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Riskmaps for carbon credit certification

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Several criticisms

Several criticisms were addressed to previous REDD+ methodologies for carbon credit certification accusing them to oversell credits.

- **Non-additionnality** : Emissions reductions would have happened anyway. Inflated project-level baselines. Jurisdictional reference levels are reasonably good predictors of future trends.
- **Leakage** : The larger the area covered by a REDD+ initiative, the lower the leakage risk.
- **Reversal** : Jurisdictions are less likely than projects to have their forest carbon stocks decimated by a disturbance event.

Frances Seymour (WRI) : 4 Reasons Why a Jurisdictional Approach for REDD+ Crediting Is Superior to a Project-Based Approach.

New jurisdictional approach

Deforestation intensity

- Baseline activity data or Forest Reference Emission Level at the jurisdictional level
- Amount of deforestation.
- Deforestation "quantity" or "intensity".

Spatial deforestation risk

- Map of the deforestation risk at the jurisdictional level.
- Spatial relative probability of deforestation.
- Deforestation "location".

Risk map at the jurisdictional level

Objectives

- Identifying hot-spots/cold-spots of deforestation.
- Classifying forest pixels by risk of being deforested.
- One unique model for the whole jurisdiction (no methodological discrepancies between projects).
- Use this map to allocate deforestation (estimated for the jurisdiction) per project.

Figure – Map of the deforestation risk for Perou.
Green : low, Red/**Black** : high.

Allocating deforestation to projects

- Jurisdictional risk map : a map with class of deforestation risk.
- Obtaining a deforestation density map :
  Class of defor. risk [1, 2, ..., I] $\rightarrow$ Defor. density (ha/yr/pixel).
- Can be used to allocate deforestation per project.

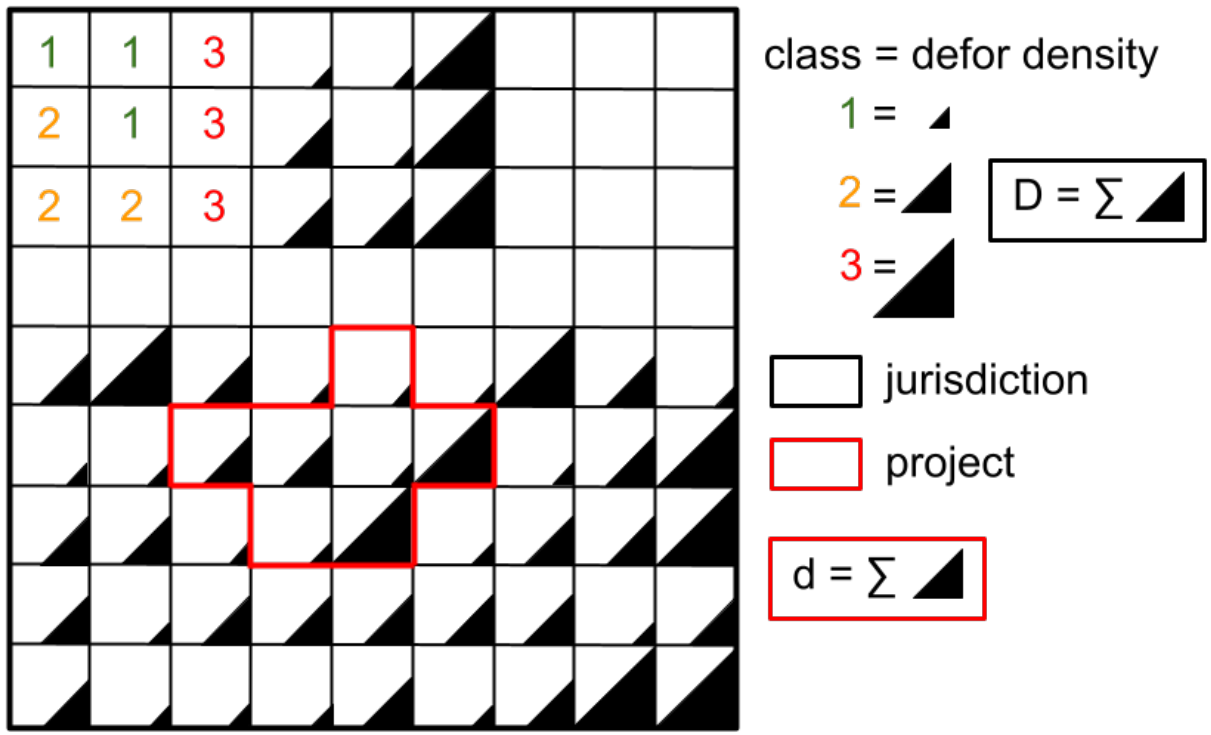

Figure – Allocating deforestation to projects within the jurisdiction.

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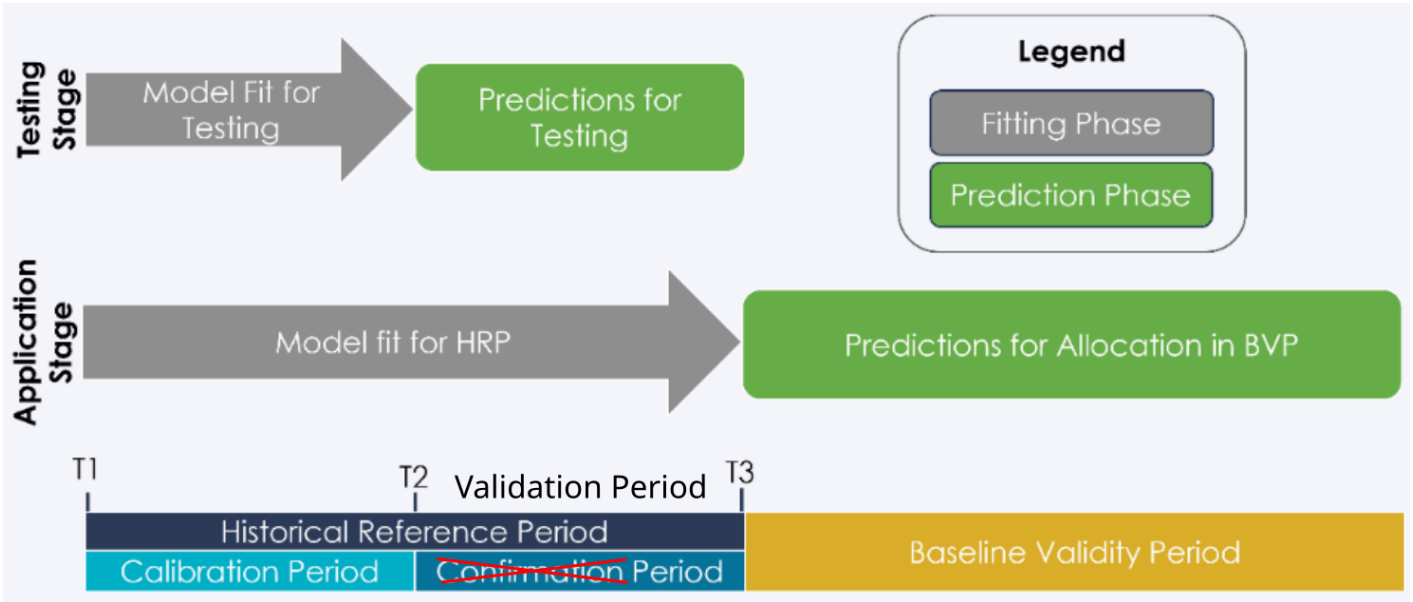
VT0007 methodology

- Developed by Clark University (J. R. Eastman and R. G. Pontius Jr.) for Verra.
- **Aim** : Obtaining the best risk map possible at the jurisdictional level.

Basic steps

1. Use a reasonably good reference model to map the deforestation risk.
2. Let the user propose alternative maps from alternative models.
3. Validation step : check that alternative models are better than the benchmark model.
4. Use the best alternative map to allocate deforestation.

Modelling periods



- Three dates : t1, t2, t3.
- Four periods : calibration, validation, historical, (baseline validity period).
- Why different periods : model predictions must be compared with **independent data** (validation period).
- To forecast after t3, we want to use as much data as possible (historical period).

Benchmark model

Deforestation density

Alternative models

Validation

Calibration, validation, and historical periods

Validation procedure

Verra/UClark software

https://github.com/ClarkCGA/UDef-ARP/tree/v2.09

- User must provide fcc, distance to forest edge raster, subjurisdictional borders.
- Benchmark model.
- Validation.

Limitations

- Not tool to help prepare the data.
- No tool to develop the alternative model.
- Windows only.
- Require a computer with high RAM for large jurisdiction : all raster inputs are stored in RAM during processing. Therefore, large jurisdictions will require substantial RAM allocations (e.g., 64Gb).
- Several remarks :

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Existing software

- Dinamica EGO, CLUE, TerraSet (Clark U.).

Limitations

- All are not open source (transparency).
- Difficulty to reproduce the results (transparency, reproducibility).
- Large rasters on large jurisdiction ?
- No scripting : not well adapted to repeat computation.

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A not so simple methodology

Need for an integrative tool : the deforisk QGIS plugin

. . . Thank you for attention . . .

https://forestatrisk.cirad.fr

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