether the orange area issue exists today.[2] The user can access this information through two types of searches (Figure 7):

Search Village: This search function is suitable for users who know the current name of the village they are interested in. The Search Village function provides a history of revenue changes to a village, indicates whether this village was part of the orange areas, and indcates whether the orange area issue exists today (Figure 8).

Search Map: This function will provide a list of the villages in the area of interest, indicate whether these villages were part of the orange areas, and indicate whether the orange area issue exists there today (Figure 9).

In both instances, the platform offers an option to generate and download a report on the presence of orange areas in a village (Figure 10). Additionally, the report uses four indicators to identify unclear tenure. These indicators include the presence of undemarcated protected forests (hereinafter, undemarcated forests) and protected forests, changes in forest boundaries to exclude undemarcated forests and protected forests, nonrecognition of forest rights in undemarcated forests and protected forests,

Figure 1 | **Districts in present-day Madhya Pradesh and Chhattisgarh impacted by the orange area issue**

NORTH

Madhya Pradesh

Chhattisgarh

State boundary

District boundary

Districts impacted by the orange areas issue

( ) Number of totally de-notified villages in the district

Note: Jhabua, Alirajpur, Mandsaur, Neemuch, Morena, Sheopur, Khargone, Barwani, Khandwa, Burhanpur, Guna, Ashoknagar, Jabalpur, Katni, Bilaspur, Mungeli, Bastar, Kondagaon, Surguja, Surajpur and Balrampur are all independent districts today.

0   75   150   300   450
km

Source: Adapted from Garg, 2016

and levying of fines or issuing of eviction orders for encroachments on forest land in undemarcated forests and protected forests. The existence of even one of these indicators is a sufficient condition for the presence of an orange area ambiguity.

METHODOLOGY

This section details the methodology for collection, collation, and analysis of the data that power MAPTenure. It also articulates the assumptions underpinning the analysis and the limitations of the process. The process of data collection and analysis was conducted between October 2016 and February 2018 for the districts of Sidhi, Singrauli, Shahdol, Anuppur, Umaria, and Betul in Madhya Pradesh.

Data Collection and Collation

This section describes the different types of data collected, their sources, and the creation of a database or masterfile. The process included the following activities:

1. **IDENTIFYING TOTALLY DE-NOTIFIED VILLAGES FROM 1972:** This information is contained in multiple gazette notifications, issued between 1965 and 1972, that declared entire villages as having no forest area. Since there is no central repository of these notifications, they were accessed from the personal libraries of K.K. Singh and Anil Garg. They were also accessed from the divisional forest offices in the six districts. It is assumed that, together, notifications from these three sources provide a near-complete data set (Appendix Table B2).

2. **IDENTIFYING TOTALLY DE-NOTIFIED VILLAGES TODAY:** The territory of Madhya Pradesh has been reorganized several times since the 1960s, with changes in state, district, *tahseel*, and village boundaries (hereinafter, revenue changes). Identifying which present-day villages were totally de-notified requires tracing revenue changes for all villages in a district. This entailed the following steps:

a. *Identifying base year:* The base year is the earliest year when gazette notifications declaring villages as devoid of forest land were published for a district. Notably, the base year for all the districts is 1972.[3]

b. *Listing, for each district, the tahseel and the name and survey number of villages:*[4] Since year-wise lists of villages were not available, the data were compiled and cross-checked from the cadastral records called *Khasra* and *Khatauni*[5] (Figure 2) of the base year and *Adhikar Abhilekh* (Record of Rights) of 1972. The records were handwritten in Hindi and in many instances were unclear. Notably, the *Khasra*, *Khatauni*, and *Adhikar Abhilekh* are prepared at the village level. Hence, hundreds of documents had to be consulted to prepare the list of villages in the base year (Appendix Table B2). All these documents were accessed from the archives of the Department of Revenue, commonly called District Record Rooms at the District Collectorate in each district headquarters.

c. *Identifying revenue changes:* To trace the years when changes were made to districts, *tahseels*, or villages, related gazette notifications were collected from the office of the District Collectors and the Madhya Pradesh Board of Revenue in Gwalior (Figure 3). For each year when revenue changes were made in a district, a new list was created, as in the previous step.

4. **PREPARING A MASTERFILE OF REVENUE CHANGES:** The data on revenue changes were compiled into an Excel spreadsheet, resulting in a district-level masterfile (Figure 4). The masterfile provided information on revenue changes for all villages from their base year to 2017. The results from the changes were compared with the Government of Madhya Pradesh's list of present-day villages in each district to verify the accuracy of the process.[6] For 2017, the masterfile also included the *halka* number[7] and the revenue inspector's[8] circle number for each village, to enable linking with the village maps as described later in this section.

Figure 2 | *Khasra* **record for village Chandaniya, survey no. 296,** *tahseel* **Gopad Banas, district Sidhi.**

Figure 3 | **Notification stating the formation of new subdistricts in the Shahdol district of Madhya Pradesh.**

5. **ASSIGNING VILLAGES A UNIQUE IDENTIFICATION NUMBER**

   (UIN): Each village in the masterfile was assigned an alphanumeric UIN indicating the state and district in 2017 along with a number. For example, for the village of Dhonga in district Singrauli of Madhya Pradesh, the UIN is MP_SNG_0341—where MP stands for Madhya Pradesh, SNG for Singrauli, and 0341 is the position of the village in the list of all villages of a district. Assigning such a UIN made it possible to overcome the challenges of repetition in survey numbers and village names (Figure 5).

6. **IDENTIFYING MISSING VILLAGES:** When the data for all villages were collated in the masterfile, it emerged that some villages from the base year did not exist in 2017. At the same time, not all villages present in 2017 could be traced back to the base year. These "missing villages" were identified and assigned a UIN so they could be incorporated in the database.

For example, for the village called Lalpur (Figure 4) in the Anuppur district of Madhya Pradesh, the revenue changes could be as follows:

a. In 1972, village Lalpur with survey number 919 was in the Sohagpur *tahseel* of Shahdol district. The village was de-notified through a gazette notification in 1972.

b. In 1981, the Anuppur *tahseel* was created and Lalpur with survey number 919 was moved to Anuppur.

c. In 1983, a new *tahseel* of Kotma was created and Lalpur was moved to Kotma. It continued to have the survey number 919.

d. In 1998, a new district of Umaria was carved out of Shahdol, but Lalpur continued to be in the Kotma *tahseel* of Shahdol district.

e. In 2003, the district of Anuppur was carved out of Shahdol. The Kotma *tahseel* was moved to Anuppur. Lalpur with survey number 919 remained a part of the Kotma *tahseel* and moved to Anuppur district.

f. In 2013, new survey numbers were allotted to the villages in Anuppur and the survey number of Lalpur changed from 919 to 153.

Figure 4

Figure 4 | Screenshot of the masterfile for district Anuppur and revenue changes for village Lalpur in district Anuppur highlighted in yellow.

District (Pre-1972)	Tahseel (Pre-1972)	Village name (Pre-1972)	Survey number (Pre-1972)	De-Notified Village 1970-72	DISTRICT	New Tahseel created in 03.08.1981	New Tahseel created in 01.04.1983	VILLAGE (1983)	Survey Number (1983)	District split: SHAHDOL and UMARIYA (6 JULY1998)	NEW TAHSIL 1998	VILLAGE (1998)	District split: SHAHDOL and ANUPPUR (15 AUG 2003)	TAHSIL 2003	VILLAGE (2003)	Survey Number (2003)	NEW DISTRICT	NEW TAHSIL 2013	Village Name (2013)	Survey Number (2013)	Survey Number from Govt. website_25 June 2017
SHAHDOL	SOHAGPUR	PAKARIYA	571		SHAHDOL	ANUPPUR	KOTMA	PAKARIYA	571	SHAHDOL	KOTMA	PAKARIYA	ANUPPUR	KOTMA	PAKARIYA	571	ANUPPUR	KOTMA	PAKARIYA	144	144
SHAHDOL	SOHAGPUR	LAMATOLA	920		SHAHDOL	ANUPPUR	KOTMA	LAMATOLA	920	SHAHDOL	KOTMA	LAMATOLA	ANUPPUR	KOTMA	LAMATOLA	920	ANUPPUR	KOTMA	LAMATOLA	145	145
SHAHDOL	SOHAGPUR	JHIROKHA	337	Y	SHAHDOL	ANUPPUR	KOTMA	JHIROKHA	337	SHAHDOL	KOTMA	JHIROKHA	ANUPPUR	KOTMA	JHIROKHA	337	ANUPPUR	KOTMA	JHIROKHA	146	146
SHAHDOL	SOHAGPUR	BICHARPUR	729	Y	SHAHDOL	ANUPPUR	KOTMA	BICHARPUR	729	SHAHDOL	KOTMA	BICHARPUR	ANUPPUR	KOTMA	BICHARPUR	729	ANUPPUR	KOTMA	BICHARPUR	147	147
SHAHDOL	SOHAGPUR	DHUMKAHAI	483	Y	SHAHDOL	ANUPPUR	KOTMA	DHUMKAHAI	483	SHAHDOL	KOTMA	DHUMKAHAI	ANUPPUR	KOTMA	DHUMKAHAI	483	ANUPPUR	KOTMA	DHUMKAHAI	148	148
SHAHDOL	SOHAGPUR	GADHI	215	Y	SHAHDOL	ANUPPUR	KOTMA	GADHI	215	SHAHDOL	KOTMA	GADHI	ANUPPUR	KOTMA	GADHI	215	ANUPPUR	KOTMA	GADHI	149	149
SHAHDOL	SOHAGPUR	NIGWANI	523		SHAHDOL	ANUPPUR	KOTMA	NIGWANI	523	SHAHDOL	KOTMA	NIGWANI	ANUPPUR	KOTMA	NIGWANI	523	ANUPPUR	KOTMA	NIGWANI	150	150
SHAHDOL	SOHAGPUR	CHHOLHA	525		SHAHDOL	ANUPPUR	KOTMA	CHHOLHA	525	SHAHDOL	KOTMA	CHHOLHA	ANUPPUR	KOTMA	CHHOLHA	525	ANUPPUR	KOTMA	CHHOLHA	151	151
SHAHDOL	SOHAGPUR	SARANGGARH	969		SHAHDOL	ANUPPUR	KOTMA	SARANGGARH	969	SHAHDOL	KOTMA	SARANGGARH	ANUPPUR	KOTMA	SARANGGARH	969	ANUPPUR	KOTMA	SARANGGARH	152	152
SHAHDOL	SOHAGPUR	LALPUR	919	Y	SHAHDOL	ANUPPUR	KOTMA	LALPUR	919	SHAHDOL	KOTMA	LALPUR	ANUPPUR	KOTMA	LALPUR	919	ANUPPUR	KOTMA	LALPUR	153	153
SHAHDOL	SOHAGPUR	SILPUR	979	Y	SHAHDOL	ANUPPUR	KOTMA	SILPUR	979	SHAHDOL	KOTMA	SILPUR	ANUPPUR	KOTMA	SILPUR	979	ANUPPUR	KOTMA	SILPUR	154	154
SHAHDOL	SOHAGPUR	URTAN	49		SHAHDOL	ANUPPUR	KOTMA	URTAN	49	SHAHDOL	KOTMA	URTAN	ANUPPUR	KOTMA	URTAN	49	ANUPPUR	KOTMA	URTAN	155	155
SHAHDOL	SOHAGPUR	KAMRANTOLA	83		SHAHDOL	ANUPPUR	KOTMA	KAMRANTOLA	83	SHAHDOL	KOTMA	KAMRANTOLA	ANUPPUR	KOTMA	KAMRANTOLA	83	ANUPPUR	KOTMA	KAMRANTOLA	156	156
SHAHDOL	SOHAGPUR	KAISORI	105		SHAHDOL	ANUPPUR	KOTMA	KAISORI	105	SHAHDOL	KOTMA	KAISORI	ANUPPUR	KOTMA	KAISORI	105	ANUPPUR	KOTMA	KAISORI	157	157
SHAHDOL	SOHAGPUR	GUDARU	230		SHAHDOL	ANUPPUR	KOTMA	GUDARU	230	SHAHDOL	KOTMA	GUDARU	ANUPPUR	KOTMA	GUDARU	230	ANUPPUR	KOTMA	GUDARU	158	158
SHAHDOL	SOHAGPUR	DULHI BANDH	442		SHAHDOL	ANUPPUR	KOTMA	DULHI BANDH	442	SHAHDOL	KOTMA	DULHI BANDH	ANUPPUR	KOTMA	DULHI BANDH	442	ANUPPUR	KOTMA	DULHI BANDH	159	159
SHAHDOL	SOHAGPUR	CHAKA	288		SHAHDOL	ANUPPUR	KOTMA	CHAKA	288	SHAHDOL	KOTMA	CHAKA	ANUPPUR	KOTMA	CHAKA	288	ANUPPUR	KOTMA	CHAKA	160	160
SHAHDOL	SOHAGPUR	RAIUSA	896		SHAHDOL	ANUPPUR	KOTMA	RAIUSA	896	SHAHDOL	KOTMA	RAIUSA	ANUPPUR	KOTMA	RAIUSA	896	ANUPPUR	KOTMA	RAIUSA	161	161
SHAHDOL	SOHAGPUR	KHAMRAUDH	180		SHAHDOL	ANUPPUR	KOTMA	KHAMRAUDH	180	SHAHDOL	KOTMA	KHAMRAUDH	ANUPPUR	KOTMA	KHAMRAUDH	180	ANUPPUR	KOTMA	KHAMRAUDH	162	162
SHAHDOL	SOHAGPUR	PACHKHURA	558		SHAHDOL	ANUPPUR	KOTMA	PACHKHURA	558	SHAHDOL	KOTMA	PACHKHURA	ANUPPUR	KOTMA	PACHKHURA	558	ANUPPUR	KOTMA	PACHKHURA	163	163
SHAHDOL	SOHAGPUR	JARRATOLA	348		SHAHDOL	ANUPPUR	KOTMA	JARRATOLA	348	SHAHDOL	KOTMA	JARRATOLA	ANUPPUR	KOTMA	JARRATOLA	348	ANUPPUR	KOTMA	JARRATOLA	164	164
SHAHDOL	SOHAGPUR	DALDAL	429		SHAHDOL	ANUPPUR	KOTMA	DALDAL	429	SHAHDOL	KOTMA	DALDAL	ANUPPUR	KOTMA	DALDAL	429	ANUPPUR	KOTMA	DALDAL	165	165
SHAHDOL	SOHAGPUR	BODREE	784		SHAHDOL	ANUPPUR	KOTMA	BODREE	784	SHAHDOL	KOTMA	BODREE	ANUPPUR	KOTMA	BODREE	784	ANUPPUR	KOTMA	BODREE	166	166

Converting Textual Information to Spatial Information

These steps were followed to convert the data from the masterfile into maps:

1. **PREPARING DISTRICT-WISE VILLAGE MAPS:** A set of district-wise village maps was obtained from the Madhya Pradesh Agency for Information Technology (MAPIT), a government agency established to support implementation of the state IT policy. These maps were inaccurate, however, with overlaps and gaps in village boundaries. Furthermore, some villages were missing from the maps. To address these limitations, visual interpretation using computerized maps available on Bhu Abhilekh[9] and toposheets of the Survey of India was combined with standard geospatial techniques.[10] Once the maps were corrected, they were linked to the masterfile using the UIN described above.

2. **PREPARING FOREST MAPS:** Data on forest compartments were downloaded from the website of the Madhya Pradesh Forest Department.[11] Data on protected and reserved forests were digitized from the toposheets. Each district comprised multiple toposheets, as listed in Appendix Table B1.

Indicators of Unclear Tenure

To analyze the potential for orange area ambiguities in 2017, four indicators were used as discussed below. Notably, this analytical step was followed only for the totally de-notified villages.

1. **IDENTIFYING UNDEMARCATED PROTECTED FORESTS AND PROTECTED FORESTS IN A VILLAGE:** The Government of Madhya Pradesh recognizes undemarcated forests as orange areas (Principal Chief Conservator of Forest 2018). To ascertain if a village contained undemarcated forests, the forest compartment maps were overlaid with maps of reserved and forests (from the toposheets). All areas in the forest compartment but not notified as reserved

Figure 5 | **Village Pondi appears in *tahseels* Kusmi, Majhauli, Rampur Naikin, and Bahri. Thus, the UIN made it possible to overcome the challenges of repetition in survey numbers and village names.**

or protected forests were considered undemarcated protected forests. Thereafter, the undemarcated forests and protected forests were overlaid with the district-wise village maps to identify which villages have orange areas today.

2. **DETERMINING WHETHER VILLAGE BOUNDARIES WERE ALTERED TO EXCLUDE UNDEMARCATED FOREST AREAS AND PROTECTED FOREST AREAS:** In some districts of Madhya Pradesh and Chhattisgarh, village maps were modified to exclude forest areas. In these districts, it was not always possible to ascertain the presence of undemarcated forests and protected forests in de-notified villages. However, changes to the village boundaries to accommodate undemarcated forests and protected forests were considered an indicator of the presence of the orange area problem today. This indicator was only found in the districts of Sidhi and Singrauli. The following steps were followed to ascertain the change in village boundaries to exclude undemarcated forest and protected forest areas:

a. In some cases, the village maps from MAPIT had gaps or blank spaces between village boundaries. A gap of more than one hectare between village boundaries was assumed to either be a missing village or a forest area.

b. To identify whether the gap was a forest or a missing village, the village map was overlaid with the digitized toposheet.

c. If the gap was a forest area but outside the reserved or protected forests on a toposheet, it was considered an undemarcated protected forest. All areas in the forest compartment but not notified as reserved or protected forests were considered undemarcated protected forests. The blank spaces, if any, were also assumed to be undemarcated protected forests.

d. Thereafter, the undemarcated forests and the protected forests were overlaid with the district-wise village maps.

e. The existing village boundary was compared with the shape of the village boundary in the *Majmuli* maps; that is, the pre-1975 one-inch to two-mile *tahseel* maps of Sidhi and Singrauli accessed from the office of the District Collector.

f. Through this comparison, it became evident where village boundaries were changed. For the villages where the boundaries were changed, overlaying with the maps of undemarcated forests and protected forests made it possible to ascertain whether undemarcated forests and protected forests had been excluded.

3. IDENTIFYING VILLAGES WHERE FOREST RIGHTS HAVE BEEN RECOGNIZED IN PROTECTED FORESTS AND UNDEMARCATED PROTECTED FORESTS: In totally de-notified villages forest rights were recognized in protected forests. This indicated unclear tenure. One manifestation of orange areas is difficulty securing rights in undemarcated protected forests as stipulated by the Forest Rights Act (FRA).[12] In undemarcated forests, the absence of recognized rights may result from poor awareness of the ability to claim these rights or from rejection of claims due to unclear status of land. To identify the absence of recognized rights in undemarcated protected forests, data on the Forest Rights Act were collected from the Tribal Affairs Department at the District Collectorate. If the rights were recognized in reserved forests, in protected forests, or on revenue lands, it was assumed that the villagers were aware of the FRA. If villagers were aware of their rights but no rights were recognized within undemarcated protected forests, this indicated unclear tenure.

4. IDENTIFYING TOTALLY DE-NOTIFIED VILLAGES WHERE FINES HAVE BEEN LEVIED OR EVICTION ORDERS ISSUED FOR ENCROACHMENTS ON UNDEMARCATED FORESTS AND PROTECTED FORESTS: This evidence is collected from case registers in the District Collector Court, the Upper Collector Court, the District Judge Court, and the Civil Judge Court.

The evidence generated is based on government data from gazette notifications, land records, orders and circulars, and district record rooms. Limited ground-truthing was undertaken for de-notified villages in the Sidhi district of Madhya Pradesh.

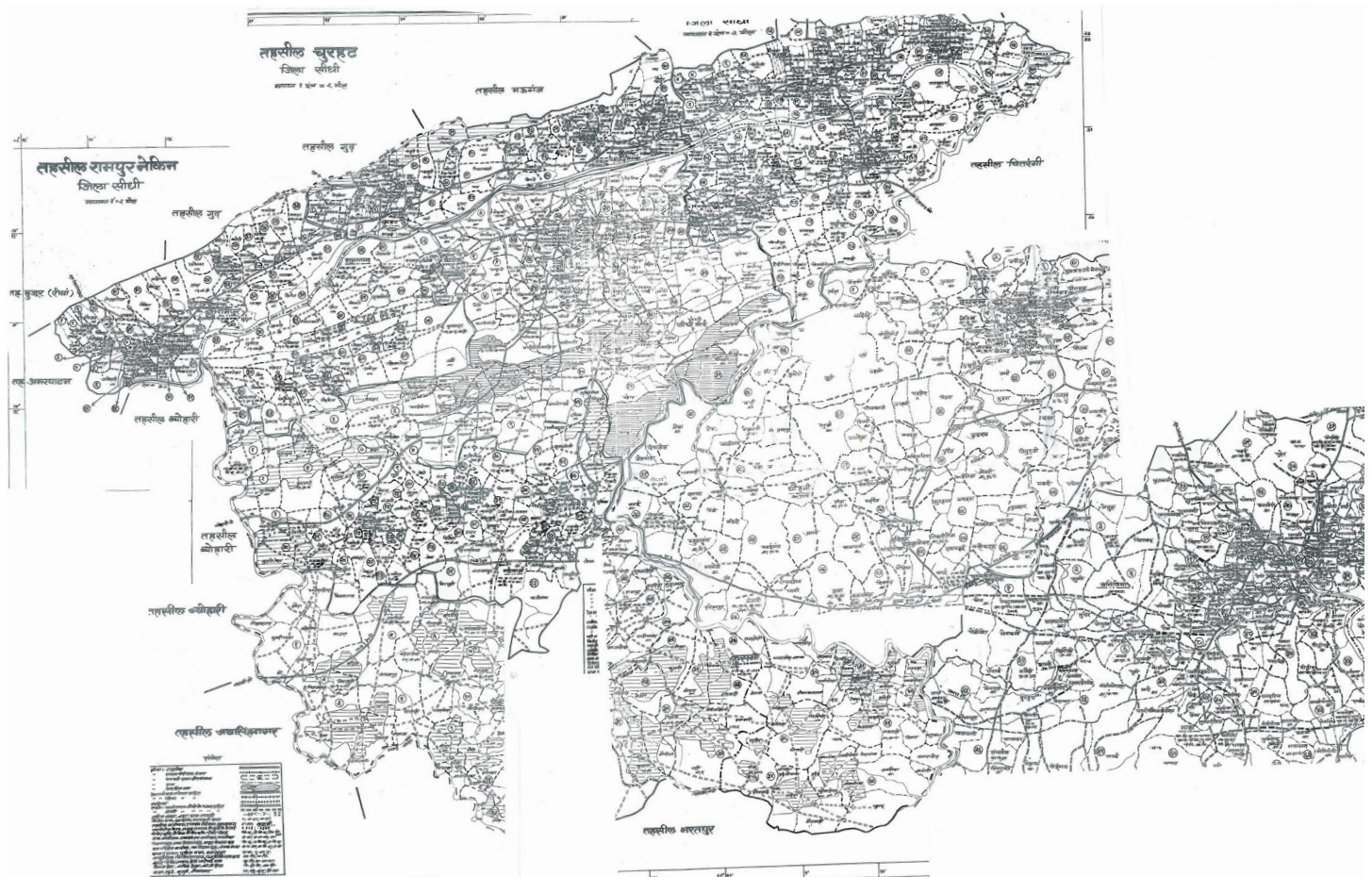Figure 6 | *Majmuli* **map of Sidhi district.**

Figure 7 | **The platform allows a Search Village and Search Map functionality to locate totally de-notified villages.**
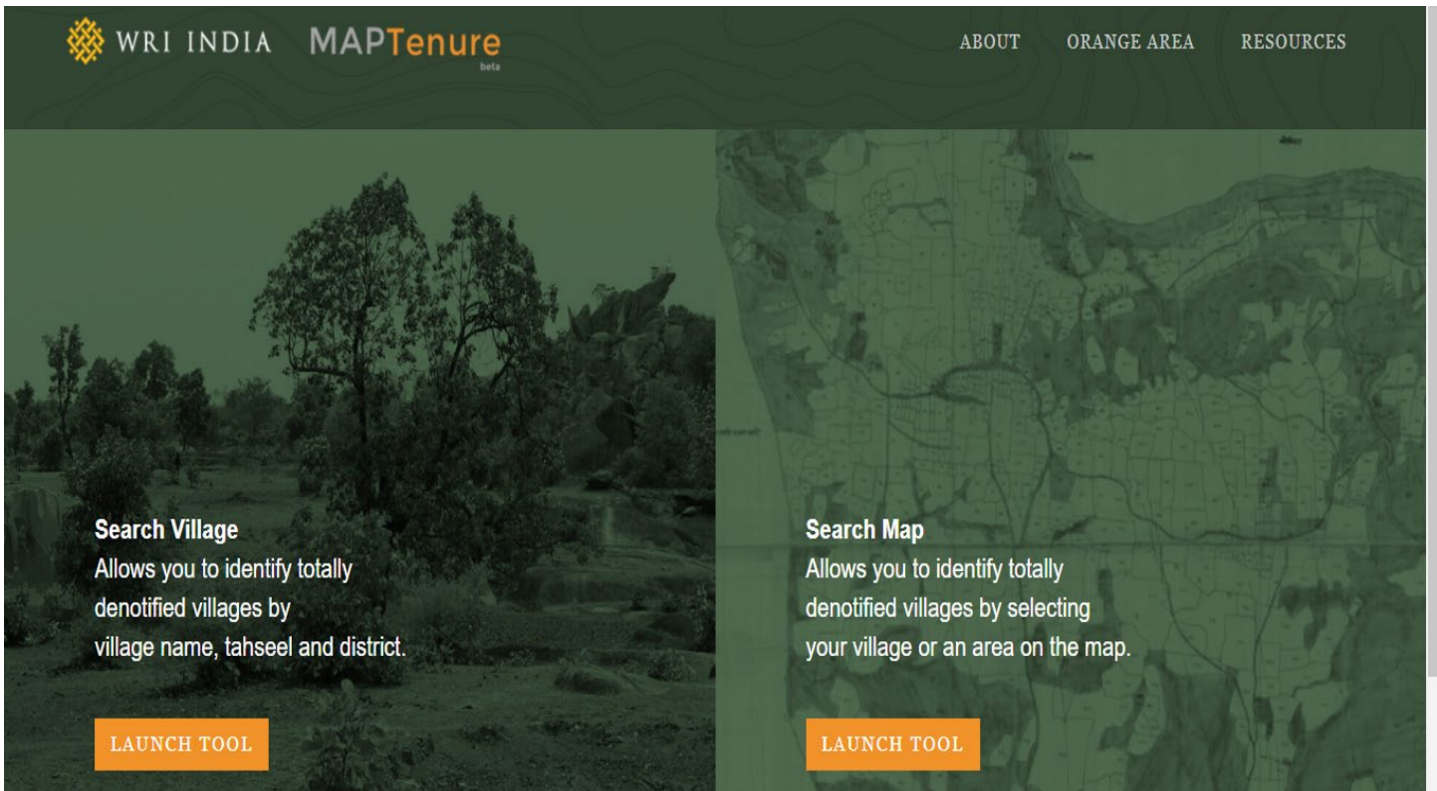

Figure 8 | **Search for a totally de-notified village using the Search Village functionality.**
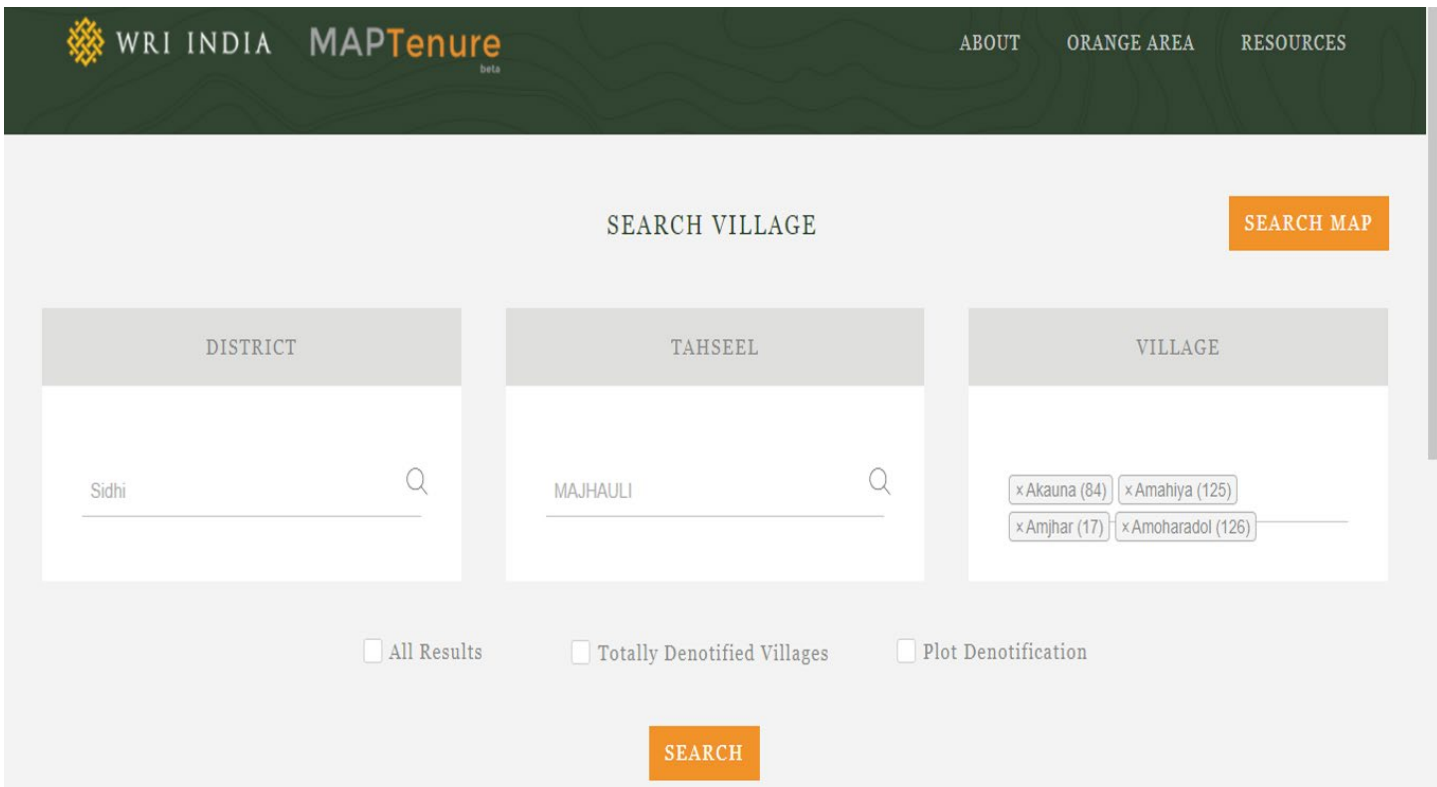
Figure 9 | **Search for a totally de-notified village using the Search Map functionality.**
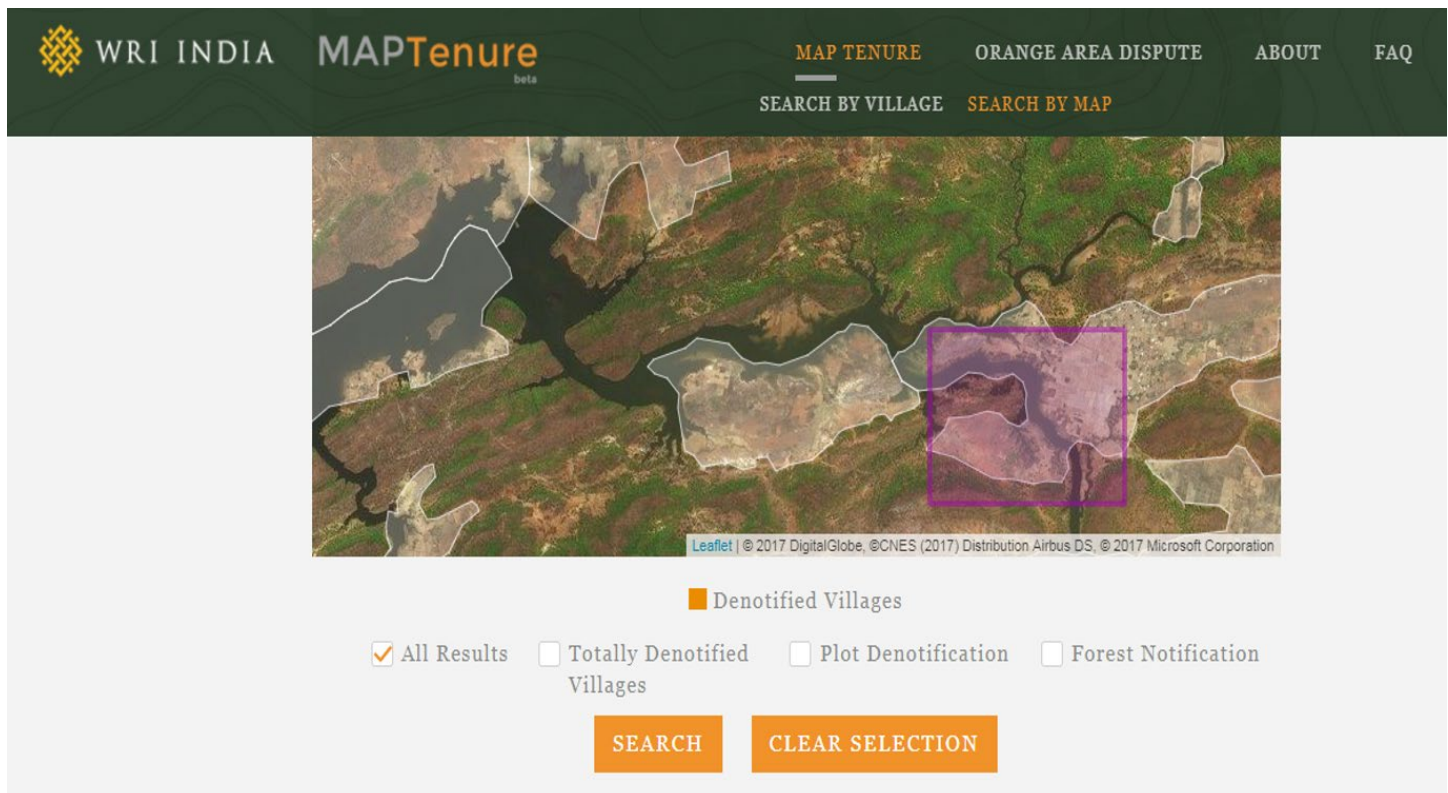
CONCLUSION

As Madhya Pradesh embarks on initiatives to support the Government of India's commitments to increase tree cover and enhance carbon sinks, the orange area issue can hamper efforts to meet these targets. Over the past two decades, there has been political will to resolve the orange area dispute. However, data on land ownership are dispersed. To understand the complexity of the issue and to resolve the dispute, it is critical to take an integrated view of the land ownership and land use changes of revenue and forest land along with the notifications on de-notifications and notifications of forest land.

Unless we untangle spatial depiction, the problem of land ownership cannot be resolved, and if data are lost, spatial information becomes nonexistent. There have also been administrative overlaps and oversights. Today, technology is available to help unravel the issue and bridge this gap. The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act of 2006 also provides us with the necessary policy and legal framework to address the orange area issue. The MAPTenure platform is the first step toward enabling tenurial clarity of orange areas in central India and operationalizing political will to help India meet its development and environmental goals.

Figure 10 | **The search results displayed here indicate villages with plot de-notifications and totally de-notified villages. The detailed report will list the revenue changes to the village along with any indicators of ambiguity.**

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APPENDIX A. HISTORICAL BACKGROUND

The root cause of tenurial ambiguity in the orange areas is dual control over the same land area by the Forest and Revenue Departments in unified Madhya Pradesh. This appendix provides an overview of how such conflicting control came to be and the measures taken so far to resolve the problem.

In the decade following India's independence, large swaths of forests and common lands that were previously part of princely states or the estates of revenue intermediaries such as *zamindars* and *malguzars* were brought under state control. In 1958, the Government of Madhya Pradesh declared these lands as "undemarcated protected forests" and entrusted their management to the state Forest Department.[1] The use of the term "undemarcated" implied that the requirements of boundary demarcation and recording and settling of rights had not been completed. Concomitantly, the Government of Madhya Pradesh developed a uniform system of land management that was enacted as the Madhya Pradesh Land Revenue Code of 1959. For the most part, this code applied to all revenue land in the state, which was essentially all lands

except those that had been declared protected or reserved forests according to the Indian Forest Act of 1927. The lands declared "undemarcated protected forests" were also included in the purview of the Land Revenue Code, to be administered by the state Revenue Department. Thus dual control was established over an estimated 9 million hectares (Mha) of land (Garg 2016). Over time, under various schemes to increase agricultural productivity, the Government of Madhya Pradesh issued *pattas*[2], or leases, for a significant part of these 9 Mha. These *pattas* were meant for cultivation, particularly by tribal and landless people.

In 1963, the Government of Madhya Pradesh initiated a time-bound process of survey and settlement.[3] This process was jointly conducted by the Forest and Revenue Departments and involved village-level survey and mapping. It involved identifying lands to be excluded from forest areas, primarily (1) small pieces of lands that were inhabited and therefore needed to be excluded from forest areas and (2) areas that, although part of forest records, were needed for future expansion of villages, agricultural cultivation, and the subsistence requirements of the villages—or *nistar*.[4]

Figure A1 | **A sample *patwari* map depicting the demarcation process in village Chhatarpur, district Betul, Madhya Pradesh. It depicts the forest areas in green before the demarcation process (left) and the areas marked as orange on completion of the demarcation proceedings (right).[a]**

Note: [a] Annexure 9 of *Ekta Parishad v. State of Madhya Pradesh and State of Chhattisgarh* 2003.

At the same time, lands with standing forests or surrounded by a forest area but not included in forest areas were to be identified as forests (*Ekta Parishad v. State of Madhya Pradesh and State of Chhattisgarh* 2003). At the village level, maps were prepared by *patwaris*[5] to indicate all the revenue land to be given to the Forest Department. All areas declared as forests through blanket notifications were colored green, and subsequently areas that were to be handed back to the Revenue Department (to be left out of forests) were colored orange—these came to be known as the "orange areas" or the "left-out areas" (Garg 2005). In the absence of a legal provision for the transfer of land from the Forest to the Revenue Department, the Indian Forests Act of 1927, as applicable in Madhya Pradesh, was amended[6] by introducing Sections 20-A[7] and 34-A[8].

Once the demarcation process was complete, the *patwari* ceded the village maps and the survey and demarcation proceedings to the designated revenue and forest officials. It was expected that the revenue and forest records would be corrected on the basis of the changes made to the village maps (*Ekta Parishad v. State of Madhya Pradesh and State of Chhattisgarh* 2003). This implied that the jurisdiction of the orange areas would be transferred to the Revenue Department under section 34A and the green areas would be retained or added to the Forest Department (Figure A1).

The process of survey and demarcation took several years to complete. In 1972, the Government of Madhya Pradesh issued a series of notifications.[9] First, it designated entire villages as having no forest areas (hereinafter referred to as "totally de-notified villages"). By the Forest Department's own estimates, approximately 31,485 villages in unified Madhya Pradesh were totally de-notified (Government of Madhya Pradesh 1976). Second, it designated plots or portions of plots of land as having no forest area (hereinafter referred to as "de-notified plots"). Through this process, 1.5 Mha of land was transferred to the Revenue Department between 1966 and 1976 (Government of Madhya Pradesh 1976).

More than 1.2 Mha were double-counted in revenue and forest records until as late as 1994 (Ashok Masih 1994).[10] Although detailed notifications were issued, the land records were not fully amended to incorporate the transition from forest to revenue. The matter was further complicated because the de-notified lands were distributed and allotted even though the processes of settlement and updating of records were incomplete.[11] Most of the beneficiaries of this land allotment were tribal, landless, and other marginalized groups. And while according to revenue records they were legitimate occupants, according to forest records they were encroachers.

While the processes of de-notification and distribution were ongoing, the large-scale felling of trees on revenue lands and the launch of the *Adhikar Abhiyan* (loosely translated as "Drive for Rights Recognition") disrupted the process. The tree-felling reports from the Hoshangabad district of Madhya Pradesh indicated that areas suited for forest cover had not been fully identified as forests in the survey and demarcation process. Accordingly, a second survey was ordered to include lands with good tree cover as forest areas. This continued until 1988 and resulted in the notification of forest areas. At the same time, the *Adhikar Abhiyan* was launched in Madhya Pradesh to convert leases to ownership, or *bhoomiswami* rights. As part of this, the Revenue Department distributed government land, including the orange areas, and people took possession of this land. Once again, however, the Forest Department neither complained nor changed its records, nor did the Revenue Department make the necessary changes to the land records.

In the late 1980s and 1990s, two critical transitions were evident in the forest sector in India. First, with the Forest Conservation Act of 1980, decisions on diversion of forest land for nonforest purposes such as agriculture, infrastructure development, mining, and other uses were brought under the purview of the national government (Chaturvedi 2016). As a result, the decision-making powers of the state governments to de-notify forest lands were curtailed by law. The Forest Conservation Act of 1980 impacted orange areas when the Supreme Court of India decided, in 1996, that all land recorded as forest, irrespective of ownership, would be brought under the purview of this legislation. The forest departments were instructed to evict encroachers, including occupants of land double-recorded as forest and revenue. The second transition revolved around recognition of the claims of communities living in and around forests and policy action to address conflict and contestation in forest areas. In 1988, for instance, the Forest Department in Madhya Pradesh appointed 10 forest settlement officers to listen to disputes and objections in the orange areas. A national-level interministerial committee also deliberated on the matter; on the basis of its recommendations, the Ministry of Environment, Forests and Wildlife directed the Madhya Pradesh government to ensure that *pattas* and grants made to tribal and rural poor were honored (Department of Environment, Forests and Wildlife 1990). It further directed that district-level committees be formed to resolve disputes at their earliest stage. The Government of Madhya Pradesh also started the process of survey and settlement in 1990 and 1994, but with the advent of the 1996 judgment, these remained ineffective.

APPENDIX B. TABLES

Table B1 | **Toposheets Accessed to Ascertain the Green Wash Areas**

SL. NO.	DEGREE SHEET NUMBER	TOPOSHEET NUMBER	DISTRICT	PUBLISHED YEAR	SL. NO.	DEGREE SHEET NUMBER	TOPOSHEET NUMBER	DISTRICT	PUBLISHED YEAR
1	55F	55F/7	Betul	2010	23	55K	55K/2	Betul	2009
2	55F	55F/8	Betul	2010	24	55K	55K/3	Betul	2009
3	55F	55F/11	Betul	2011	25	55K	55K/5	Betul	2011
4	55F	55F/12	Betul	2009	26	55K	55K/6	Betul	2009
5	55F	55F/15	Betul	2009	27	55K	55K/9	Betul	2009
6	55F	55F/16	Betul	2010	28	63D	63D/16	Umaria	2010
7	55G	55G/1	Betul	2011	29	63H	63H/14	Sidhi	2011
8	55G	55G/2	Betul	2010	30	63H	63H/10	Sidhi	2011
9	55G	55G/5	Betul	2010	31	63H	63H/15	Sidhi and Singrauli	2011
10	55G	55G/6	Betul	2009	32	63H	63H/11	Sidhi	2010
11	55G	55G/7	Betul	2011	33	63H	63H/7	Sidhi and Shadhol	2010
12	55G	55G/9	Betul	2011	34	63H	63H/16	Sidhi and Singrauli	2011
13	55G	55G/10	Betul	2011	35	63H	63H/12	Sidhi and Shahdol	2011
14	55G	55G/11	Betul	2010	36	63H	63H/8	Shahdol and Umariya	2009
15	55G	55G/13	Betul	2010	37	63H	63H/4	Shahdol	2009
16	55G	55G/14	Betul	2010	38	63L	63L/10	Singrauli	2010
17	55G	55G/15	Betul	2010	39	63L	63L/6	Sidhi and Singrauli	2010
18	55J	55J/3	Betul	2009	40	63L	63L/2	Sidhi	2009
19	55J	55J/4	Betul	2011	41	63L	63L/15	Singrauli	2010
20	55J	55J/7	Betul	2009	42	63L	63L/11	Singrauli	2011
21	55J	55J/8	Betul	2009	43	63L	63L/7	Sidhi and Singrauli	2010
22	55K	55K/1	Betul	2011	44	63L	63L/3	Sidhi and Singrauli	2010

Table B1 | **Toposheets Accessed to Ascertain the Green Wash Areas (Continued)**

SL. NO.	DEGREE SHEET NUMBER	TOPOSHEET NUMBER	DISTRICT	PUBLISHED YEAR	SL. NO.	DEGREE SHEET NUMBER	TOPOSHEET NUMBER	DISTRICT	PUBLISHED YEAR
45	63L	63L/16	Singrauli	2010	67	64E	64E/7	Shahdol and Umariya	2010
46	63L	63L/12	Singrauli	2011	68	64E	64E/3	Umaria and Anuppur	2010
47	63L	63L/8	Singrauli	2010	69	64E	64E/16	Shahdol and Anuppur	2009
48	63L	63L/4	Sidhi and Singrauli	2010	70	64E	64E/12	Anuppur and Shadhol	2010
49	64A	64A/13	Umaria	2010	71	64E	64E/8	Umaria, Anuppur, and Shadhol	2010
50	64A	64A/9	Umaria	2009	72	64E	64E/4	Umaria and Anuppur	2010
51	64A	64A/14	Umaria	2009	73	64F	64F/13	Anuppur	2010
52	64A	64A/10	Umaria	2011	74	64F	64F/9	Anuppur	2010
53	64A	64A/15	Umaria	2009	75	64F	64F/5	Anuppur	2010
54	64A	64A/11	Umaria	2010	76	64F	64F/1	Anuppur	2009
55	64A	64A/16	Umaria	2011	77	64F	64F/14	Anuppur	2010
56	64A	64A/12	Umaria	2009	78	64F	64F/10	Anuppur	2010
57	64E	64E/13	Sidhi	2009	79	64I	64I/13	Singrauli	2010
58	64E	64E/9	Sidhi	2009	80	64I	64I/9	Singrauli	2009
59	64E	64E/5	Umariya and Shahdol	2010	81	64I	64I/5	Singrauli	2009
60	64E	64E/1	Umariya and Shahdol	2010	82	64I	64I/1	Sidhi and Singrauli	2009
61	64E	64E/14	Shahdol	2011	83	64I	64I/3	Anuppur	2011
62	64E	64E/10	Shahdol	2009	84	63L	63L/14	Singrauli	1971
63	64E	64E/6	Shahdol and Umariya	2011	85	64I	64I/4	Anuppur	1970
64	64E	64E/2	Shahdol	2011					
65	64E	64E/15	Anuppur and Shadhol	2009					
66	64E	64E/11	Shahdol	2010					

Table B2 | Period of Data Collection and Sources of Data

DISTRICT	PERIOD OF DATA COLLECTION	DOCUMENTS CONSULTED TO VERIFY THE LIST OF VILLAGES FROM 1956	NUMBER OF *KHASRA* AND *KHATAUNI* LEDGERS REFERRED	SOURCE FOR *KHASRA* AND *KHATAUNI* LEDGERS, RECORD OF RIGHTS	SOURCE FOR GAZETTE NOTIFICATIONS FOR DE-NOTIFICATION	SOURCE FOR INFORMATION ON NEWLY CARVED DISTRICTS FROM EXISTING DISTRICTS	SOURCE FOR INFORMATION ON NEWLY CARVED *TAHSEELS* FROM EXISTING DISTRICTS	FRA DATA
Sidhi	October 2016 to July 2017	*Khasra* and *Khatauni* ledgers, *Adhikar Abhilekh* 1972	Around 8,936	Land Records Room, District Collectorate Sidhi	Personal library of K.K. Singh	-	General Administration Department, District Collectorate Sidhi	Forest Department, Sidhi
Singrauli	October 2016 to July 2018	*Khasra* and *Khatauni* ledgers, *Adhikar Abhilekh* 1972	Around 4,305	Land Records Room, Collectorate Singrauli	Divisional forest officer, Forest Department (West Sidhi)	Sidhi District Census Handbook 2011	General Administration Department, District Collectorate Singrauli	Tribal Affairs Department, Singrauli
Shahdol	September 2017 to January 2018	*Khasra* and *Khatauni* ledgers, *Adhikar Abhilekh* 1972	Around 6,307	Land Records Room, Collectorate Shahdol	For Sohagpur and Bandhavgarh, Divisional Forest Officer, Forest Department, Shahdol; for Beohari and Pushparajgarh, personal library of Anil Garg	General Administration Department, District Collectorate Shahdol	General Administration Department, District Collectorate Shahdol	Tribal Affairs Department, Shahdol
Anuppur	September 2017 to January 2018	*Khasra* and *Khatauni* ledgers, *Adhikar Abhilekh* 1972	Around 4,896	Land Records Room, Collectorate Anuppur		Anuppur District Census Handbook 2011	General Administration Department, District Collectorate Anuppur	Tribal Affairs Department, Anuppur
Umaria	September 2017 to January 2018	*Khasra* and *Khatauni* ledgers, *Adhikar Abhilekh* 1972	Around 4,879	Land Records Room, Collectorate Umaria		Umaria District Census Handbook 2001	General Administration Department, District Collectorate Umaria	Tribal Affairs Department, Umaria
Betul	December 2017 to February 2018	List of villages 1958/59 and *Khasra* and *Khatauni* ledgers, *Adhikar Abhilekh* 1972	Around 3,000	Land Records Room, Collectorate Betul	Personal library of Anil Garg	-	Betul District Census Handbook 2011, Betul District Census Handbook 2001	Tribal Affairs Department, Betul

ENDNOTES

1. Land ownership and governance in India operates through an extensive legal framework that determines the management of revenue territory. In India, land ownership and land use must be understood as two separate frameworks of governance but with multiple overlaps. This means that forest land is land under the jurisdiction of a state forest department but could be utilized for agricultural or industrial purposes. Similarly, land governed by a revenue department could be agricultural, could have forests, or be common/*nistar* land. Each department also maintains its own territorial organization to govern its land. Both revenue and forest lands are governed by separate laws under the Indian constitution.

2. Entire villages that were issued gazette notifications designating them as having no forest area are referred to as "totally de-notified villages" in orange area parlance.

3. Since the first set of gazette notifications with the village survey numbers were issued in 1972.

4. Since a subdistrict, a district, and a state may have multiple villages of the same name, a survey number is used to identify each village. It is also referred to as the settlement number or general number.

5. The *Khasra* is the basic village form in which the description of every plot (that is, the name of the owner, area, land use, and the different subcategories of land use such as the type of crop, whether the land is irrigated or not, and the types of trees on the land) is entered. The *Khasra* is rewritten every fifth year in the prescribed form. It is provided for every plot in a cadastrally surveyed village and is filled out by the patwari after local enquiry and field inspection (Mehta 2002). The *Khatauni* is a ledger with individual land records, where the records of all the landowners in the village are listed with their names and *Khasra* number.

6. The masterlist of present-day villages is available at http://landrecords.mp.gov.in/index.htm (Madhya Pradesh Land Records Department 2018).

7. The *patwari* is in charge of keeping the records at the village level. This person maintains land records, statistical data, and land measurements of the village. She or he could be holding records of one to four villages, a cluster called a *halka*. The *patwari* is the interface between the landholder and the state revenue department.

8. The work of the *patwari* is supervised by the revenue inspector, who is the next highest functionary. A revenue inspector's circle may contain 80 to 90 villages, grouped into 15 to 19 *patwari* circles.

9. Bhu Abhilekh is a Government of India web portal to digitize land records: http://mpbhuabhilekh.nic.in/bhunakshaweb/.

10. Accuracy of 85 percent is estimated from this process.

11. For more information on the Forest Department, go to its website: http://www.mpforest.org/Intranet/intranet.aspx.

12. The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act of 2006 (also called the Forest Rights Act) "recognizes and vests the forest rights and occupation in forest land in forest dwelling Scheduled Tribes and other traditional forest dwellers who have been residing in such forests for generations but whose rights could not be recorded; to provide for a framework for recording the forest rights so vested and the nature of evidence required for such recognition and vesting in respect of forest land."

APPENDIX A ENDNOTES

1. This was done through blanket notifications such as Notification no. 9-X-50, dated July 10, 1958.

2. A *patta* is a land revenue record that establishes the title or ownership of land. The Patta Register is maintained at the subdistrict office and contains ownership details of all landholdings.

3. A survey is an operation carried out to bring the records of an area up to date and pertains to revision or correction of field maps, division of land into survey numbers, recording of old survey numbers, and power to renumber or subdivide survey numbers, groupings of villages to form *tahseels* or districts, and preparation of record rights of an area.

4. Land set apart for exercise of *nistar* rights may be timber or fuel reserve; pasture, grass, *bir*, or fodder reserve; burial ground and cremation ground; *gaodhan* or village site; camping ground; threshing floor; bazaar (market); skinning ground; manure pit; public purposes such as schools, playgrounds, parks, lanes, and drains; and any other purpose that may be prescribed (Ramanathan 2002). *Nistar* lands consisted of tree cover categorized as *nistari van* (open forest), *malguzari/zamindari van* (forests on land owned by *zamindars* and *malguzars*, revenue *van, bade jhad ke jungle, chote jhad ke jungle, ghas* (grass)*, charnoi* (grazing), and *charagah* (pasture).

5. Ramanathan 2002, vi.

6. See Madhya Pradesh Act 9 of 1965, sec. 6 (w.e.f. 20-3-1965).

7. Forest recognized in the merged territories as village forests or protected forests, or forests other than reserved forests, by whatever name designated or locally known, shall be deemed to be protected forests.

8. The state government may, by notification, direct that from a date fixed by such notification, any forest or portion thereof protected under the act shall cease to be a protected forest.

9. One such notification being Government of Madhya Pradesh (1972).

10. Between 1966 and 1976, approximately 1.5 Mha of land was transferred to the Revenue Department by the Forest Department (Government of Madhya Pradesh 1976). However, no changes were made to the revenue records to reflect this transfer (Garg 2005).

11. In 1976, a Madhya Pradesh government cabinet note directed the district administrations to issue *pattas* on the 1.9 Mha of land demarcated to be transferred to the Revenue Department but awaiting de-notification under Section 34-A.

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ACKNOWLEDGMENTS

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We start with data. We conduct independent research and draw on the latest technology to develop new insights and recommendations. Our rigorous analysis identifies risks, unveils opportunities, and informs smart strategies. We focus our efforts on influential and emerging economies where the future of sustainability will be determined.

CHANGE IT
We use our research to influence government policies, business strategies, and civil society action. We test projects with communities, companies, and government agencies to build a strong evidence base. Then, we work with partners to deliver change on the ground that alleviates poverty and strengthens society. We hold ourselves accountable to ensure our outcomes will be bold and enduring.

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