SOIL HUMUS in CAMBODIA

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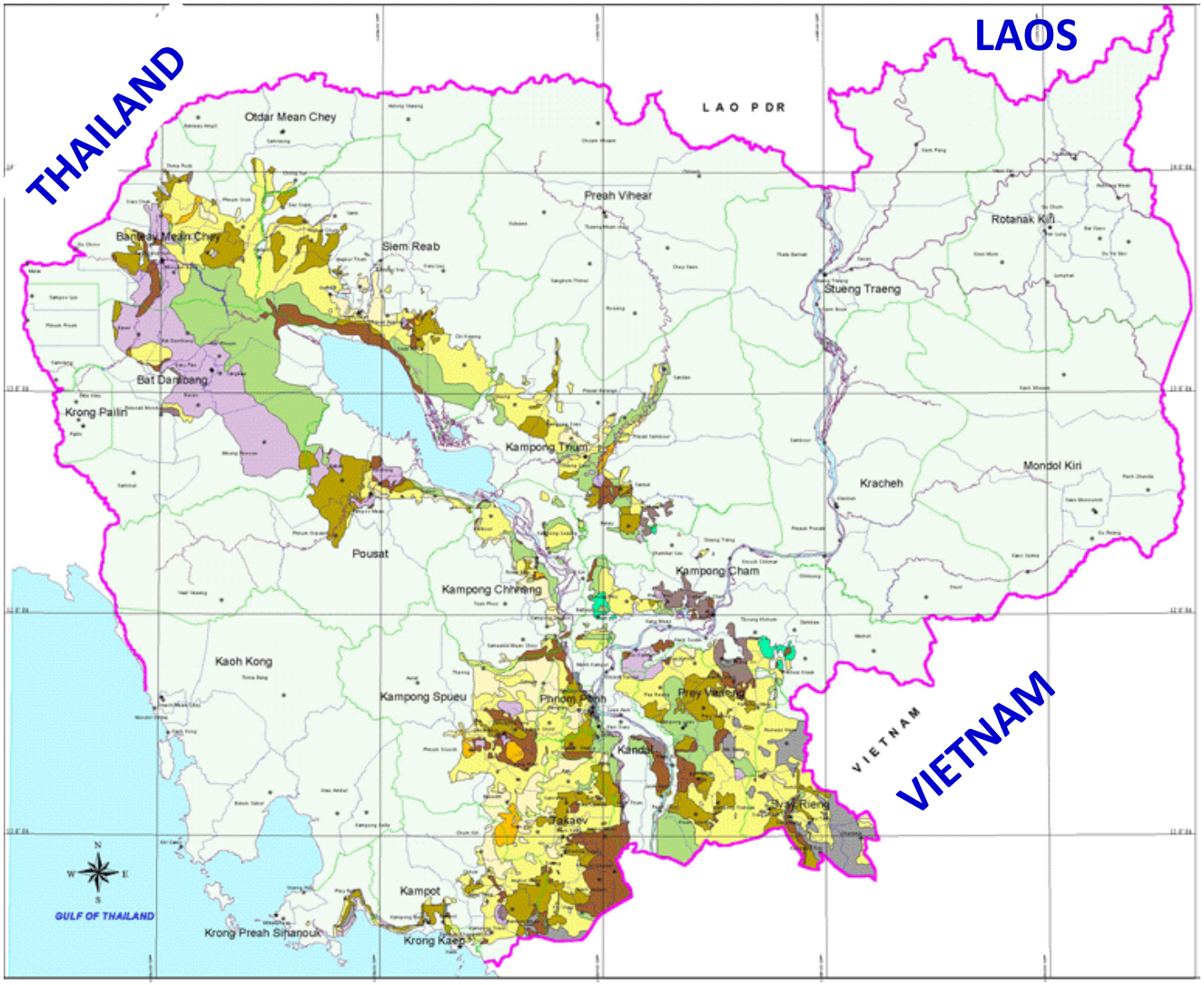
I. CAMBODIA



- Low-lying central plain (includes the Tonle Sap (Great Lake) & Mekong River; surrounded by uplands & low mountains
- 181,035 km^2. ≈ 15 millions
- Tropical monsoon w 2 seasons: Wet (May – Oct) & Dry (Nov – May)
- Average temperature 28 ^oC

Typical landscape

Soil erosion

Sedimentation

Rainforest @ edge ⇒ **Humus**

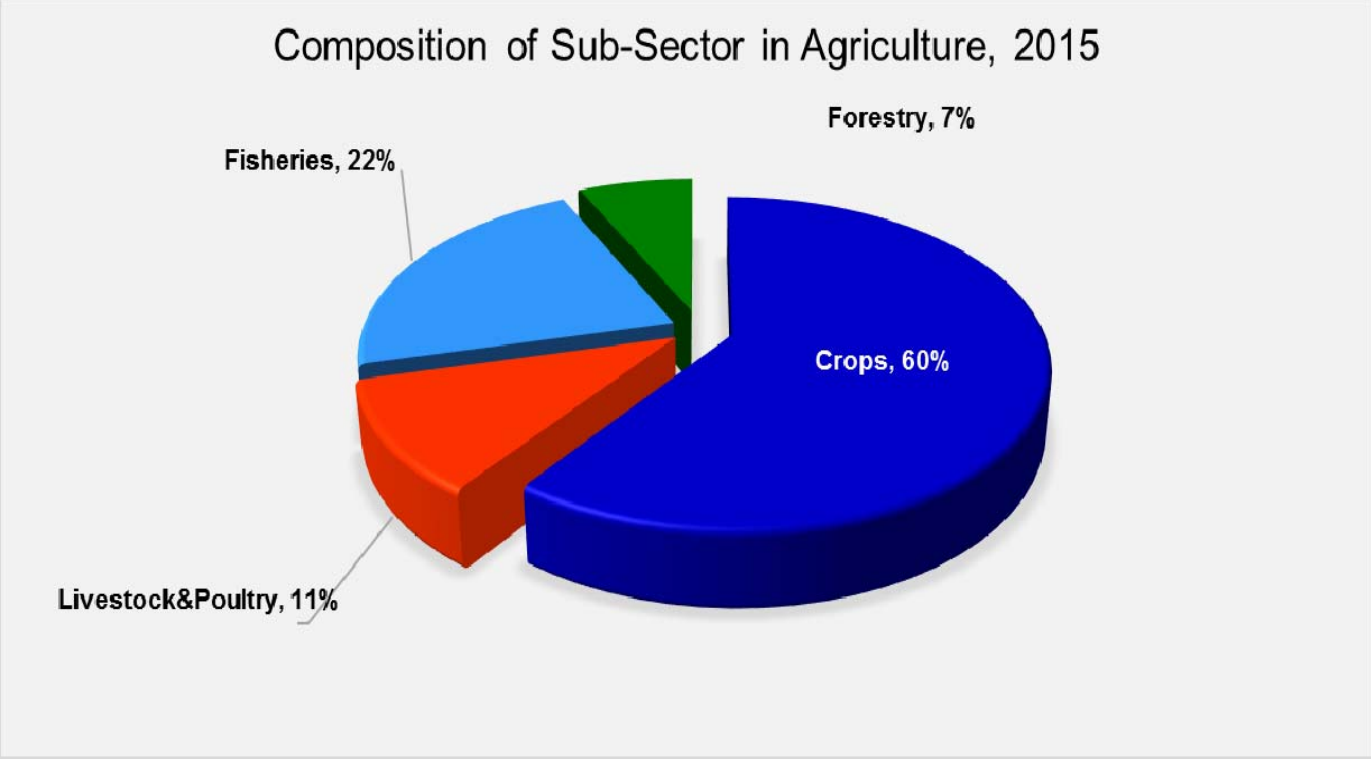
⇒ Soil fertility

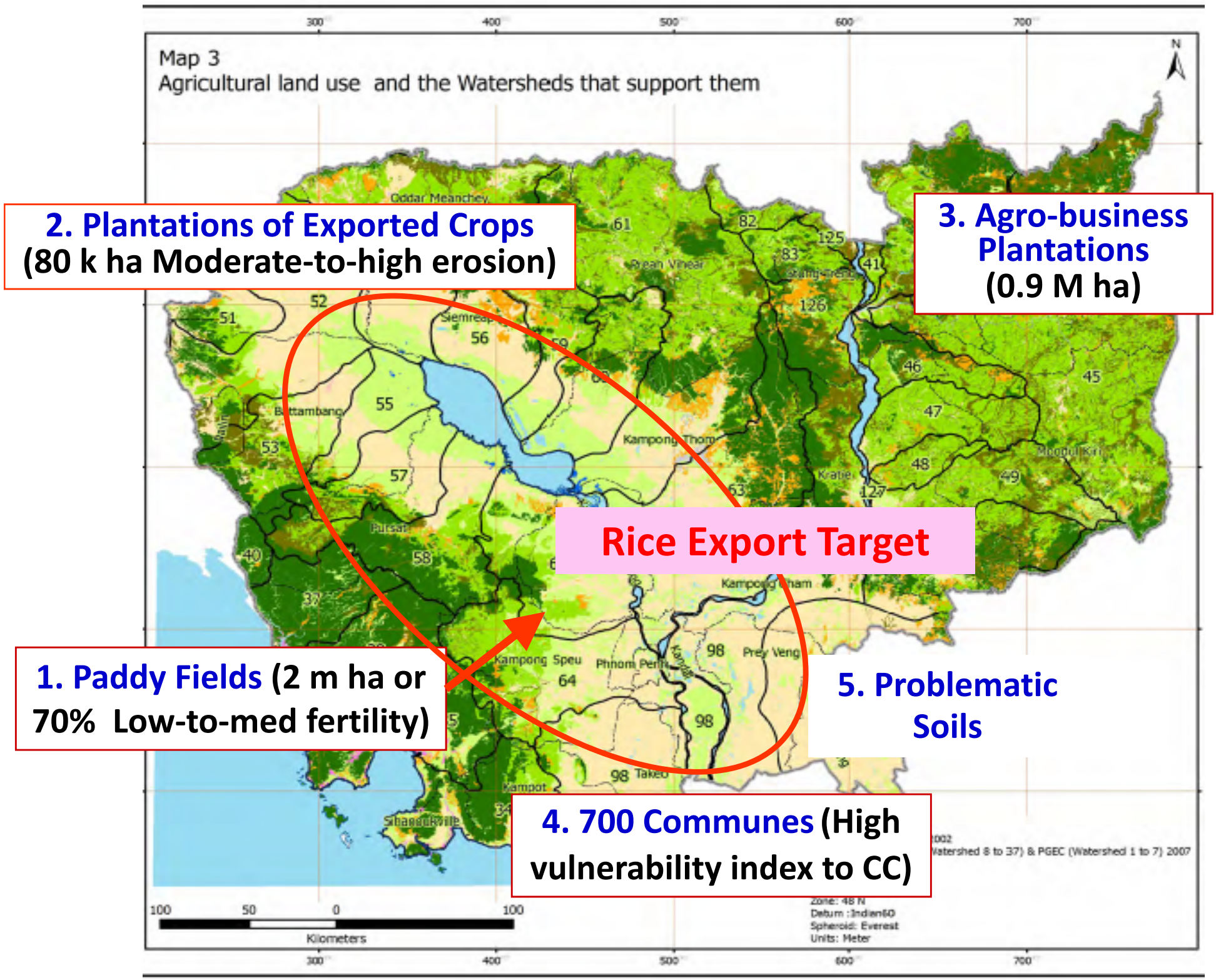
⇒ Water infiltration & Purification,

⇒ ↓ Soil erosion & Sedimentation …

II. Cambodian Agriculture

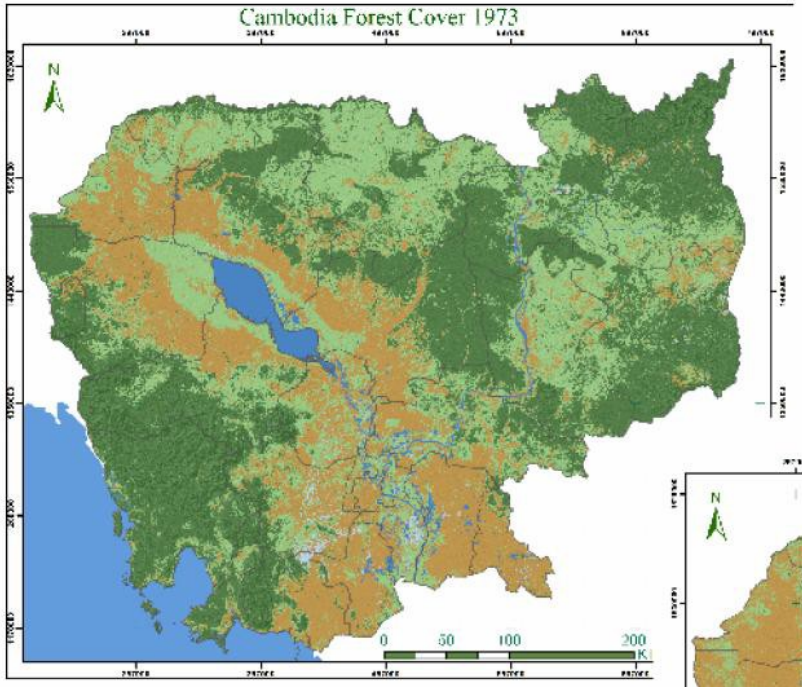
- Agrarian country - Agr is economy foundation
- ≈ 80 % of population in rural areas
- > 30 % of GDP from agr production & export
- Govt: enhancement of agr productivity, diversification, commercialisation, land reforming, sustainable management of natural resources, notably land, forestry & fisheries (fundamental to accelerate economic growth & poverty reduction)
- To modernize the sector thru adoption of new approaches & technologies
- **Rice:** Staple food. Surplus since 1995. > 10 m tons. Export ½. **World best quality**

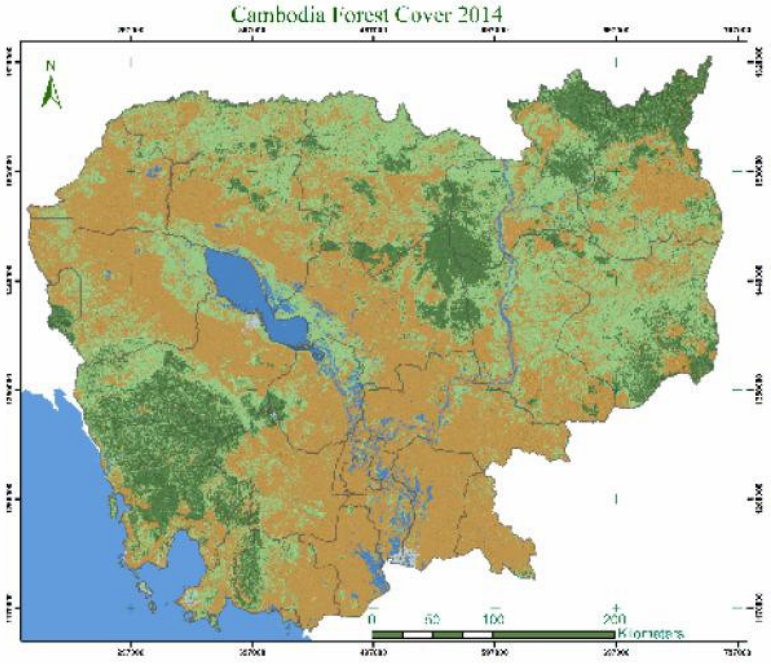



Map 3
Agricultural land use and the Watersheds that support them
2. Plantations of Exported Crops
(80 k ha Moderate-to-high erosion)
3. Agro-business Plantations
(0.9 M ha)
Rice Export Target
1. Paddy Fields (2 m ha or 70% Low-to-med fertility)
5. Problematic Soils
4. 700 Communes (High vulnerability index to CC)
Oddar Meanchey
Siemreap
Battambang
Kampong Thom
Kratie
Pursat
Kampong Speu
Phnom Penh
Prey Veng
Takeo
Kampot
Kilometers

III. Pressure on Natural Resources

- Population & economic pressure ⇒ Agr intensification ⇒ Pressure on available land, inducing substantial degradation of natural resources
- After peace restoration, area of annual upland crops soared from 120,000 ha in 2000 to 800,000 ha in 2012 (≈ 680,000 ha of forest gone)





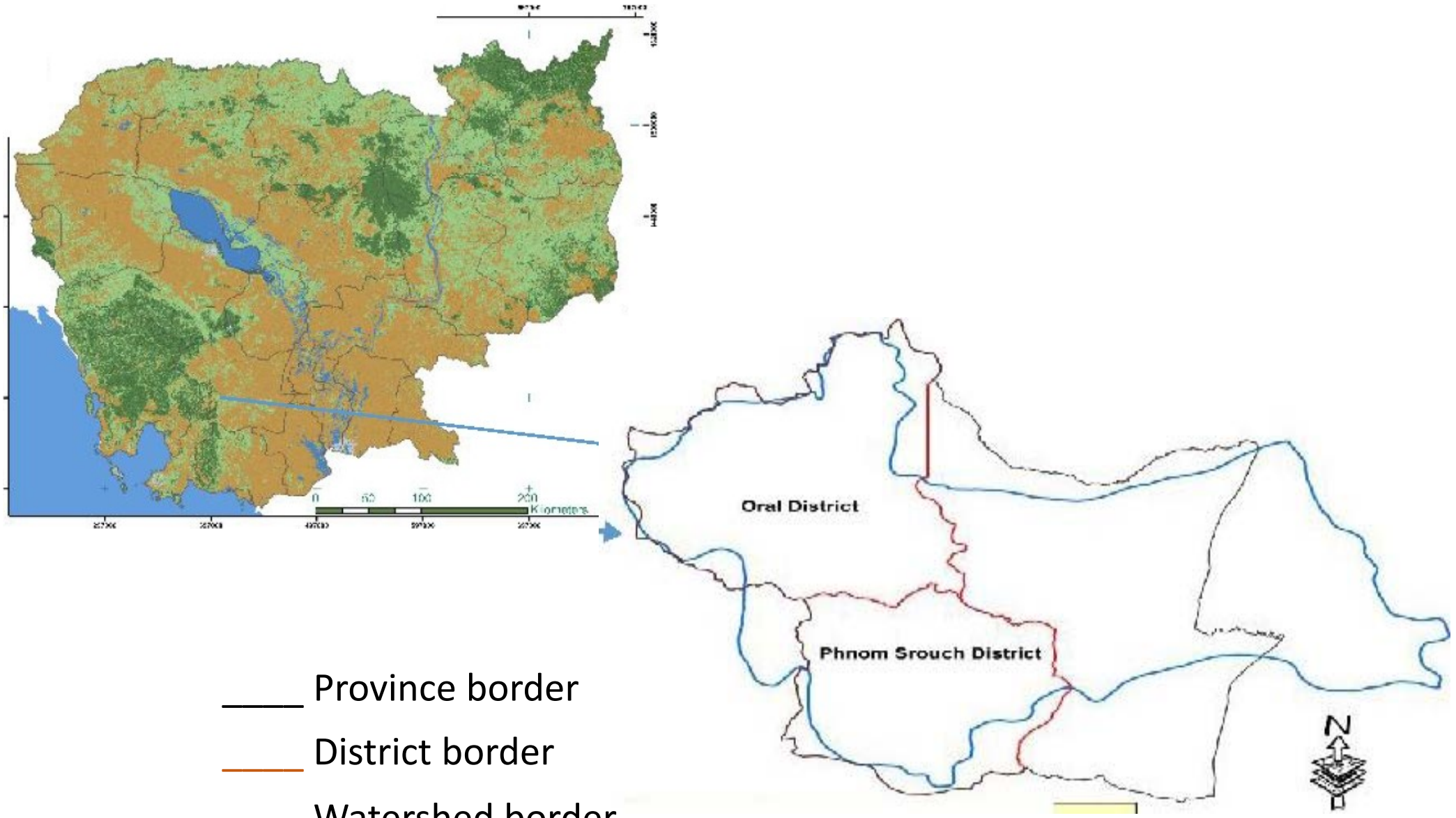
Forest Cover:

- 73 % in 1965
- 49 % in 2014

IV. Conservation Agriculture

- Help enhance ecological processes, preserve & restore soil fertility, mitigate CC & foster farm sustainability
- Minimum soil disturbance, continuous mulch & cultivation of diverse crop
  $\Rightarrow \downarrow$ Labour & weed & $\uparrow$ Yields
- Being supported by wide range of stakeholders
- Adoption by smallholder farmers shown as profitable conversion

V. Economic Valuation in Prek Thnot Watershed



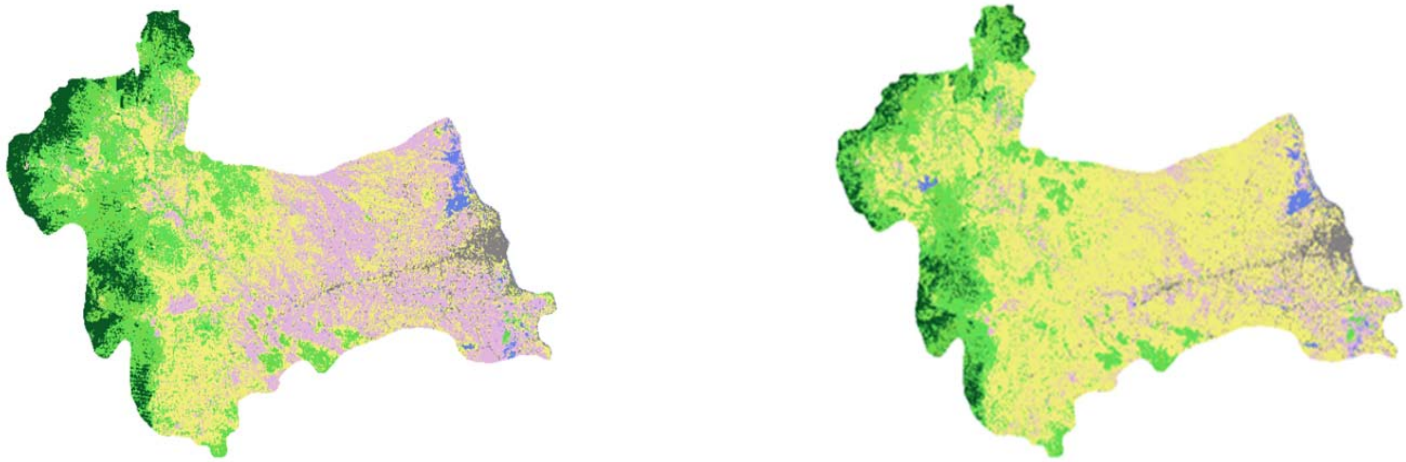
____ Province border

____ District border

____ Watershed border

V. Economic Valuation in Prek Thnot Watershed

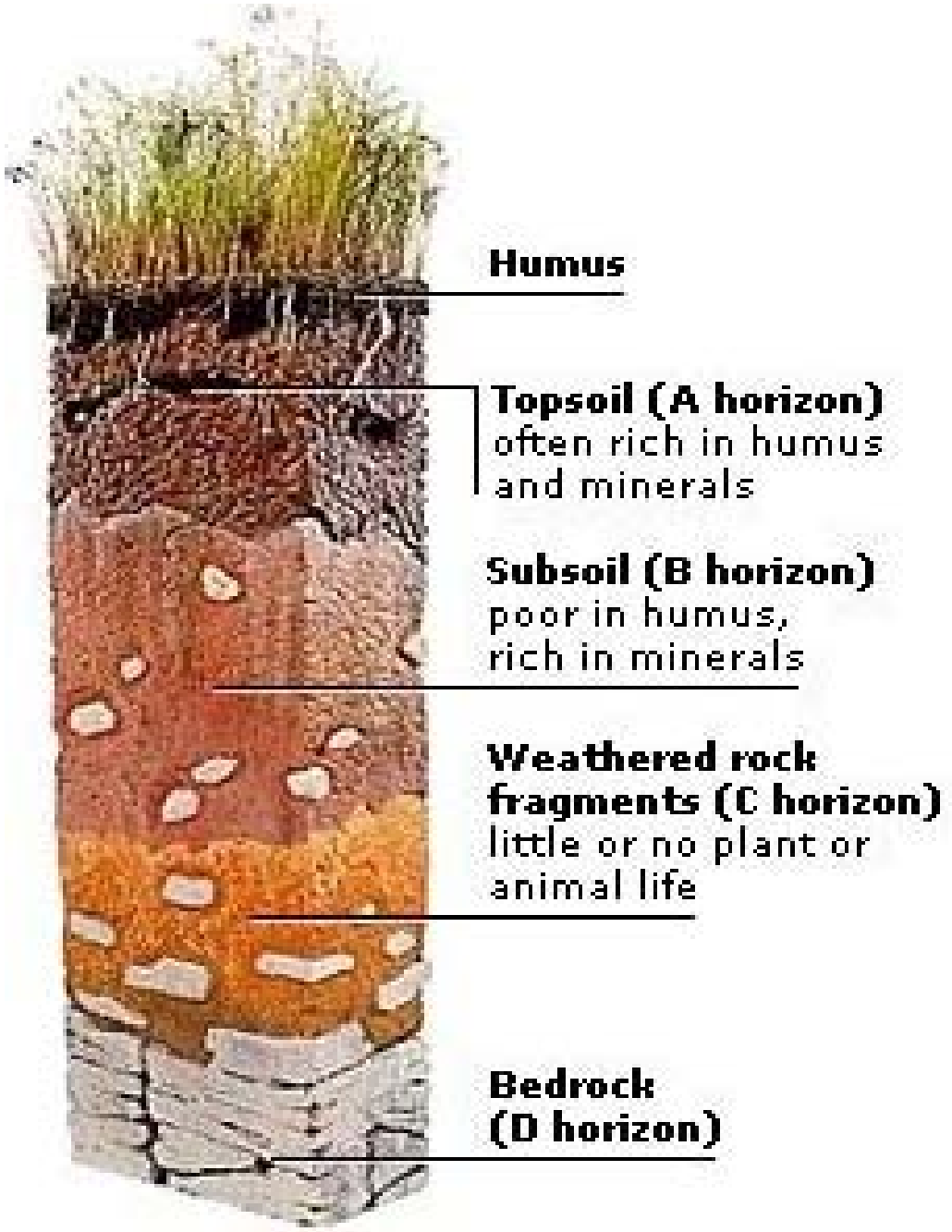
- The Shed: Priority in National Action Program to Combat Land Degradation (UNCCD)
- One of major paddy cultivation areas, BUT crop production low & unstable
- **Ecosystem services for valuation**: Cultural, Provisioning, Regulating, Sustaining …



Land Cover in Prek Thnot Watershed in 1992 & 2012

- **Drivers & causes of damage**: Small-scale agr, forest use, industrial agr commodity production, low incentives & capacity for sustainable land & forest management, lack of law enforcement …

VI. Soil Humus



- Literature search & review not found specific study on humus soil in Cambodia
- Terminology may be related to soils with high organic matter content which have slow decomposing activity of soil microorganism

An idealized soil profile

VI. Soil Humus

- From geological point of view, soils possibly divided in 3 broad groups:
  1. **Alluvial** - occupy broad inland basins, mainly utilized as paddy rice fields
  2. **Basaltic** - carefully cultivated as rubber plantations with modern management
  3. **Sandstone** - large areas in plateaux & mountains, surrounding inland basins, covered with either dense or open forests
- Low fertility & conventional rice cultivation $\Rightarrow$ Destroys structure
- Low use of inorganic fertilizers - Encourage to use animal manure & compost

VII. Organic Agriculture in Cambodia

- Possible greater disturbances in future due to changing weather pattern caused by global warming ⇒ Risk of harvest failures likely to increase
- Farmers can reduce the risk by significantly improving humus (organic matter) content ⇒ ↑ Soil capacity to absorb & retain water
- Soil conservation & organic agr ⇒ enhance biodiversity of soil organisms & stabilize soil aggregates (essential in creating healthy food web in soils surrounding plant roots), thus, reinforce each other to build healthy soils
- Recycling of organic matter & planting green manure crops ⇒ ↑ Carbon & Nitrogen content ⇒ ↓ GHGE

VIII. Actions should be taken

- ✓ **Challenges ahead** - to be able to ↑ productivity sustainably on both old & new lands to feed increasing population (≈ 1.75 %/year)
- ✓ Profitability of farmers must be ↑ If they & their children to stay on the lands
- ✓ Aging farmers & lack attraction to young ⇒ inevitably mechanization ⇒ Require new research & development works on sustainable management of agr lands & restoring forest ecological services
- ✓ Basic information on soil nature, potentialities & limitations necessary to develop program for increasing food & crops are needed
- ✓ Need to reassess fertilisers for particular farms
- ✓ R & D collaboration with others on soil humus related matters