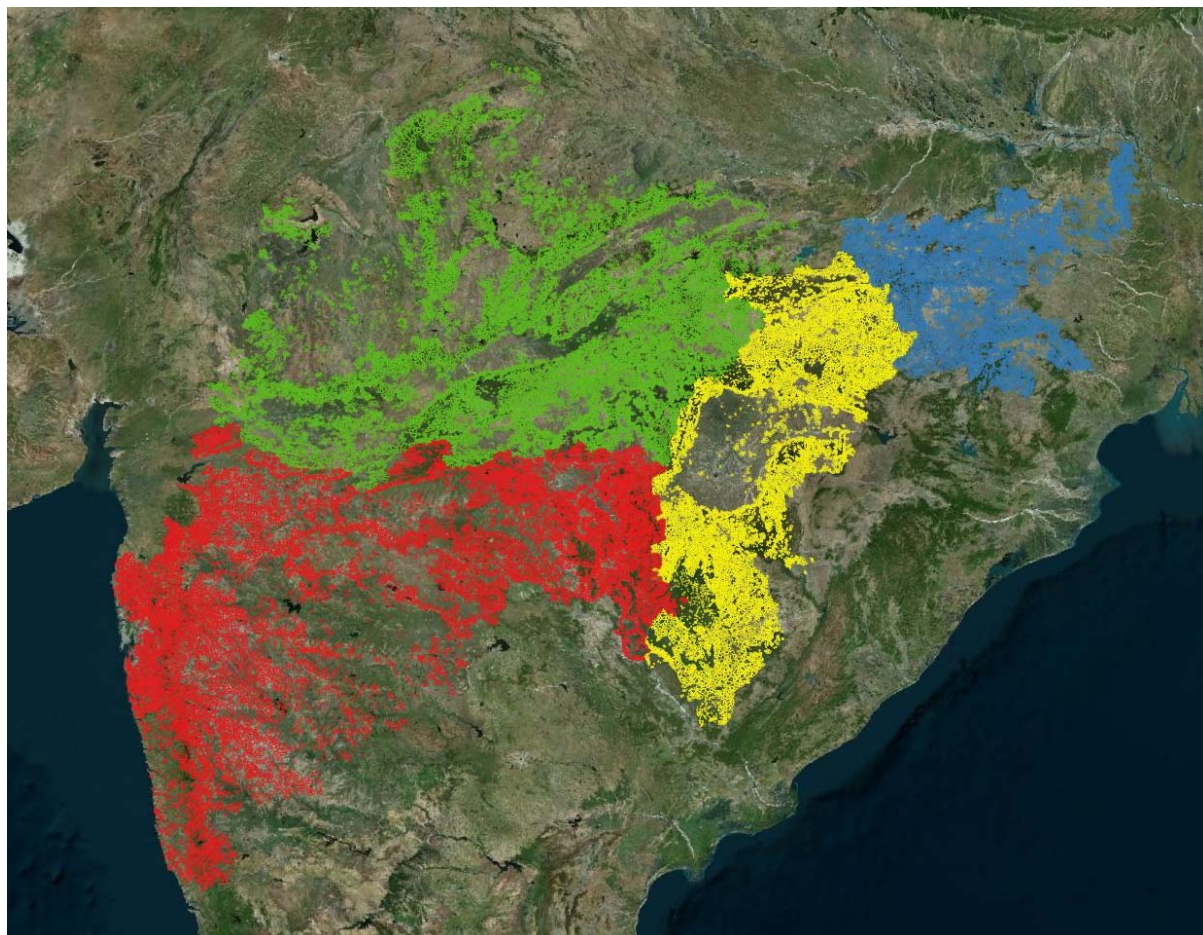


ESTIMATING AND MAPPING CFR POTENTIAL

FOR MADHYA PRADESH, CHHATTISGARH,
JHARKHAND AND MAHARASHTRA



Sharachchandra Lele
Arushi Khare
Shruti Mokashi

TECHNICAL REPORT

*Forests & Governance Programme, Centre for Environment and Development
ATREE, Bengaluru*



Project supported by
Bharat Rural Livelihoods Foundation

ESTIMATING AND MAPPING CFR POTENTIAL FOR MADHYA PRADESH, CHHATTISGARH, JHARKHAND AND MAHARASHTRA

1. BACKGROUND

The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006, commonly called FRA, is a landmark legislation in the history of independent India. It recognizes the multiple historical injustices imposed on forest-dwellers in India, particularly in central India. To redress this injustice, the FRA provides for recognizing multiple forms of rights: individual rights to cultivation and settlement (IFRs), community rights to use (CRs) and to manage (CFRs) forests themselves, and habitat rights of particularly vulnerable tribal groups (PVTGs). It also asks that forest villages be converted to revenue villages. The CFR rights can potentially transform forest governance in India, because they decentralize the authority of forest management to Gram Sabhas.

Unfortunately, the implementation of the FRA has been far from satisfactory. While recognition of IFRs has been promoted, albeit with lapses, the biggest lacuna has been the poor implementation of the CFR provisions. The reasons for non-implementation are multiple. Among these is a lack of clarity, both in government and among proponents of the FRA, as to where and **how much forest land might be eligible for CFR claims and in which villages**. Consequently, there is no 'target' that state governments must reach and against which their performance must be measured in terms of implementing CFR rights recognition.

Estimating the **CFR potential and mapping its locations** in a state helps in three ways:

1. It enables the nodal agency for FRA implementation at the state level to focus their efforts in the appropriate locations and anticipate some of the issues and challenges that they might face.
2. It enables civil society groups working on CFR rights recognition to also direct their energies and understand the spatial context of claim-making.
3. It enables state governments to measure progress against a target, prevents faulty declaration of 'completion of FRA process' and enables advocacy groups to hold state governments accountable in the implementation of CFR rights.

This study attempts to estimate (a lower bound for) the potential area that could come under CFR rights in four important central Indian states: Madhya Pradesh, Chhattisgarh, Jharkhand and Maharashtra. It also maps the location of these potential CFR claim areas.

Two caveats are in order. First, this estimate is approximate and meant primarily as a guidance, with limited micro-level validity. Claims by individual Gram Sabhas may exceed and deviate spatially from these estimates. Second, estimating the CFR potential is only a first step; it must be followed by the actual process of awareness building and rigorous claim-making and verification on the ground. This will require intense groundwork to understand forest legal status and records in different locations, and the consequent challenges faced by (and solutions for) communities actually making CFR claims.

2. ESTIMATING CFR POTENTIAL

Generating an estimate of how much land could come under Community Forest Resource rights and where is not an easy task, especially given the complexity of land and forest settlement in our country and the poor quality of land records and maps. A first crude estimate was attempted by the CFR-LA network attempted using only census data. It simply assumed that if a village had forest area within its revenue boundary, then that area would (at the very least) certainly constitute its CFR.¹ Even this lower-bound estimate showed that (after excluding 5 north-eastern states and J&K) at least 35 million hectares should come under CFR rights, against which the area of CFR rights granted came to only 3% (which is also an over-estimate given the tendency to mis-report other rights (sec.3(2) rights) under “CFR”).

But the reality of forest ‘settlement’, especially in central Indian states, is that large tracts of forest are demarcated as Reserve Forest and kept ‘outside’ the revenue settlement, thereby not being part of any revenue village and not showing up in the census tables. These large patches have hundreds of settlements inside them (often designated as ‘forest villages’) as well as abutting them. Field experience shows that villagers from at least these villages (inside/adjacent) would be using these forests and exercising customary rights over them.²

¹ CFR-LA. 2016. Promise and Performance: Ten Years of the Forest Rights Act in India. Community Forest Rights-Learning and Advocacy, India, available at <https://www.fra.org.in/document/Promise%20and%20Performance%20Report.pdf>.

² It is also possible that other villages that do not abut the forest exercise at least usufruct rights in these forests, which may constitute CR (community resource) rights under the FRA. Only a ground-level public verification process can clarify such rights. To the extent that they may overlap with CFR rights of abutting villages, they will not add to the potential CFR area.

We have therefore adopted a two-step method for CFR potential calculation and village identification:

1. All the villages that have more than 10ha of forest area (as per Census2011) within their revenue boundaries are first identified and their forest area estimated.
2. For villages that are in or adjacent to 'forest lands outside village revenue boundaries', we used a thumb rule that their customary boundary would extend to at least **2km** into the forest, and identified and estimated the area in such a **2km buffer to forest adjacent villages**. This 2km figure is a very approximate thumb-rule, based on field observations about the areas that are likely to be under customary use and management.

The total of the CFR potential is then the sum of areas in 1 and 2 above.

3. USING GIS TO MAP AND ESTIMATE CFR POTENTIAL

The survey and settlement of forest boundaries in central Indian states happened under different administrations during the British colonial period: various directly administered Provinces as well as various princely states. Moreover, the types of communities and their use of the forests was also varied, including Adivasis engaged in shifting cultivation (kumri or podu), farmers engaged in settled cultivation and using forests for grazing and firewood collection, and nomadic pastoralists. The extent of resistance from communities to British takeover of the forests was one more complicating factor. So the way forest boundaries were drawn and rights were recognized by the British varied a lot. Broadly speaking, we see two situations:

- a) The forest land is inside the revenue boundary of the village, and
- b) The forest land is outside the revenue boundary of any village.

The first situation is depicted in Figure 1 below. The green line is the village revenue boundary, and the hatched area is the area on which CFR was recognized.

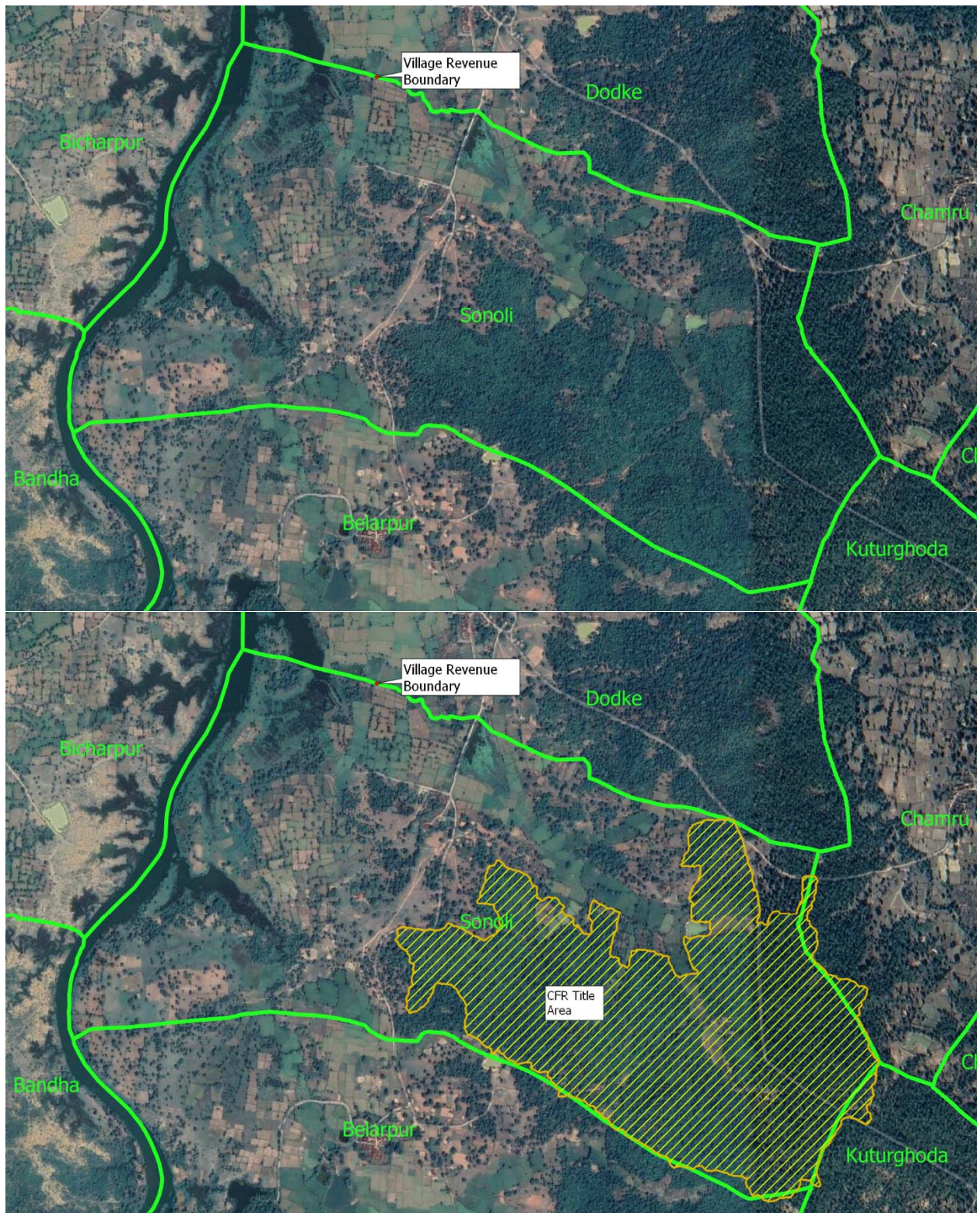


Figure 1. Example of Sonoli village (Rajnandgaon district, Chhattisgarh) where forest area claimed as CFR is entirely within the revenue boundary. Figure on top shows the location of actual forest and the figure below shows the boundary of CFR granted. As can be seen, there are villages on all sides of Sonoli village.

The second situation is shown in Figure 2 below. The revenue boundary of a village may include only the agricultural lands and settlement areas, and much of the forest used by the villagers may lie outside the revenue boundary, in the 'Reserve Forest' (RF) land. Villagers

have identified this traditional 'nistaar' or 'vahivaat' area on forest compartment maps and/or showed evidence such as grazing passes issued for different compartments to claim these areas.

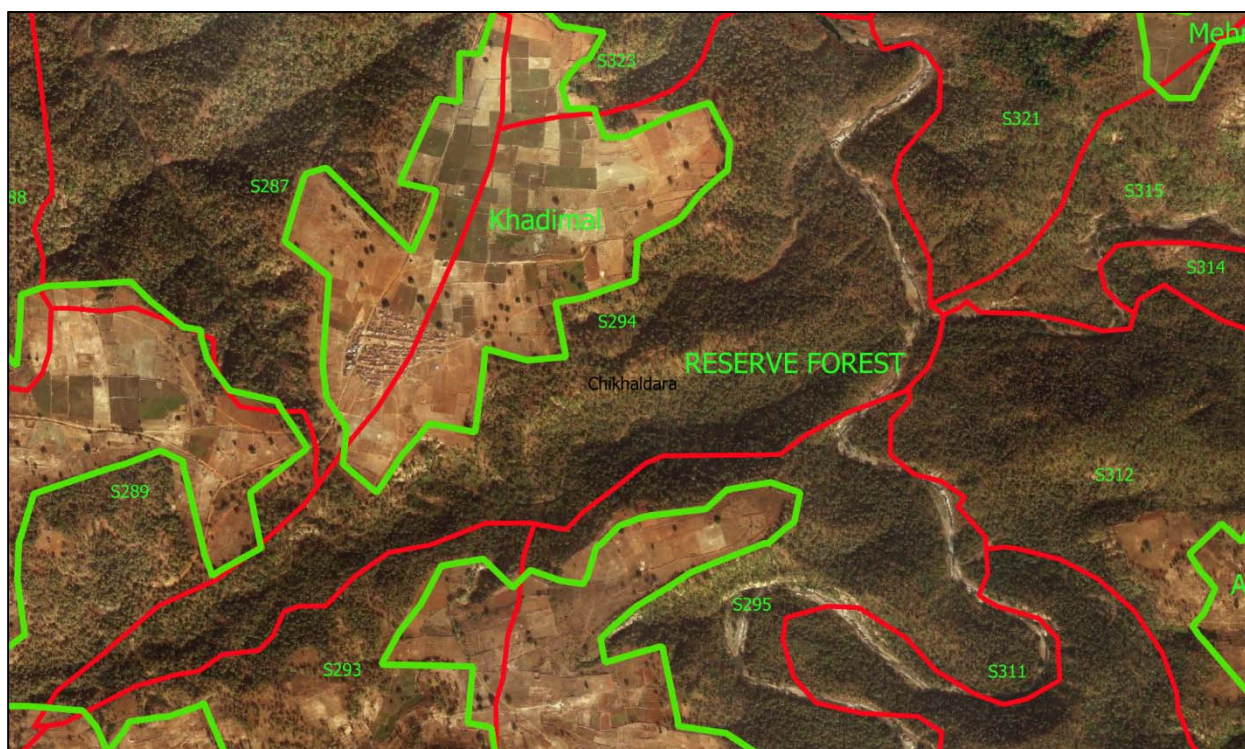


Figure 2. Example of Khadimal village, Amravati district, Maharashtra, with forest and CFR rights outside its revenue boundary: Green lines are village revenue boundaries, and red lines are forest compartment boundaries. Khadimal village was granted CFR rights over the forest in compartment S294 and S295.

How does one estimate the CFR area that is likely to be claimed in these two situations?

Step (a) For the cases where the forest area is within the revenue boundary, one can reasonably assume that villagers would have rights over **at least that area**, and this area can be estimated from 'forest' column in the village-wise Census 2011 data (village amenities directory). To be conservative, we may include only villages with 'forest' area more than 10ha.

Step (b) For the cases where the forest area is outside the revenue boundary, we propose a thumb-rule, based on field experience, that villages inside or adjacent to the RF may claim **at least up to 2km into the RF** (from the edge of their village).

Adopting this approach, we implemented it in a Geographic Information System (GIS) framework³ to develop maps and estimate the CFR potential as follows:

1. Obtain village boundary maps of a state in vector (shapefile) format.
2. Check their geo-positioning or if necessary geo-rectify the maps.
3. Ensure that the attributes include Census 2011 codes (or if the codes are from earlier censuses, translate them to 2011 codes).
4. Compare the polygons in the map with the Census 2011 village and town lists so as to identify and fix problems such as missing villages, duplicate village ids, etc., and assign the 'non-village' polygons to 'town', 'waterbody', and 'forest'.
5. Link Census 2011 landuse data (which are provided in the village amenities directory) to this vector layer. Identify villages with more than 10ha in the 'forest' landuse field. This completes step (a) above.
6. Identify all the 'forest' (RF) polygons in the shapefile, and all the 'forest adjacent' villages; draw an 'inward buffer' of 2km into the forest polygons and estimate its area.
7. Merge the villages with forest area with villages adjacent to forest polygons to create a full list of villages with CFR potential.

An illustration of how step 6 is applied is given in Figure 3 and Figure 4 below.

³ In particular QGIS from www.qgis.org, an open source software.

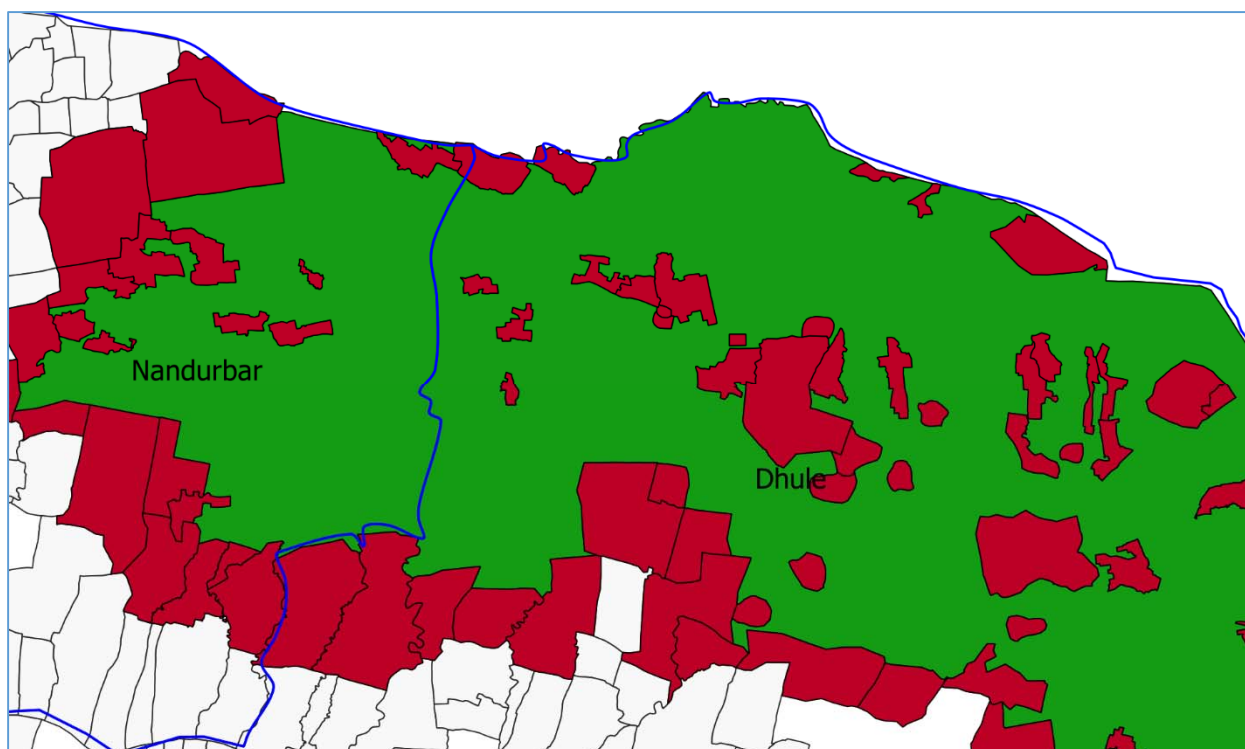


Figure 3. Identify RF polygons (green) and forest adjacent villages (brown)

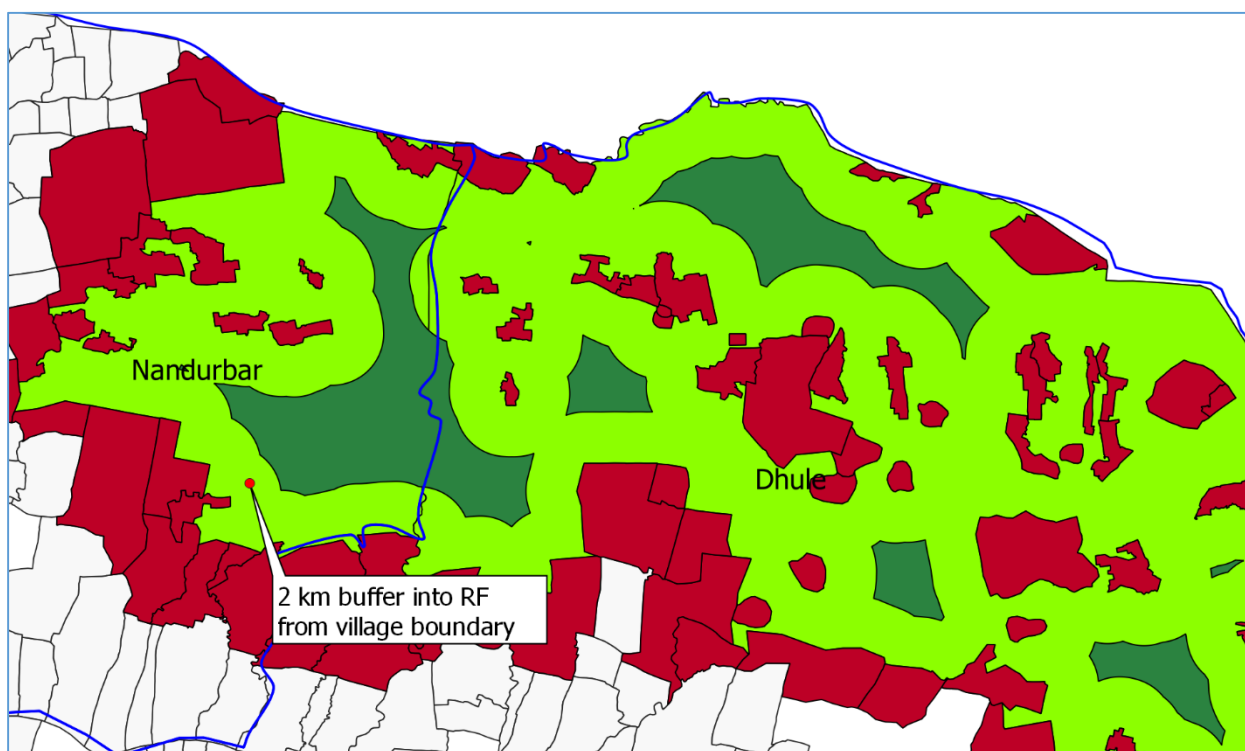


Figure 4. Estimate likely CFR claim area by drawing a 2km buffer from edge of village boundary into RF (bright green). Some area of RF may remain unclaimed (dark green).

4. APPLYING THE METHOD TO 4 MAJOR CFR POTENTIAL STATES: CHALLENGES INVOLVED

Central India represents the main region of the country where a large forested tract coincides with a large forest-dwelling population (including especially Adivasi or Scheduled Tribe populations) and highly unsettled or historically unrecognized forest rights. This is therefore the region where the CFR potential is the highest. We chose to implement this methodology in viz., **Madhya Pradesh, Chhattisgarh, Jharkhand and Maharashtra.**⁴

Several challenges were encountered in implementing our methodology.

1. **Obtaining Census village boundary maps:** Census of India is the most comprehensive source of village data in the country.⁵ This includes village ‘directories’ that contain village population and land-use data, as well as District Census Handbooks that include tehsil or block-wise maps showing village boundaries. However, to be usable, these maps have to be in digitized (shapefile) format. The most challenging step was obtaining reliable versions of these village boundary shapefiles, checking them for topological and data errors, and ensuring that they could be matched reasonably with ground realities and census data. This was especially true for Madhya Pradesh and Chhattisgarh, where a large number of ‘forest villages’ or villages inside forests are present but whose locations have not been provided with any accuracy in the Census Handbook maps. We tested village boundary shapefiles from various sources including SEDAC (Columbia University)⁶ and National Remote Sensing Centre’s Bhuvan database, censusgis.org, IITBombay⁷ and so on, and finally used the one with least errors. While in the case of Jharkhand and Maharashtra, we were able to match the village layer with the census tables, in the case of Chhattisgarh, we were eventually unable to locate about 100 forest villages.⁸
2. **Errors in Census village boundaries: Reserve Forest swallowed up by Forest Villages:** The second problem was that in some heavily forested districts/tehsils, the official boundaries of forest villages as depicted in the Census 2011 Handbooks seem to have been arbitrarily demarcated as massive polygons, even as the official census

⁴ We had initially chosen Odisha also, but the Odisha government has supposedly released a similar ‘FRA Atlas’ report (<https://www.downtoearth.org.in/news/forests/in-a-first-odisha-studies-potential-forest-land-under-fra-69481>) so we did not cover Odisha in this exercise.

⁵ Note that the term ‘village’ as used by Census includes revenue villages, standalone ‘forest villages’ and other unsurveyed settlements. Individual hamlets within revenue villages are sometimes listed separately.

⁶ Including <http://sedac.ciesin.columbia.edu/data/set/india-india-village-level-geospatial-socio-econ-1991-2001>.

⁷ https://www.cse.iitb.ac.in/~pocra/MahaCensus_shapefile_data1.2/MaharashtraCensus.html.

⁸ The Chhattisgarh government is in the process of developing maps for forest villages with the help of IIT Roorkee. It is hoped that this will eventually enable the identification of such villages.

landuse statistics show tiny villages (which is the reality). So large 'RF' polygons have disappeared and there is no forest outside village boundaries as per the Census map (Figure 5 and Figure 6 below). But the values for total geographical area and forest area in the census village amenities directory are small, indicating that the villages are still tiny enclaves with forest area outside their boundary.

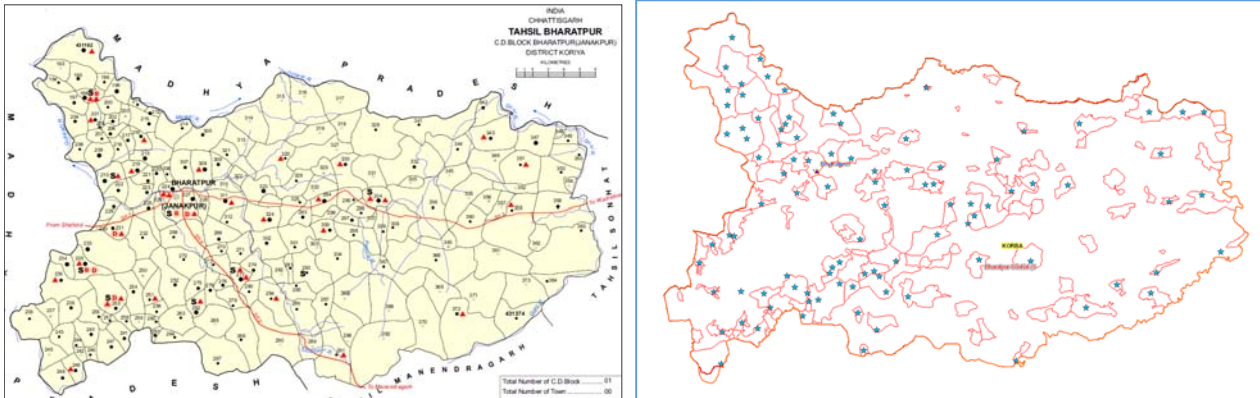


Figure 5. Bharatpur tehsil, Koriya district, CG: The map from the DCHB 2011 (left), suggests that all land is within village boundaries. But total geographical area of the villages in census data adds to less than 1/3rd of the geographical area of the tehsil. The map from the CG state GIS portal (right) shows the correct picture: viz., large tracts of forest (blank space) lie outside village boundaries.

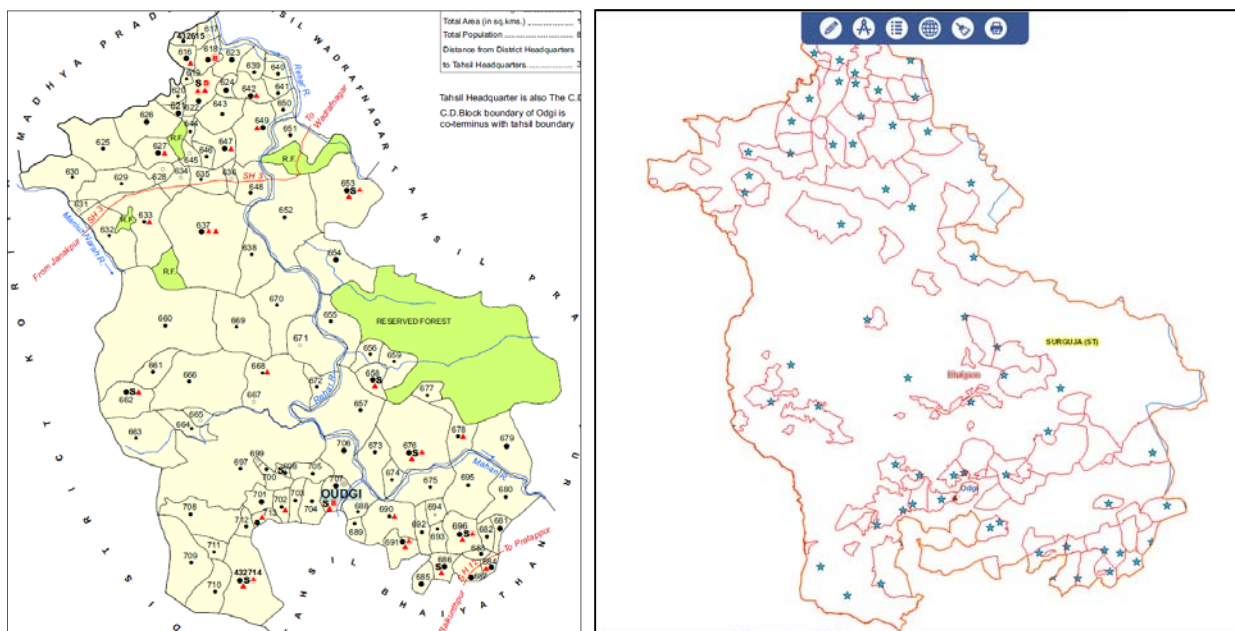


Figure 6. Oudgi tehsil, Surguja district (now Surajpur), CG: The map from the DCHB 2011 (left), suggests that almost all land is within village boundaries (except the green RF patch). But total geographical area of the villages in census data adds to less than 1/4th of the geographical area of the tehsil. The map from the CG state GIS portal (right) shows the correct picture: viz., large tracts of forest (blank space) lie outside village boundaries.

These errors were most prevalent in Chhattisgarh and Madhya Pradesh Census 2011 data. In the case of Chhattisgarh, we were able to obtain and use an older shapefile that showed the forest boundary more correctly. In the case Madhya Pradesh, however, we were unable to do so, and so the estimates remain highly approximate and locally inaccurate.

3. **Errors in Census data: Village boundary actually includes forest, but Census data under-reports:** We encountered many cases in Madhya Pradesh where the Census Handbook maps show that a village includes significant forest area, but the Census 2011 data show the forest area as 0 or very small, and a Total Geographical Area (TGA) that is much lower than what is shown in the map. Further digging indicated that the 1991 census data for the same villages show a large TGA and forest area, matching the areas indicated in the Census Handbook map. An example from Shivpuri district is given in Figure 7 below.

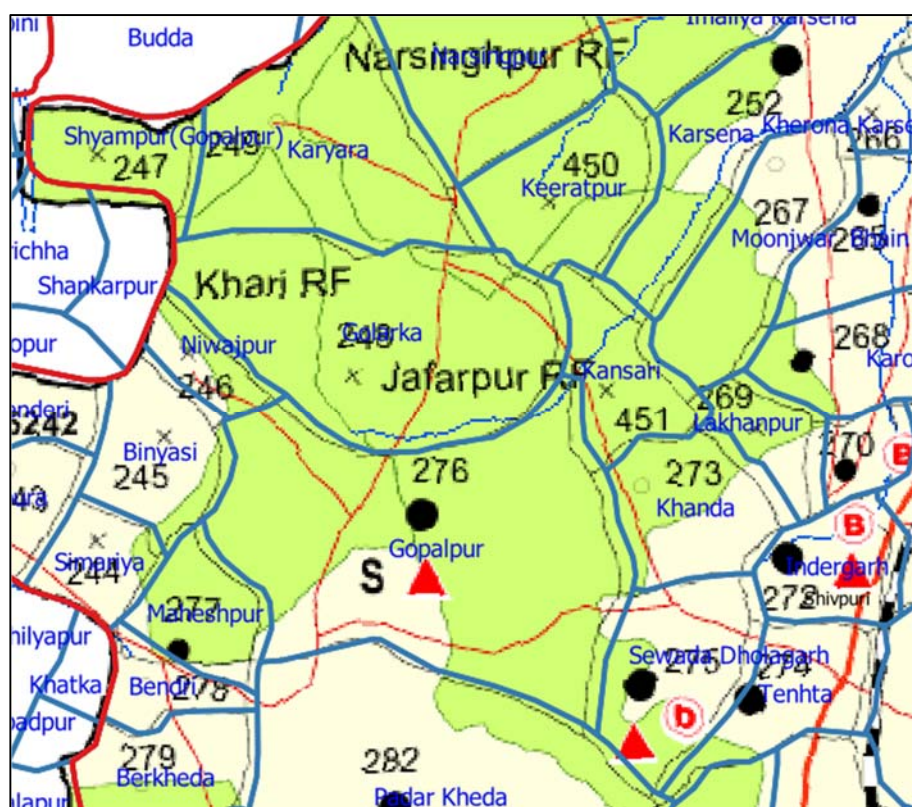


Figure 7. Example of village boundary including large forest but Census 2011 data reporting lower figures: Gopalpur village (ID 276) in Shivpuri district, Shivpuri tehsil clearly includes a large forest area (green) within its boundary (blue line) as per Handbook, but Census 2011 data show 0 ha of forest. Census 1991 data show 3018 ha. The same is true for many neighbouring villages: Moonjwar, Karsena, Karyara.

This mismatch might be the result of a recent policy in Madhya Pradesh to exclude forest areas from village revenue details even when the original revenue settlement

included the forest. We identified at least 290 villages where a large forest area reported in 1991 was mis-reported as 0 in 2011, and ~2200 cases where the forest area has dropped by more than **100ha** from 1991 to 2011.⁹ As the Shivpuri example shows, this is simply a change in reporting, not an actual decline in forest area. Although we have no way of systematically correcting these errors, we have tried to estimate the minimum additional CFR potential in Madhya Pradesh that might result from correcting this error (using the 'additional' forest area from the ~2200 villages).

4. **Zero area, zero population villages:** Even as per Census 2011 tables, each state has tens or hundreds of villages that have zero population and zero total geographical area (TGA). It is not clear why these are listed in the census tables and even demarcated in the village layers with tiny polygons. Where such villages were inside or adjacent to the RF, we deleted the village polygon (i.e., merged it with the RF) before estimating the CFR potential and drawing up the list of potential CFR villages. The number of villages so deleted/merged were: 106 in Chhattisgarh, 38 in Madhya Pradesh, 0 in Jharkhand and 36 in Maharashtra.¹⁰

5. RESULTS: CFR POTENTIAL OF THE 4 STATES

The estimated (minimum) CFR potential based on the above methodology is as follows.

1. Chhattisgarh:

- a. Total number of villages in the state (Census 2011) = 20,126
- b. Number of forest-adjacent 'zero-population-zero-TGA' villages= 106
- c. Villages containing forest area more than 10 ha = 8,510
- d. Forest area contained in these villages = 19,904 sqkm
- e. Reserve Forest *outside* village boundaries¹¹ = 38,566 sqkm
- f. Villages adjacent to these Reserve Forests = 8,338

⁹ In more than 1200 villages, the difference is more than **500ha**. The blocks (in districts) particularly affected by this problem are Shivpuri (in Shivpuri), Obedullaganj (in Raisen), Ichhawar (in Sehore), Pawai and Shahnagar (in Panna), almost all of Sidhi district, Chitrangi (in Singrauli), several blocks in Jhabua and Alirajpur districts, and Kurai (in Seoni).

¹⁰ The actual number of 'zero-population-zero-TGA' villages in each state was higher.

¹¹ After dissolving the 'zero-population-zero-TGA' village polygons into the respective forest polygons.

- g. Extent of such RF falling under 2km buffer = 33,938 sqkm
- h. **Minimum CFR potential in CG (d + g) = 53,842 sqkm**
- i. **Minimum villages with CFR potential in CG = 11,445**

(obtained by merging lists in c and f)

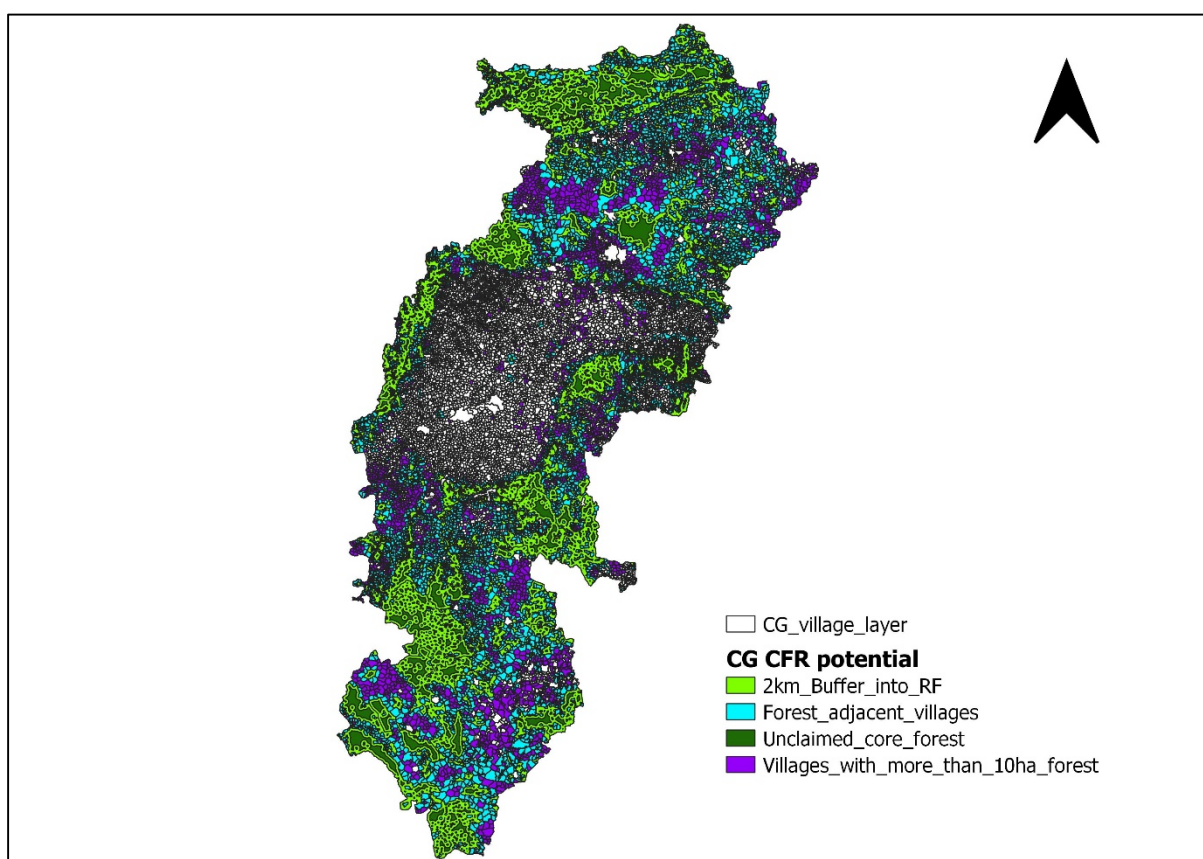


Figure 8. CFR potential villages in Chhattisgarh (denoted by purple and sky blue)

2. **Madhya Pradesh:**

- a. Total number of villages in the state (Census 2011) = 54,903
- b. Number of forest-adjacent zero-population-zero-TGA villages= 38
- c. Villages containing forest area more than 10 ha = 16,754
- d. Forest area contained in these villages = 37,411 sqkm
- e. Reserve Forest *outside* village boundaries = 22,718 sqkm

- f. Villages adjacent to these Reserve Forests = 6,273
- g. Extent of such RF falling under 2km buffer = 20,537 sqkm
- h. **Total minimum CFR potential in MP (d + g) = 57,948 sqkm**
- i. Additional potential if 1991 forest areas are considered = 9,222 sqkm
- j. **Total minimum villages with CFR potential in MP = 19,158**
(obtained by merging lists in c and f)

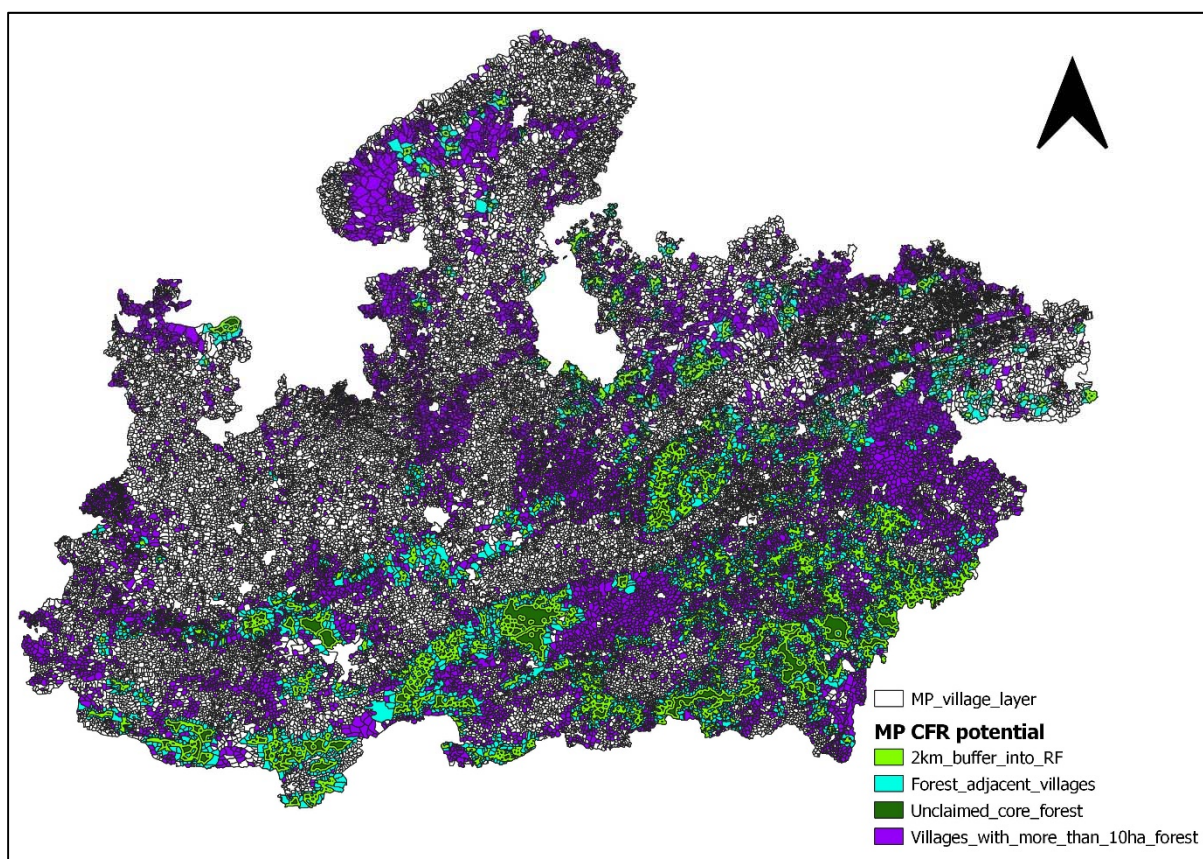


Figure 9. CFR potential villages in Madhya Pradesh (denoted by purple and sky blue)

Given the major errors and uncertainties in the spatial data for Madhya Pradesh, we must acknowledge that the above estimate is to be treated with caution, and the village lists for Madhya Pradesh need to be refined in a tehsil-wise manner by those more familiar with ground conditions and with access to more accurate data.

3. Jharkhand

- a. Total number of villages in the state (Census 2011) = 32,395

- b. Number of forest-adjacent zero-population-zero-TGA villages= 0
- c. Villages containing forest area more than 10 ha = 12,294
- d. Forest area contained in these villages = 18,877 sqkm
- e. Reserve Forest *outside* village boundaries = 2,609 sqkm
- f. Villages adjacent to these Reserve Forests = 933
- g. Extent of such RF falling under 2km buffer = 2,298 sqkm
- h. Total minimum CFR potential in JH (d + g) = 21,175 sqkm**
- i. Total minimum villages with CFR potential in JH= 12,510**
(after merging lists in c and f)

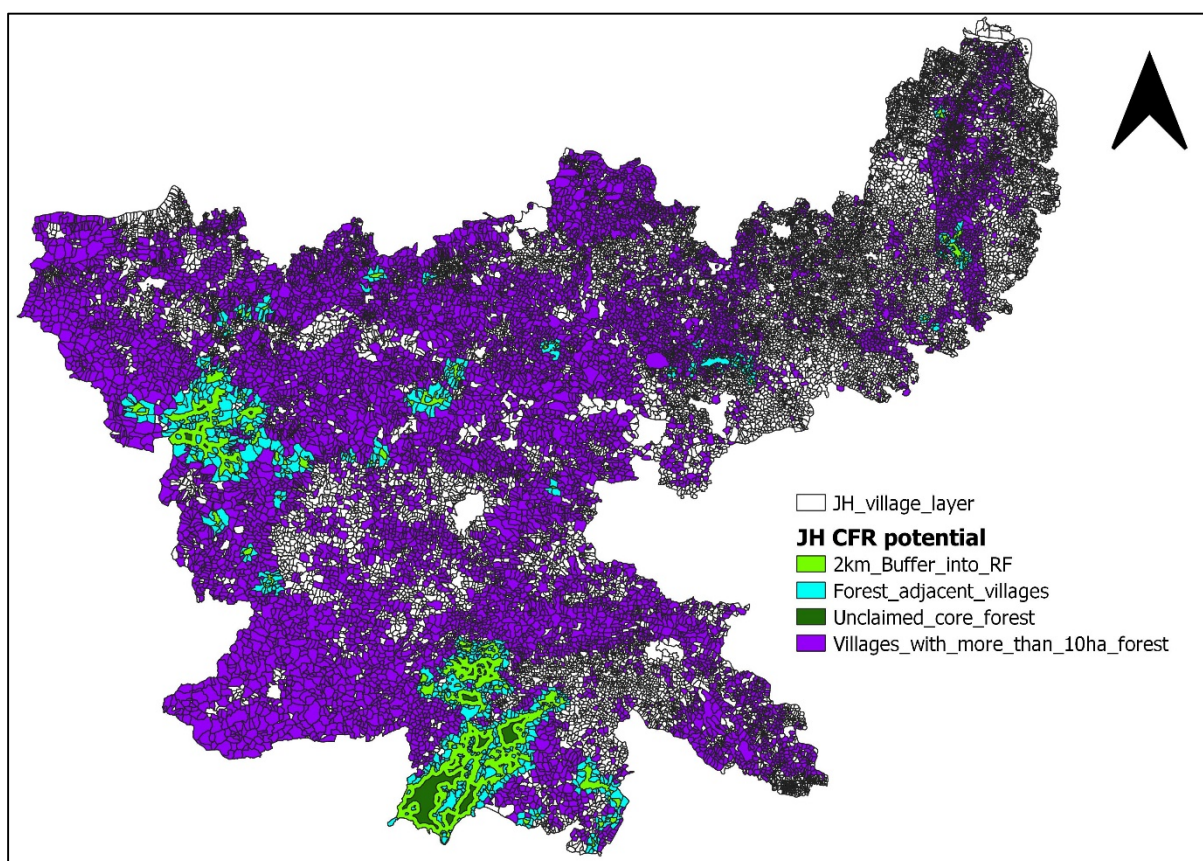


Figure 10. CFR potential villages in Jharkhand (denoted by purple and sky blue)

4. Maharashtra

- a. Total number of villages in the state (Census 2011) = 43,665
- b. Number of forest-adjacent zero-population-zero-TGA villages= 36
- c. Villages containing forest area more than 10 ha = 16,320
- d. Forest area contained in these villages = 36,043 sqkm
- e. Reserve Forest *outside* village boundaries = 17,021 sqkm
- f. Villages adjacent to these Reserve Forests = 3,669
- g. Extent of such RF falling under 2km buffer = 14,221 sqkm
- h. **Total minimum CFR potential in MH (d + g) = 50,264 sqkm**
- i. **Total minimum villages with CFR potential in MH= 17,252**
(obtained by merging lists in c and f)

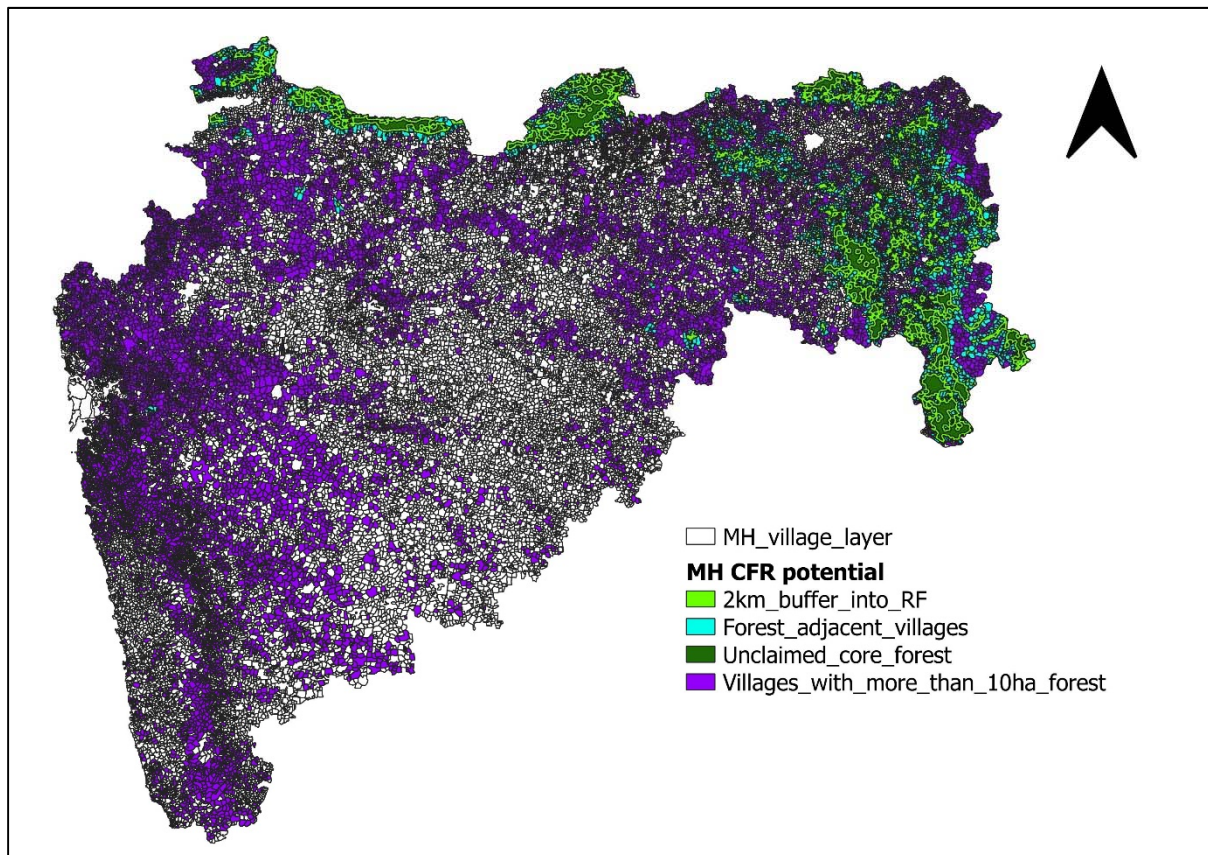


Figure 11. CFR potential villages in Maharashtra (denoted by purple and sky blue)

The actual lists of villages with CFR potential are being provided separately as spreadsheet files.

Our methodology is a flexible one; so, for instance, if it is believed that the typical distance to which CFR claims may extend is say 4km, one can incorporate the same into the buffer estimation (step 6 in section 3) and re-estimate the potential. Similarly the estimate can also be modified by changing the threshold of 10ha of forest within a village.

6. CFR IMPLEMENTATION

A cursory comparison with the CFR implementation status reports submitted by the states to the Ministry of Tribal Affairs is given below:

State	Minimum CFR potential from this study	Community rights area granted as per status reports	Caveats
Chhattisgarh	53,842 sqkm	8,252 sqkm (15%)	Includes 3(2) area and community rights to other non-forest uses
Madhya Pradesh	57,948 sqkm	5,931 sqkm (10%)	Includes huge area u/s 3(2) and community rights to other non-forest uses
Jharkhand	21,175 sqkm	420 sqkm (2%)	Includes 3(2) area and community rights to other non-forest uses
Maharashtra	50,264 sqkm in 17,252 villages	11,769 sqkm to 5,071 villages	After removing 3(2) rights and multiple titles per village

Note: Source for area granted is Monthly Progress Report of January 2020 on MoTA website, except Maharashtra, where more detailed data came from the Tribal Research and Training Institute.

Note that the reported area of community rights granted include areas granted under section 3(2) (development rights). This is particularly so in the case of Madhya Pradesh, where the vast majority of the so-called community rights granted are sec 3(2).¹² In the case of

¹² See SAMARTHAN. 2011. *Recognition of Community Forest Rights under Forest Rights Act in Madhya Pradesh and Chhattisgarh*. UNDP, New Delhi.

Maharashtra, we were able to obtain the entire list of titles, and after removing sec 3(2) rights and other rights for non-forest use, and combining multiple titles issued to the same village, we estimate that 5,071 unique villages/hamlets have been granted CFR/CR titles over 11,769 sqkm.

Thus, from the comparison, it is clear that Maharashtra has made much more progress (23% of potential area granted) than all the other states in terms of CFR implementation (especially since the figures for Maharashtra are corrected ones, while the others are over-estimates).

By highlighting this gap and providing the spatial information necessary to identify the CFR potential areas, we hope our analysis will provide some impetus to the fuller implementation of this key provision of the Forest Rights Act 2006.

ACKNOWLEDGEMENTS

We wish to thank Mohan Hirabai Hiralal for urging us, over many years, to come up with estimates of CFR potential using maps and Census data. We also thank the Bharat Rural Livelihoods Foundation that provided the financial support to finally make this work possible.

We are grateful to the large network of spatial data users, especially Craig D'Souza, Deepak Malghan, Ashwini Chhattre, and members of DATAMEET googlegroup, who helped us obtain various versions of village boundary maps from which we were able to piece together the above estimates.

We also thank Gowri Uday in the ATREE GIS lab, who put in significant work in cleaning up the Chhattisgarh layer, and Shiva Subramanya, WebGIS coordinator at ATREE, who has developed a prototype webGIS that we hope to use eventually for public display of our results.
