

## INTER-AMERICAN INSTITUTE FOR GLOBAL CHANGE RESEARCH

IPCC WG2 - Future Research Needs

fossil fuel substitution by agriculture & forestry

climate change mitigation through biomass potentials

: costs and trade-offs with soil conservation

balancing carbon needs for soils and energy consumption





## crop residue

decreased maximum soil temperatures at the soil surface by at least 5°C increased soil water storage by at least 50 mm increased uptake of nitrogen from the soil organic matter and applied fertilizers

Power, Wilhelm, Doran, Soil Tillage Res., 8: 101-111



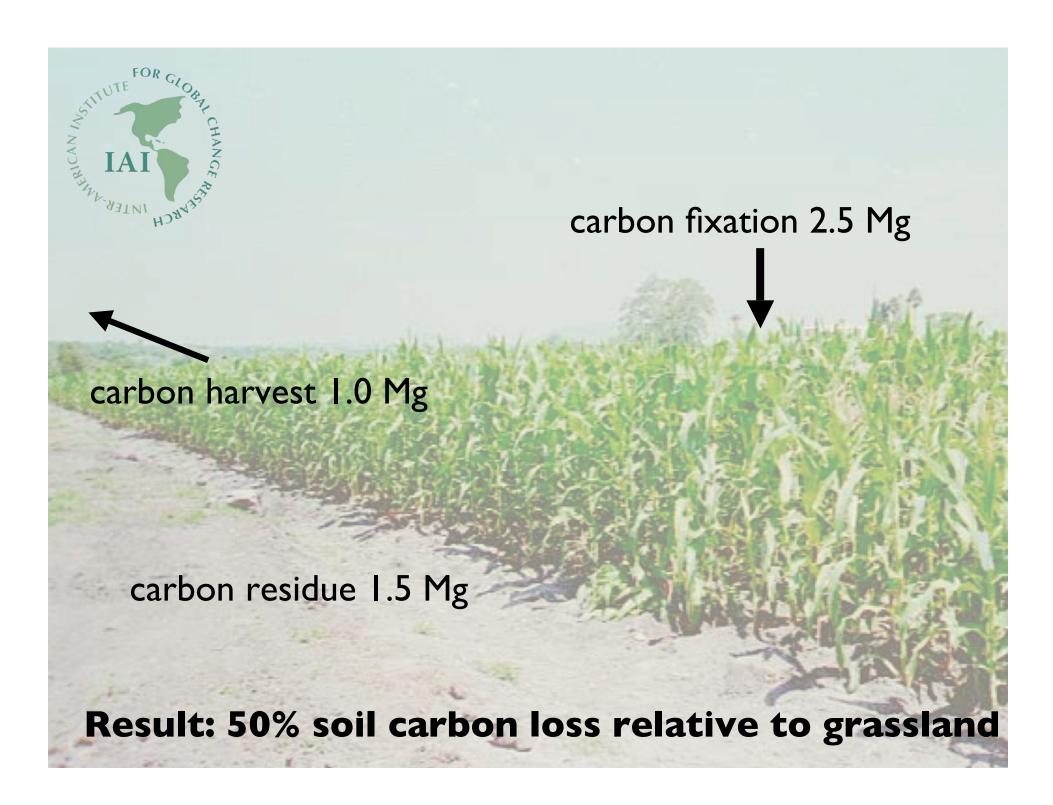


each Mg ha<sup>-1</sup>of maize residues on the soil surface increased maize grain and stover production by approximately 120 and 270 kg ha<sup>-1</sup>



typical maize yield: 4-7 Mg ha -1 typical harvest index: 32 to 46%

typical residue amount 0.5 - 1.5 Mg carbon ha -1





carbon fuel harvest 1.5 Mg

carbon grain harvest 1.0 Mg

carbon fixation 2.5 Mg

Result estimate:

70% - 80% soil carbon loss relative to grassland



## soil organic matter function

mitigation cost

nutrient supply

water storage

surface protection

carbon storage

fertilizer

irrigation

erosion

CO<sub>2</sub> mitigation

