ETHOS

Engineers in Technical and Humanitarian Opportunities of Service

"A geospatial web-based tool to evaluate woodfuel environmental impacts"

Montserrat Serrano-Medrano and Adrian Ghilardi

National Autonomous University of Mexico

BCS CLÚSTER DE BIOCOMBUSTIBLES SÓLIDOS

1° aniversario cigga centro de investigaciones en geografía ambiental - UNAM

Woodfuel includes fuelwood (or firewood) and charcoal

Relevance

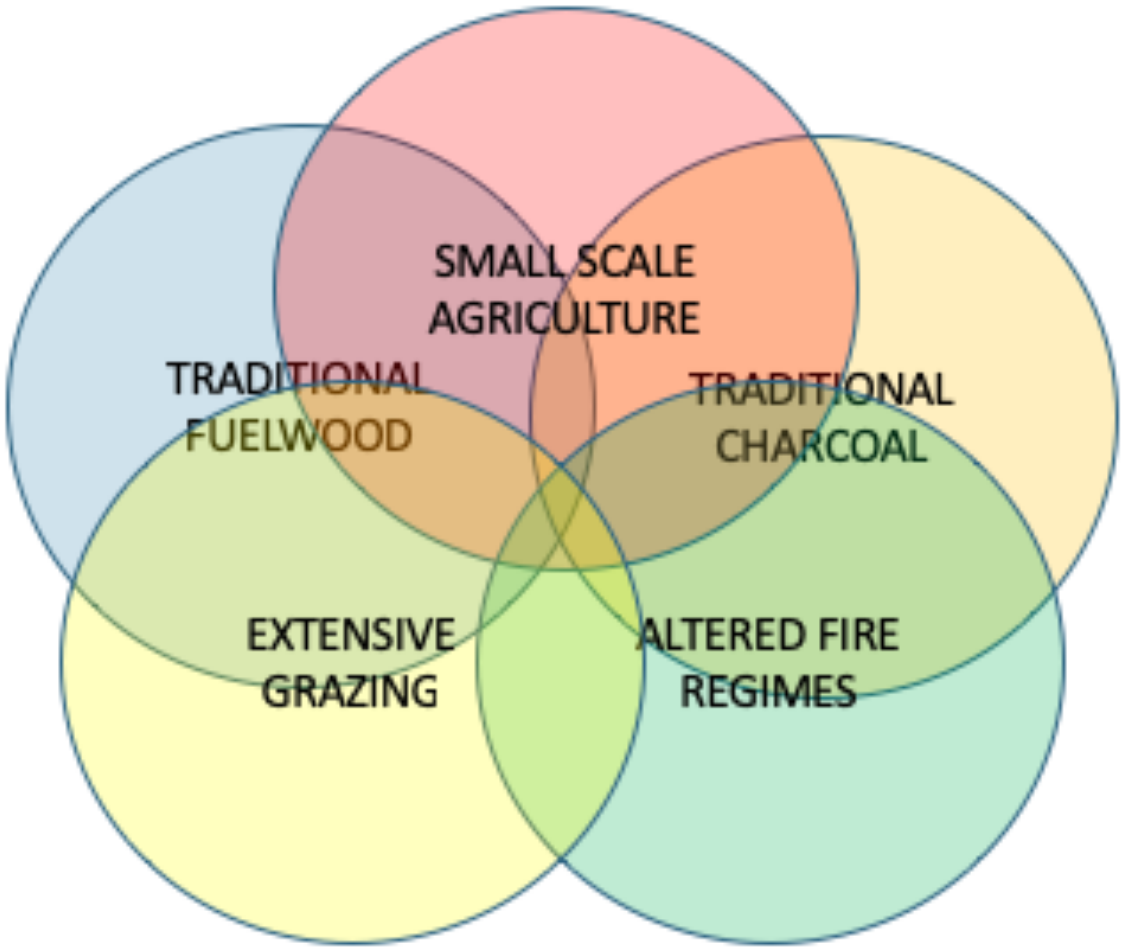
- Approximately 2,600 million people around the world currently use fuelwood (FW).
- Fuelwood is the main energy source to cover basic energy needs such as cooking and heating for most poor people in developing countries.
- FW is very important to support livelihood means for poor people as it lightens or even nullifies the economic burden attributable to ensure household energy provision.

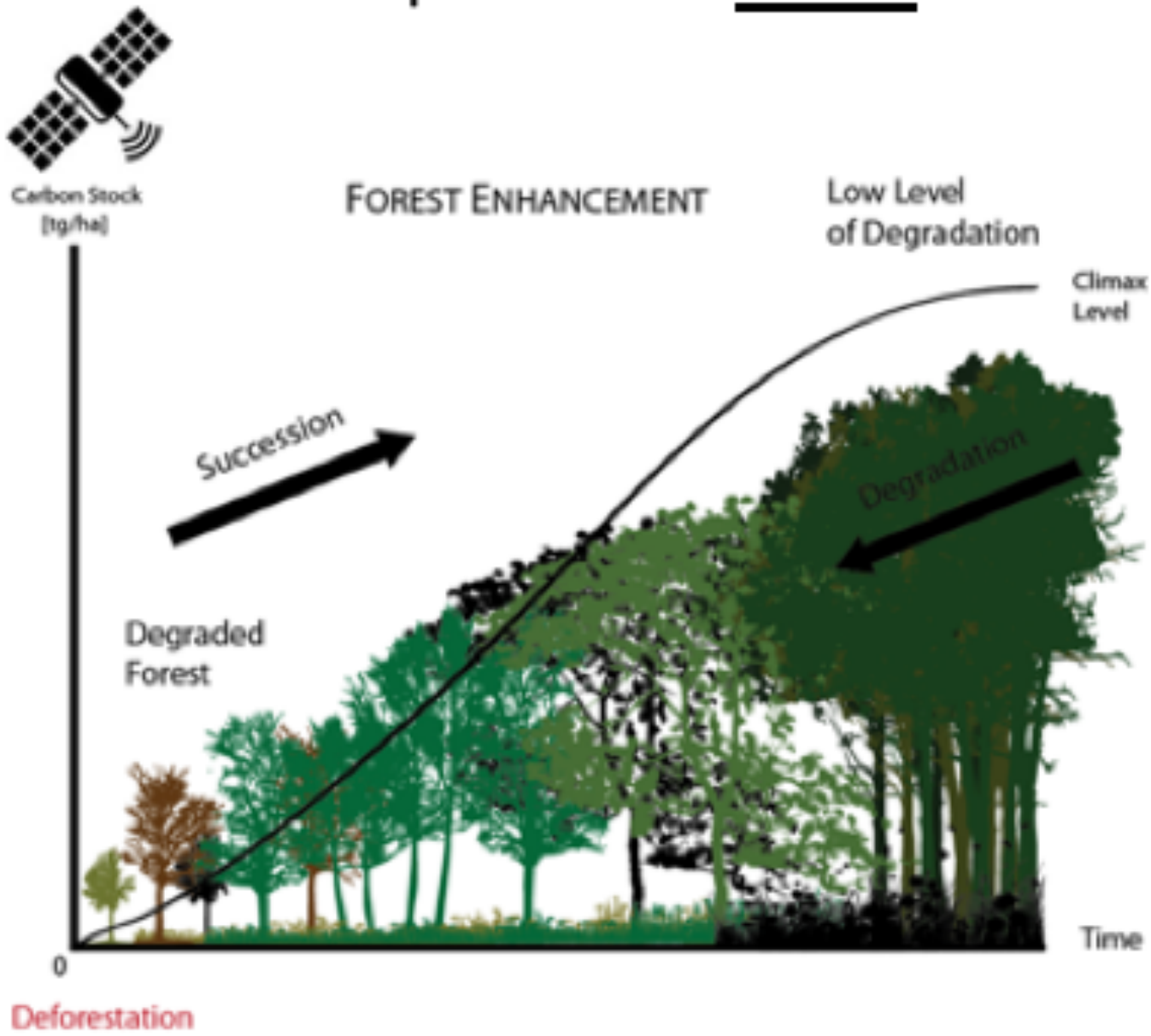
Woodfuel-driven environmental impacts

- Loss of biomass (MoFuSS / FuRDEST)
- Loss of biodiversity
- Genetic erosion
- Tospoil sterilization
- Incidence of pests
- Alter fire regimes

- Global warming
- Black Carbon

Harvest of wood for energy purposes co-exist with other drivers of change, and its potential impacts are NOT evident "from above"





MoFuSS

MoFuSS is an open-source freeware developed to evaluate potential impacts of firewood harvest and charcoal production over the landscape. It's a GIS-based model that simulates the spatio-temporal effect of woodfuel harvesting on the landscape vegetation and that accounts for savings in non-renewable woody biomass from reduced consumption. MoFuSS is being developed and supported by the National Autonomous University of Mexico, in close collaboration with the US Center of the Stockholm Environment Institute and the Global Alliance for Clean Cookstoves.

MoFuSS lead developer: Adrián Ghilardi

SEE MOFUSS

FUrDest is a free software tool to estimate the current and projected demand of biomass in the residential sector. Fuelwood demand values are available at both, spatio-temporal level and aggregated level. FUrDest is being developed by National Autonomous University of Mexico and recently also funded by the Solid biofuels Cluster of the Mexican Center of Energy Innovation (CEMIE-BIO for its acronym in spanish).

FUrDest lead developer: Monterrat Serrano

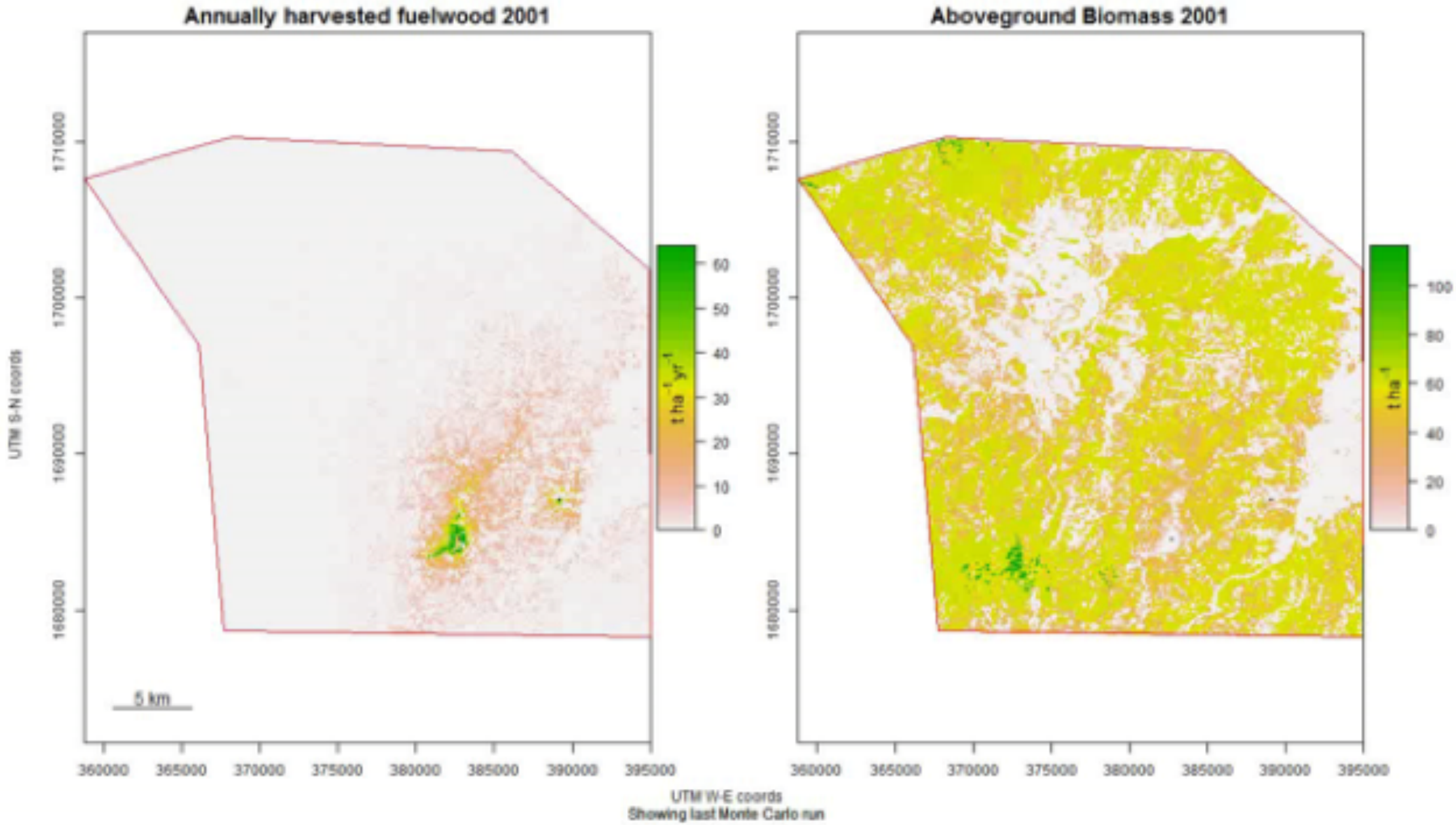
FUELWOOD DEMAND SOFTWARE TOOL

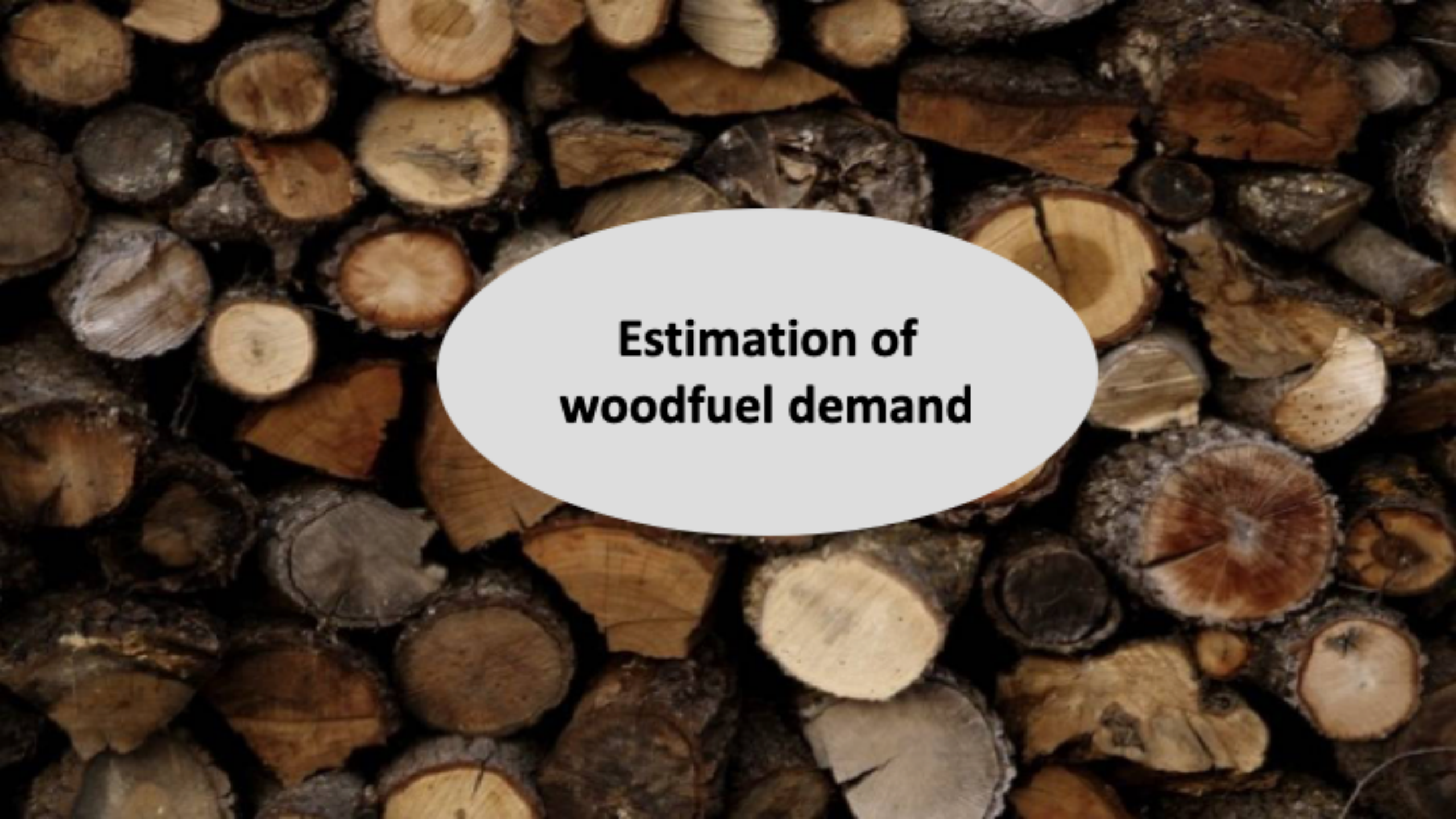
FUrDEST

www.mofuss.unam.mx

Modeling Fuelwood Saving Scenarios

1. Landscape level analysis of woodfuel-driven forest degradation.
2. Simulate wood extraction and woody biomass regeneration within a user-defined geographic region.
3. Users can design "what-if" scenarios and observe the impacts on the landscape.
4. Objectives of simulations:
   - Project where and when woodfuel demand is likely to contribute to forest degradation.
   - Model the impact of interventions that aim to reduce woodfuel consumption.
5. Target audience:
   - User-friendly interface: local policy makers and practitioners
   - Code: Researchers


Annually harvested fuelwood 2001
Aboveground Biomass 2001
UTM S-N coords
1710000
1700000
1690000
1680000
5 km
t ha⁻¹ yr⁻¹
0
10
20
30
40
50
60
t ha⁻¹
0
20
40
60
80
100
360000
365000
370000
375000
380000
385000
390000
395000
UTM W-E coords
Showing last Monte Carlo run

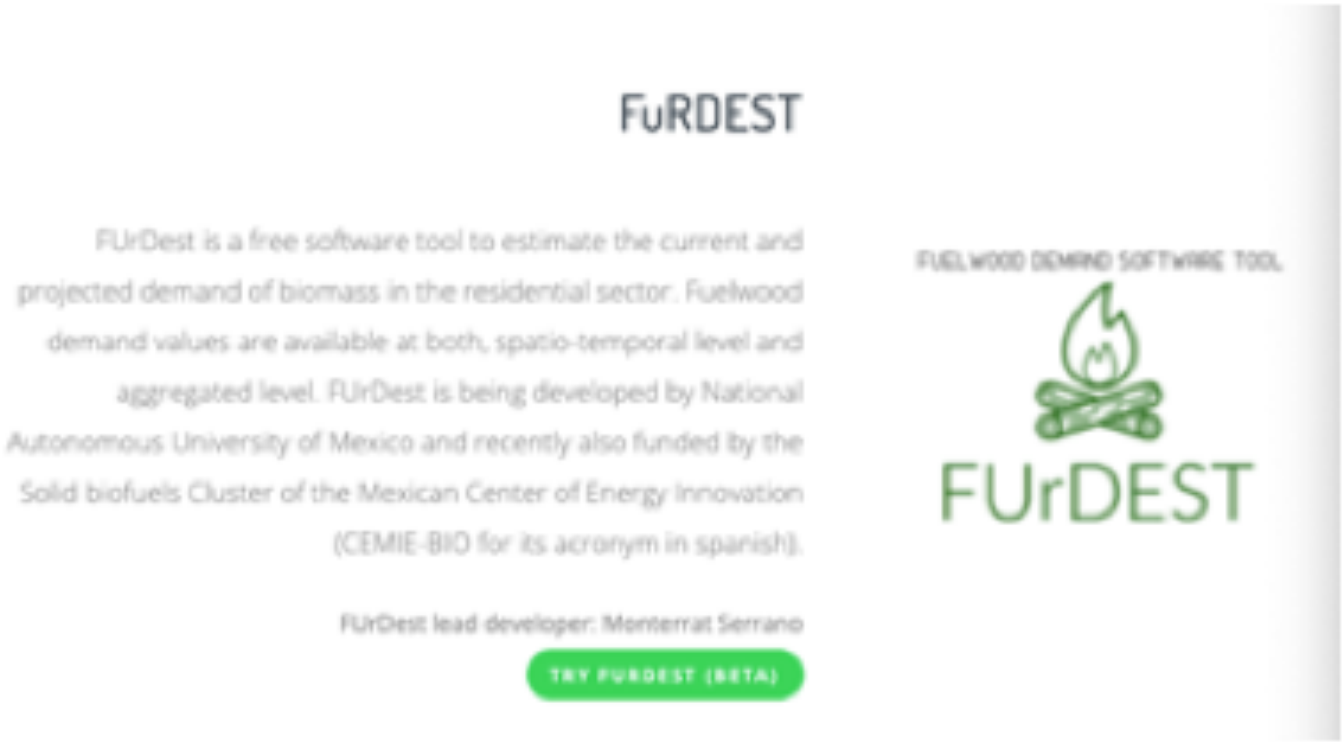

Estimation of
woodfuel demand

➢We estimated FW total demand (exclusive and **mixed LPG-FW** use) in Mexico under a spatio-temporal explicit approach.

Modeling stacking is a **complex** task.

➢ Our model integrates local census data to obtain the number of FW users and study cases data to obtain FW per capita consumption.

➢This model projects FW consumption analyzing FW saturation and population trends from 1990 and 2000 census data of near forty thousand localities with FW use.



http://www.mofuss.unam.mx/

- *FUrDEST* is currently a user-friendly woodfuel demand geographic information system .
- We could model different levels of fuel and stove stacking to estimate current and projected demand (spatio-temporal)
- This estimates are used by ***Mofuss*** to model environmental impacts derived from residential woodfuel demand
- Intervention analysis: BAU vs Alternative WF demand scenarios; sensitivity analysis; Environmental impacts (degradation, GHG's emissions, etc.) ***(Mofuss).***
- Evaluation of policy impact – environmental impacts
- Provides relevant information at local and national levels
- Free/ intuitive tool for stakeholders/policy makers

PAISES MOFUSS FURDEST JAVASCRIPT CUSTOMIZE

FuRDEST

FUelwood DEmand Software Tool

Graficar Consumo

Consumo Nacional

graficar

Consumo por Entidad federativa

México
Michoacán
Morelos
Nayarit
Nuevo León
Oaxaca

graficar

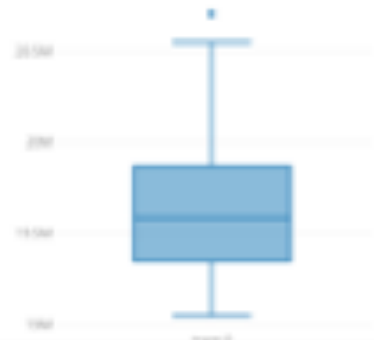
PAISES MOFUSS FURDEST JAVASCRIPT CUSTOMIZE

Consumo por Municipio

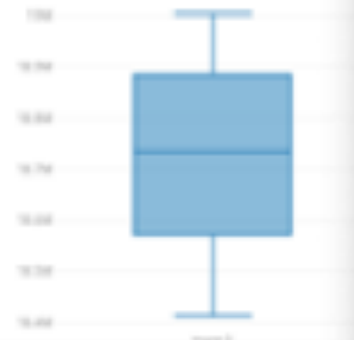
PAISES MOFUSS FURDEST JAVASCRIPT

Estadísticas del consumo

Históricas



Proyectadas



Contacts

Montserrat Serrano

mttserrano@gmail.com

Adrian Ghilardi

aghilardi@ciga.unam.mx