Marginal Abatement Cost Curves and Sustainable Development

John M. Antle Professor of Applied Economics



MACCs – Déjà vu all over again?

Late 1990s – 2000's – many studies estimating "carbon supply curves" or MACCs

 Many used opportunity cost concept: estimate or simulate marginal cost of changing land use or management practices to increase and maintain SOM in soil or otherwise reduce net emissions from ag systems

2010 (approximately): frustration over climate policy failures (Kyoto; US; etc), growing acceptance of need to adapt to seemingly inevitable climate change => adaptation!

Paris 2015: back to mitigation – NDCs & etc to limit warming to 1.5° C

 Oxford conference* Sept 2016: IPCC challenge to the global climate science community – what to do? Answer to Paris – back to the MACC?

But in the mean time, we discover Sustainable Development Goals

Many relevant to ag! What to do?

Can we meet all of these?

Synergies? Tradeoffs?





The Challenge of Multi-dimensional Sustainable Development

- Example: East Africa Dairy Development Project (Gates Foundation, Heifer International, International Livestock Research Institute)
- Goal: double dairy income for 500K small farms (< 4 cows) over 10 yrs using genetics, management, markets



EADD Tradeoff Analysis

Indicators:

- Economic
 - o Farm income
 - Poverty rate
- Environmental
 - o Water use
 - \circ Methane emissions
- Social
 - Women's control of assets
 - Infant milk consumption (child nutrition)

Technology impacts:

- Synergies: Higher income, lower poverty, better nutrition
- Tradeoffs: increased water use, methane emissions, decreased share of women's assets



The limit of the MACC: getting beyond a climate centric approach to climate policy?

The AgMIP approach: mitigation – adaptation cobenefits (synergies and tradeoffs)?





