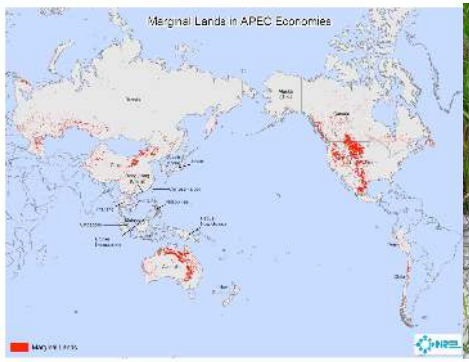
iBiol
(Innovative Bio-Production in Indonesia LIPI)

The 4th JASTIP Symposium " Biomass To Energy, Chemicals and Functional Materials"

The Potential of Developing Marginal Land for Biomass Sorghum Production





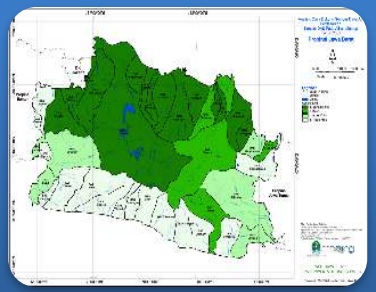

I Made Sudiana[1], Atit Kanti[1], Puspita Lisdiyanti[2], Yopi[2], Didik Widyatmoko[3], Arwan Sugiharto[1], Maman Rahmansyah[1], Reni Lestari[2], Shigeto Otsuka[4], Masaru Kobayashi[5], Toshiaki Umezawa[5]

[1] Research Center for Biology-LIPI, [2]Research Center for Biotechnology-LIPI, [3]Center for Plant Conservation LIPI, [4]University of Tokyo,
[5]RISH, Kyoto University, Japan

Outline

What is the main challenges of revegetation

- Soil physico-chemical analyses
- Soil biological diagnosis
- Climate and irrigation status



Strategy for revegetation

- Marginal land tailing area, and post mining
- Marginal land ultisol soil
- Marginal land entisol soil
- Marginal land due to forest fire

Potential biomass production

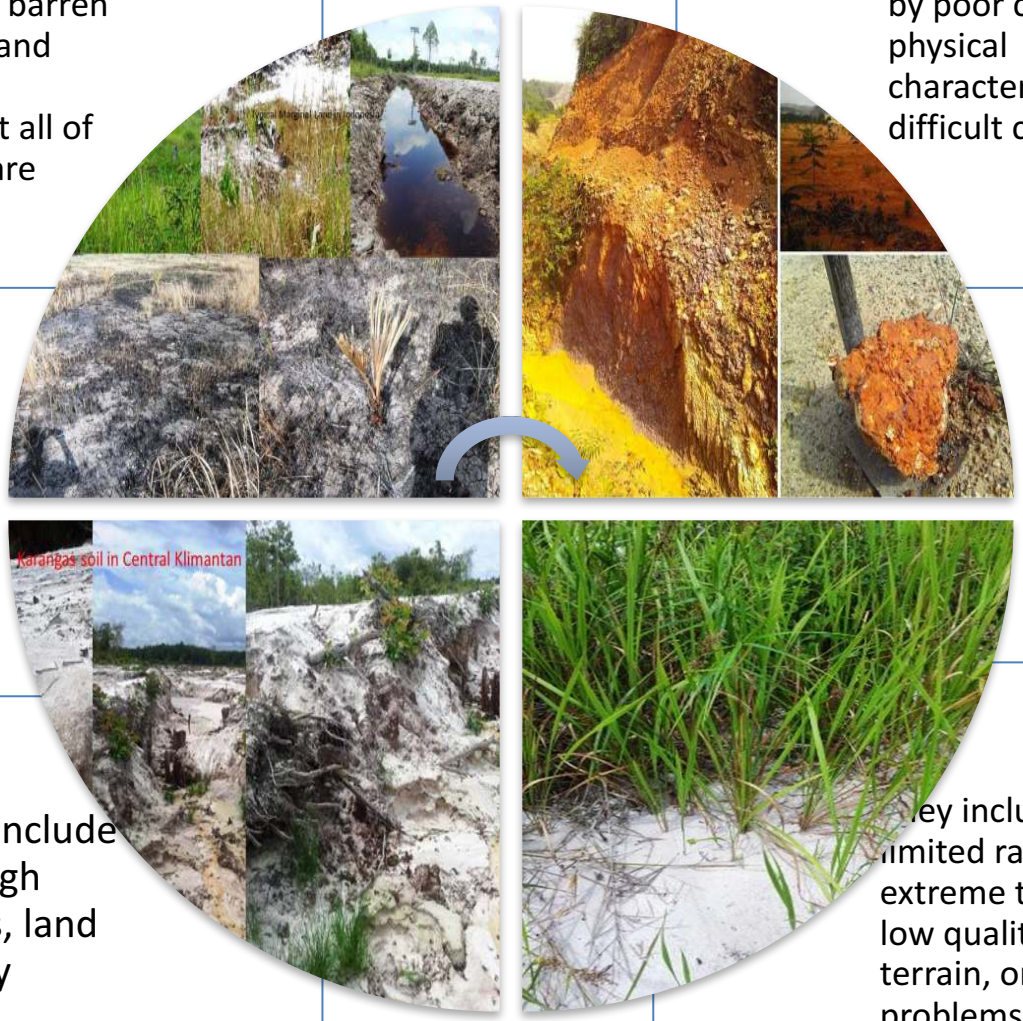
- Energy and materials
- Biorefinery

SATREPS PROJECT (2016-2021)
Project for Producing Energy and Materials Through Revegetation of Alang-alang (*Imperata cylindrica*) Fields

Marginal lands (ML)

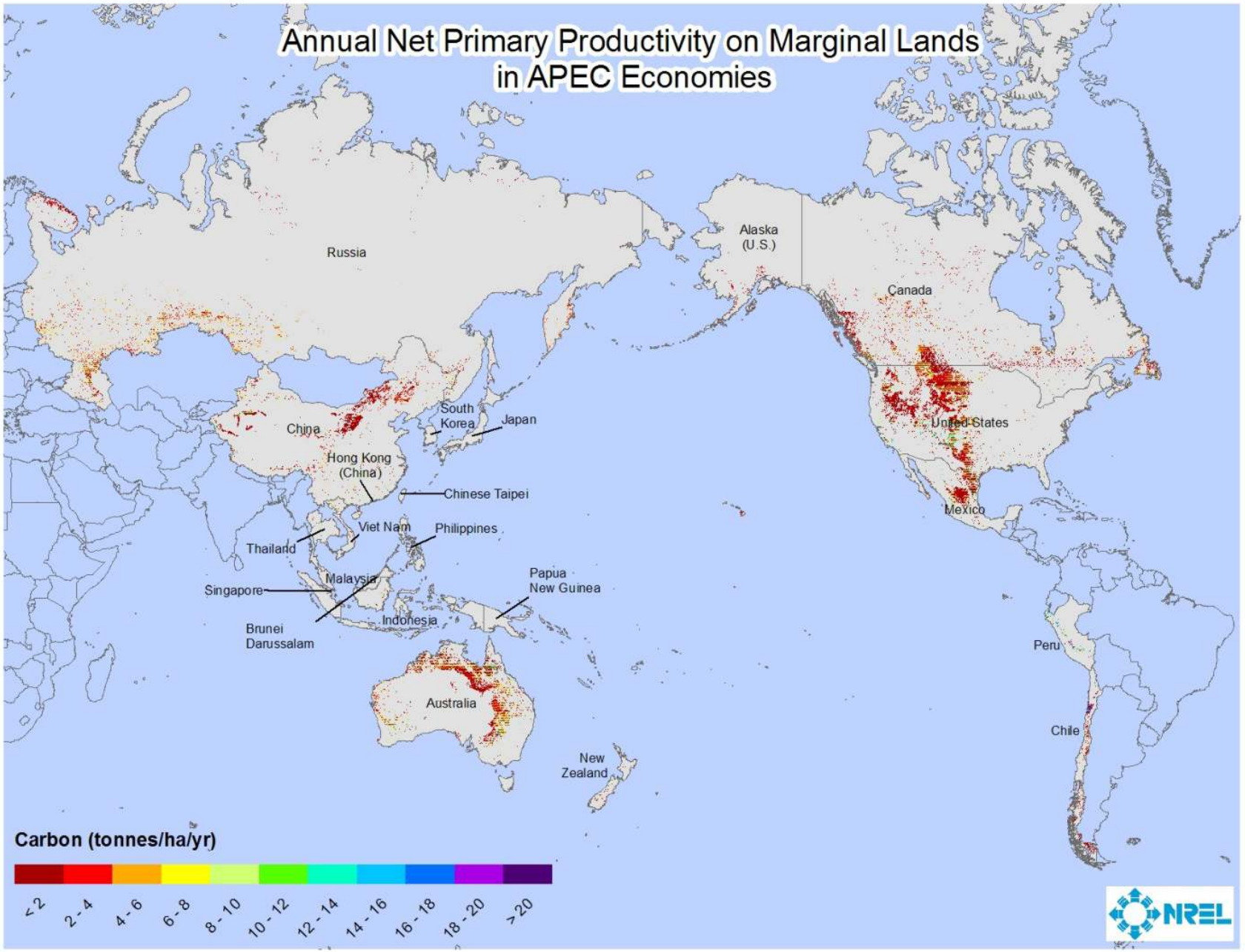
- waterlogged or marshy land, barren rocky areas, and glacial areas. Evidently, not all of these areas are suitable for agriculture

- ML are characterized by poor climate, poor physical characteristics, or difficult cultivation.



- Examples include deserts, high mountains, land affected by salinity,

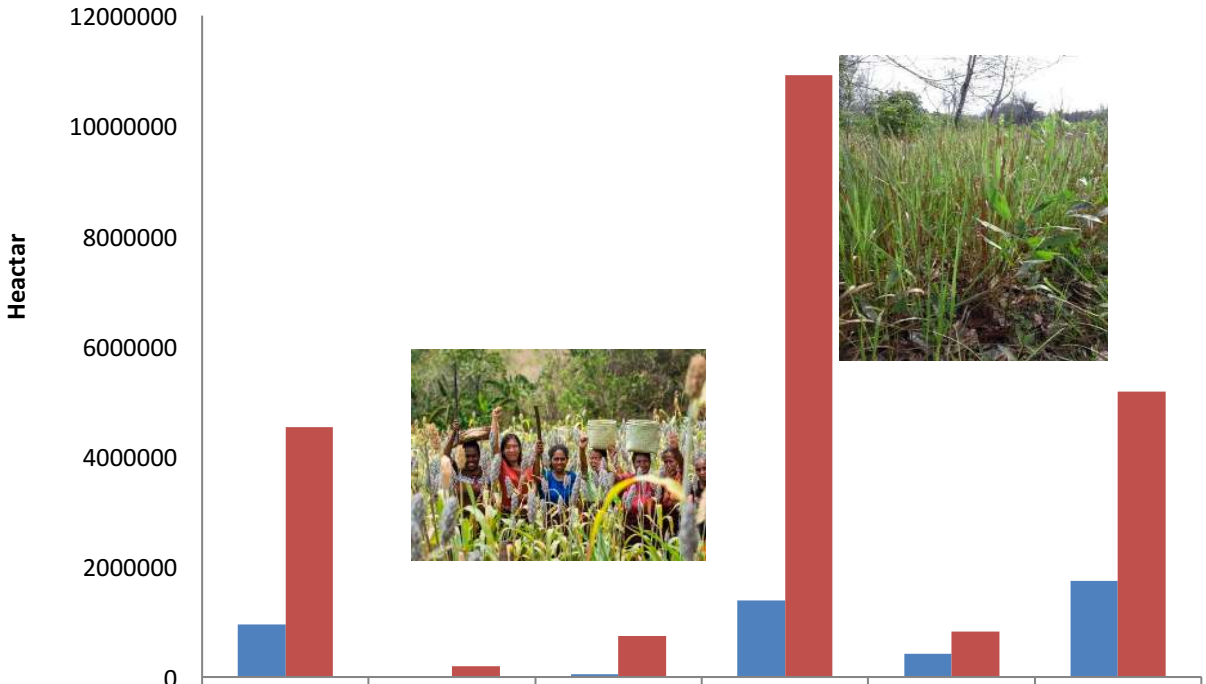
…ey include areas with …imited rainfall, extreme temperatures, low quality soil, steep terrain, or other problems for agriculture.


Annual Net Primary Productivity on Marginal Lands
in APEC Economies
Russia
Alaska
(U.S.)
Canada
United States
Mexico
China
South
Korea
Japan
Hong Kong
(China)
Chinese Taipei
Viet Nam
Philippines
Thailand
Malaysia
Singapore
Papua
New Guinea
Indonesia
Brunei
Darussalam
Australia
New
Zealand
Peru
Chile
Carbon (tonnes/ha/yr)
< 2
2 - 4
4 - 6
6 - 8
8 - 10
10 - 12
12 - 14
14 - 16
16 - 18
18 - 20
> 20
NREL

Marginal Land in Indonesia

Herman Subagio dan Muh. Aqil. 2014. Perakitan dan Pengembangan Varietas Unggul Sorgum untuk Pangan, Pakan, dan Bioenergi. IPTEK TANAMAN PANGAN VOL. 9 NO. 1 2014. Page 39. Source: Badan Penelitian dan Pengembangan Pertanian (2007).

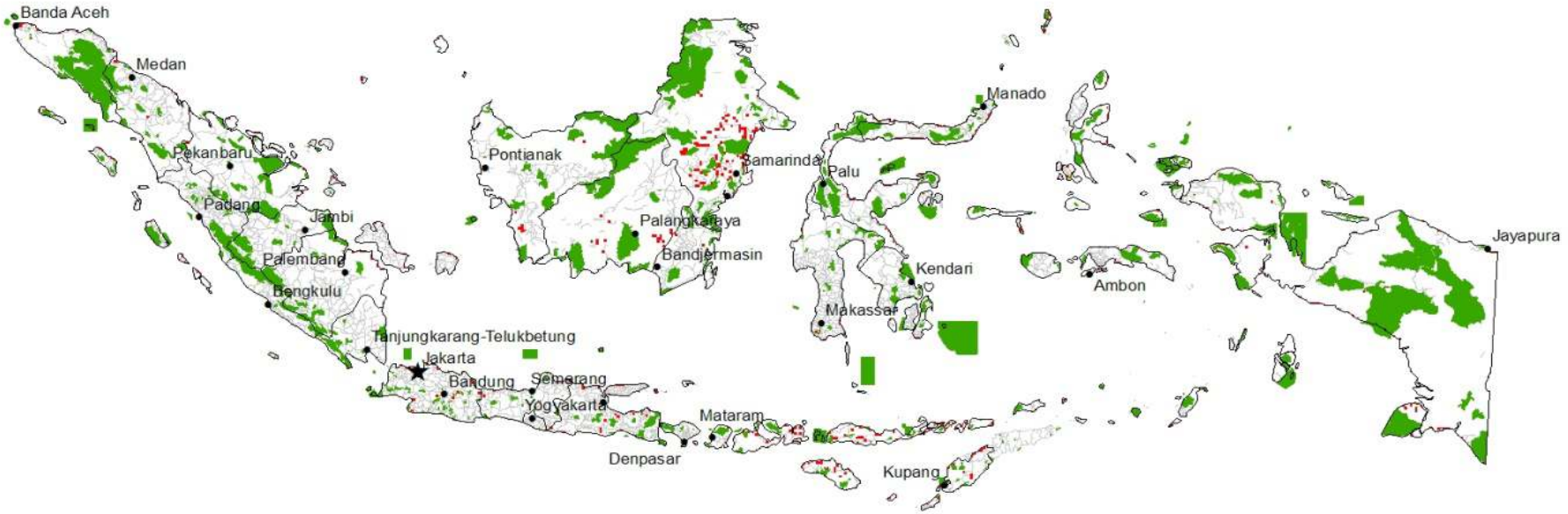
Marginal land In Indonesia in 2007



	Sumatera	Jawa	Bali and NTT	Kalimantan	Sulawesi	Maluku and Papua
Swamp and Non wamp	961050	14393	48922	1395939	422972	1738978
Dry land	4533856	197497	747824	10911452	816632	5179951

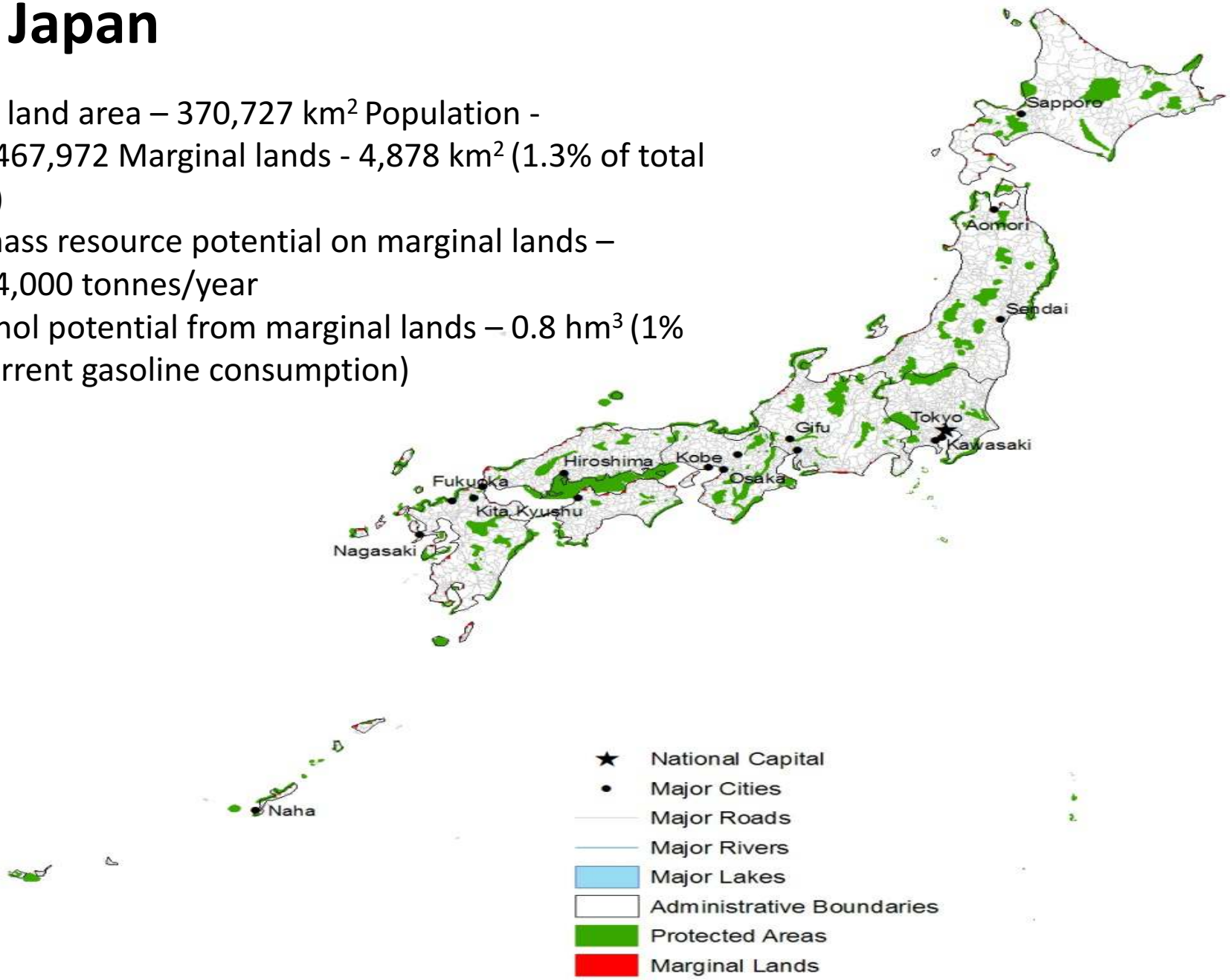
Indonesia

Total land area – 1,847,033 km^2 Population - 234,693,997 Marginal lands - 37,123 km^2 (2% of total area) Biomass resource potential on marginal lands – 15,494,000 tonnes/year Ethanol potential from marginal lands - 6 hm^3 (23% of current gasoline consumption)



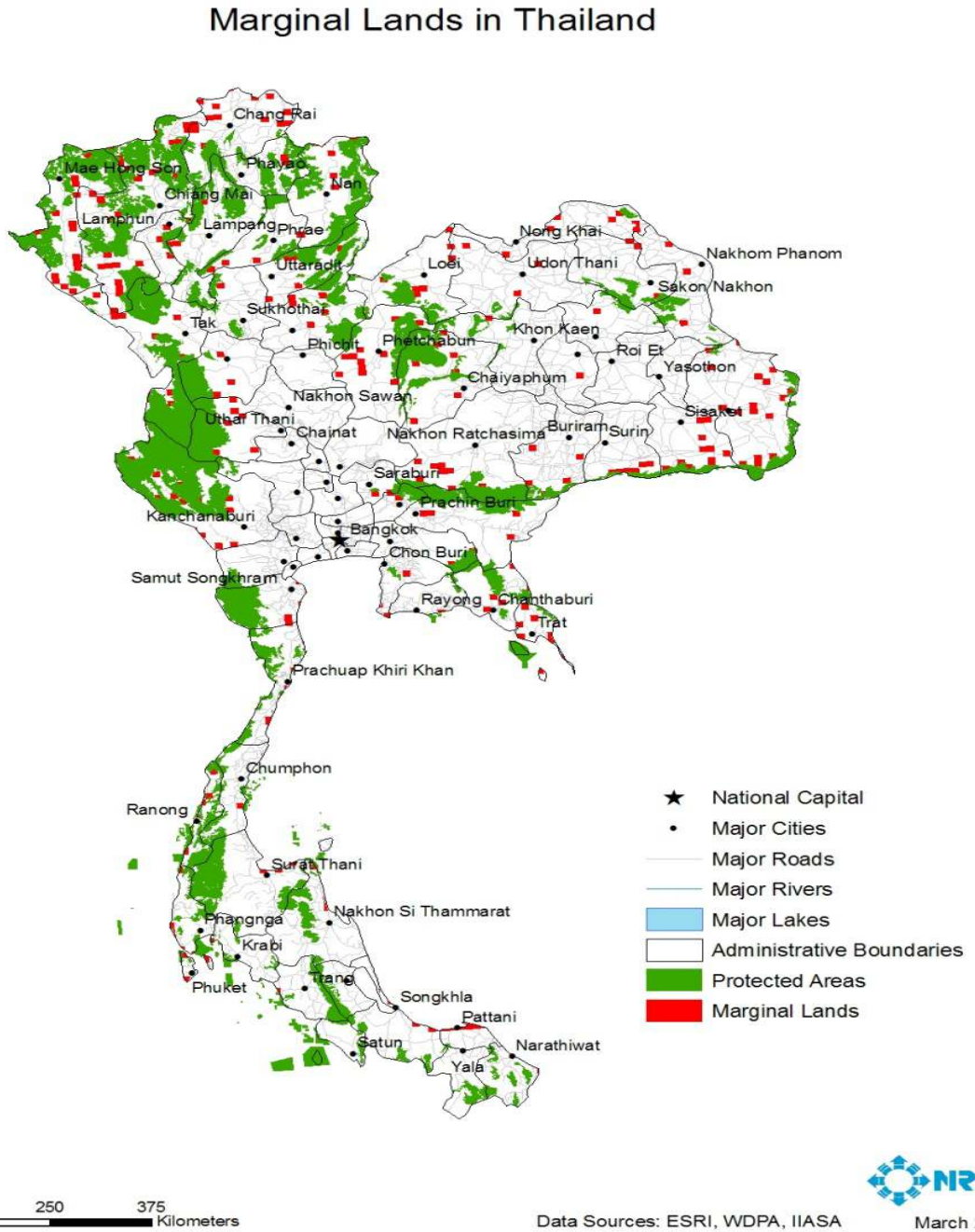
Japan

Total land area – 370,727 km^2 Population - 127,467,972 Marginal lands - 4,878 km^2 (1.3% of total area)
Biomass resource potential on marginal lands – 1,924,000 tonnes/year
Ethanol potential from marginal lands – 0.8 hm^3 (1% of current gasoline consumption)



Thailand

Total land area – 515,357 km^2
Population - 65,068,149
Marginal lands - 17,253 km^2
(3.3% of total area)
Biomass resource potential on marginal lands – 10,394,000 tonnes/year Ethanol potential from marginal lands – 4 hm^3
(38% of current gasoline consumption)



REVEGETATION

FIELD SURVEY

REVEGETATION DESIGN

PROJECT IMPLEMENTATION

SATREPS PROJECT (2016-2021)

Project for Producing energy and materials Through Revegetation of Alang-alang (*Imperata cylindrica*) Fields