

Managing Ecosystems to Mitigate Climate Change: It's not just the on-site carbon stocks

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economic systems

forestry: system is complex and does not simply accumulate C - see VGs - this is a good graphic to show some of the elements

take a forest ecosystem with 100 MTC/Hectare - can harvest (then goes into long-lived, products, short-lived products, substitution of wood for other materials, biofuels, things to landfill, etc) OR, can maintain it. Ends up the two come up similar in terms of net impact on carbon flows.

net C after 100 years protect versus harvest: and after 20 years see VGs - depends on efficiency

not just C - but your C and my C

Ag: changing ag practices can change GHG emissions

1997 data - average crops over US - convert from conventional to no till: .337 kC/Hec/Yr in ag soils, can't preserve C over time and soil pool of C goes into the atmosphere in 40-50 years

have to maintain the ag practice to keep C there over time

less energy used saves more C but if the ag practice to sequester C used more energy, would have a negative impact on C over time

productivity change? if you lose it, have to plow another acre somewhere. If gain productivity, could release some land from ag and say, plant forest.

Corn only - nitrogen application - if increase, increase N₂O emissions, energy use for fertilizer, but increase productivity so can release land from ag.

large complex set of feedbacks - nitrogen matters a lot and effect on productivity matter a lot - N₂O emissions are a big deal too.

system is already close to optimization

net effect on GHG emissions when changing to no-till depends on the details - VG - net decrease in early years, but after 40 years can be plus or minus depending on details.

instead of buying and selling C - can rent it. short term C flows

how to deal with irrigation? It changes energy balance

Farm Bill - C market and other no till benefits - how to measure below-ground C? Have to take a lot of samples to get very accurate - ag easier than forest cause more homogeneous

no degradation in landfills essentially

biofuels, perennial crops, conservation tillage - could have benefits

legacy - this only can be done because we did it so badly in the past - the opportunity is created by poor past practices