

Alternative Policies on Climate Change and their Implications on the U.S. Agricultural Economy

Conference Summary

Won W. Koo and Yong Jiang

With emerging regulations on greenhouse gas (GHG) emissions, policy alternatives mitigating GHG emissions are of great interest to the agricultural community. A national conference to enhance the understanding of climate policy and its implications to the U.S. agricultural economy was hosted by the Center for Agricultural Policy and Trade Studies (CAPTS) at North Dakota State University (NDSU) with the cooperation of NDSU Energy and Product Innovation Center (Bio-EPIC) and Farm Foundation. The conference was held in Fargo, ND on May 24, 2010. Below are the key insights for each theme of the meeting.

Video remarks

Kent Conrad (U.S. Senator)

- Agricultural production risk increases as climate undergoes changes
- Agriculture plays a vital role in addressing the challenges of climate change
- North Dakota shows tremendous potential in carbon sequestration and clean energy production

Byron Dorgan (U.S. Senator)

- North Dakota is a state with production of diverse energy sources and agricultural production
- Climate change, agriculture, and energy are interrelated
- Energy bill should include provisions to reduce carbon emissions and maximize renewable energy production
- Family farms can play an important role by producing renewable energy and providing carbon offsets.
- Legislations should be aimed to limit GHG emissions rather than cap and trade (C&T)

Climate Change: What does it mean to the U.S. agriculture?

Roger Johnson (President, National Farmers Union)

- Climate and energy legislations provide better opportunities for agriculture
- Farmers could benefit from climate policy with income from carbon sequestration and renewable energy that may more than offset production cost impact
- National Farmers Union (NFU) supports a climate policy on the conditions including: 1) United State Department of Agriculture (USDA) administration of agricultural carbon emission offsets, 2) science-based carbon sequestration rates, 3) no cap on

domestic agricultural offsets, 4) recognition of early actors, and 5) stackable credits for carbon emission offsets and other environmental benefits

Bob Young (Chief Economist, American Federal Bureau)

- Capping, trading, and pricing carbon would be a major change in the nation's economy
- Input costs for agriculture would rise under climate change legislation
- Carbon emission offsets from agriculture could cause a shift of cropland out of production, resulting in a decrease in agricultural production in the next 40 years

William Hohenstein (Director, Climate Change Program, USDA)

- Climate, climate variability, and climate change have effects on agriculture and land use
- Agricultural and forest systems are important sources of GHGs and carbon sinks
- Forest and agriculture offer low-cost opportunities to mitigate climate change
- Issues with offsets include baseline definition and additionality, permanence, and measurement
- USDA role in carbon offset markets includes identifying eligible practices, establishing metrics for quantifying credits, establish reporting requirements, providing technical assistance, certifying implementation, recordkeeping, auditing, allocating carbon offsets, paying incentives, and monitoring.

Potential impact of climate change policies on land use and food production

Dennis Nuxoll (Director, Government Relations, American Farmland Trust)

- The climate policy choice is either Environmental Protection Agency (EPA) regulation or Congressional legislation regulation on GHG emissions
- EPA regulation would result in higher production cost without carbon sequestration opportunity for agriculture
- Congressional legislation creates more income opportunities (carbon offsets, demand for agricultural biomass as bioenergy feedstock) and imposes no cap GHG emissions on agriculture
- While a USDA study and a study based on the FASOM model indicate large shifts in land use, other studies show limited land use shifts.
- Accurate modeling to understand climate impacts is vital to understand policy implications

Bruce McCarl (Professor, Texas A&M University)

- Climate change is happening
- Policy directions and elements include mitigating the extent of climate change, adapting to climate change to reduce impact, and absorbing the consequence and impact.
- Policy challenges include current costs of mitigation and adaptation v.s. effects in future; uncertain effects and effectiveness of adaptation and mitigation, ineffective unilateral action on mitigation with no collective action, and resource and investment competition.

- Agricultural sensitivity to climate change: the northwest region of the U.S. tends to gain and the southeast region tends to lose
- Climate change effect on research returns and implication on investment needs
- Agricultural adaptation: irrigation, drought resistant varieties, tolerant breeds and varieties, crop and livestock mix, tree rotation age, abandonment, investment in research, extension, and capital.
- Agricultural mitigation: increased farm income and reduced traditional agricultural production
- Agriculture is sensitive to policy directions, land use competition is important to increase net farm income, price, production, and income will respond

C.S. Kim (Senior Economist, Economic Research Services, USDA)

- A carbon contract based on a per acre incentive payment for carbon sequestration is more cost effective policy alternative than a per ton basis

Suzanne Thornsby (Associate Professor, Michigan State University)

- The two approaches to examine potential economic impacts of climate change on agriculture are agronomic and hedonic modeling
- Agronomic approach is a structural modeling technique based on explicit consideration of agricultural production feedbacks and interactions with climate and market and economic conditions. It is challenging to incorporate and reflect all the feedbacks, production, and market adjustment
- Hedonic approach directly links land rent to climate variables in reduced form conditional on other factors. It is able to incorporate a range of behavioral responses without specific information on feedback mechanism
- Interpreting impact assessment of climate change needs to consider the fundamental difference in the assessment approaches

Luncheon address

David Berg (President and CEO, American Crystal Sugar Company)

- The sugar industry will be negatively and severely impacted by GHG regulations
- The U.S. sugar industry has less environmental impact than those in foreign countries
- Increased import of sugar from foreign countries can increase global GHG emissions

Economics of sequestering carbon in the U.S. agriculture

Richard Gilmore (President/CEO, The GIC Group)

- Production agriculture and related secondary agro-industries are significant sources of methane, N₂O, and CO₂: production agriculture accounts for 5-25% of emission in developed countries and 20-35% of emissions in advanced developing countries; secondary agro-industries contribute 5-15% of emissions in developed and advanced developing countries

- In the Kerry-Lieberman Bill (American Power Act), agriculture and forestry are expected to provide the bulk of the U.S. offset program – huge opportunity for the U.S. agriculture.
- Eligible offset projects include fugitive methane capture from energy production and distribution, agricultural sequestration by land management, and practice change
- Agriculture is expected to gain from cap-and-trade (C&T)
- Agricultural carbon index can serve as instruments for valuing agricultural offsets while providing a benchmark for measuring the carbon performance of the production agriculture, secondary agro-industry, and land use subsectors.

Patrick Westhoff (Co-director, Food and Agricultural Policy Research Institute (FAPRI), University of Missouri-Columbia)

- Agriculture will respond to incentives for carbon sequestration
- Agricultural production may be subject to competition among food, fiber, fuel, and carbon offsets with resulting market consequences in prices, supply and demand, and profits.
- Carbon offset prices increases over time but the predictions of EPA are different than the predictions of Department of Energy (DOE)
- No-till or other practices may have little effect on production and prices, while expansion of forestry or energy crops can have significant effects.
- Uncertainties in estimating production cost impacts include energy cost change, effect of energy cost change on agricultural input prices, effect of provisions to benefit energy-intensive, trade-exposed industries, and farmer production adjustment
- Higher energy costs would reduce farm income, increased biofuel production and acreage shifts could change the picture, and landowners most likely benefit while livestock producers least likely
- Specifics of the climate policy in final legislation adds another uncertainty on the estimation of the impact on agriculture

Daniel De La Torre Ugarte (Professor and Associate Director, Agricultural Policy and Analysis Center, University of Tennessee)

- C&T could generate additional income for the U.S. agriculture sector
- Challenges for agricultural offsets include the level of carbon prices, loss of agricultural competitiveness due to land use change including afforestation and rising energy prices, potential conflicting interests between landowners and farm operator, limited offset opportunities and innovation, and offset generation and accounting (additionality, permanence and leakage).
- Most of the challenges could be addressed with pragmatic and common sense approaches: it may be cheaper not to confine offsets to additionality criteria; permanence in sequestered carbon can be addressed by set-aside incentives or insurance; potential carbon leakage calls for global action and discounting; agricultural offsets could be a bridge to future with permanent carbon sequestration
- Regional impacts need to be taken into account as all segments of the sector do not have the same ability to sequester carbon

Won W. Koo (Professor and Director, CAPTS, NDSU)

- ND farmers appear to be reluctant to participate in carbon sequestration
- Even though farmer's participation in carbon sequestration increases with higher carbon prices, the participation is not very sensitive to price changes
- Farmers are more likely to participate in the carbon sequestration program if they own CRP land, cropland, and rangeland
- Young farmers (less than 45 years old) are supportive to climate change legislation and are more likely to participate
- With the fertilizer industry exempted from GHG regulation, most ND farms would gain possibly for a carbon price higher than \$10/mt carbon equivalent
- Farmers would gain more from C&T if more actively involved in carbon sequestration
- Policy design will significantly affect the costs and benefits of C&T in agricultural sector

Alternative policy options in reducing GHG emissions and implications

Tristan Brown (Researcher, Center for Agricultural and Rural Development, Iowa State University)

- Current proposal for climate legislation violate international trade law while leaving loopholes for foreign competitors
- Embedded carbon valuation system – a single unified framework similar to value added tax applied to all economic activity
- Fast pyrolysis bioenergy platform will achieve economic feasibility under comprehensive carbon policy
- Current legislation (Waxman-Markey) contains several loopholes to make renewable bioenergy platforms viable

Brent Gloy (Associate Professor, Cornell University)

- Livestock production is likely to be worse off under C&T
- Manure management practices using anaerobic digester reduce GHG emissions but ability to supply offsets to mitigate the negative impact varies with farm size and species; dairy best, hogs probably second. Large farms are most likely to participate
- Relatively high offset prices (more than \$15/mt CO₂ e) are required for a significant reduction in GHG emissions from manure storage
- Impact is highly uncertain because of uncertain potential supply

Ray Massey (Agricultural Economist, Commercial Agriculture Program, University of Missouri)

- Higher prices are more certain than higher incomes
- Opportunities for agriculture to provide offsets may be uncertain due to issues related to additionality, permanence, verification, and enforcement
- Agriculture will have few income opportunities from C&T without offsets

- Agriculture needs to be involved in climate legislation to minimize costs and maximize opportunities

Panel discussion: Issues, challenges, and opportunities in reducing GHG emissions

Andrew Schmitz (Ben Griffen Endowed Professor, University of Florida)

- Climate change affects agricultural trade through its impact on production
- The effect of climate policy on agricultural trade could be significant
- Modeling agricultural impact of climate policy needs to incorporate the trade effect

Barten Schoott (First Vice President, National Corn Grower Association (NCGA))

- NCGA opposes HR 2454 because of increased production cost, limited offset programs, and diversion of corn acres
- NCGA along with other farmer groups would endorse a climate policy which meets certain standards

Doug Goehring (Commissioner, North Dakota Department of Agriculture)

- Modeling agricultural economy and climate policy impact is challenging as it includes several factors and assumptions
- It is important to understand producers' perspective regarding their family and feeding the world
- Carbon contract should be flexible to allow wide participation in providing carbon emission offsets
- Policy needs to address the challenges faced by producers
- Consensus needs to be reached among agricultural community and scientists

Dennis Nuxoll (Director, Government Relations, American Farmland Trust)

- The policy context for climate legislation is EPA regulation of GHG emissions
- Agricultural sector needs to be ready for climate policy

Nathan Clark (Senior Vice President and Director, Climate Change Exchange Offset Program)

- Agriculture faces the choice between EPA or Congressional legislation regulation
- It is diligent to be involved in climate change legislation
- Carbon emission offsets represent a big opportunity for agriculture and forestry

Liz Mathern (Carbon Program Specialist, ND Farmers Union)

- The voluntary carbon credit program maintained by the NDFU has accumulated much experience in farmer participation in carbon offset markets
- Carbon sequestration is a new concept for farmers
- Participation in carbon sequestration needs to be flexible
- The relationship between carbon contract and climate policy is currently unknown

D.C. Coston (Vice President, NDSU), moderator, asked each panel member “Where would the panel like to see the agricultural community stand in five years in relation to climate policy?”

- Nathan Clark: a robust C&T system
- Doug Goehring: move slowly
- Andrew Schmidt: move slowly
- Dennis Nuxoll: a functional C&T system
- Liz Mathern: no EPA regulation and educate farmer with opportunity

Final remarks from the organizer of the conference

Won W. Koo (Director and Professor, CAPTS, NDSU)

Agriculture plays a vital role in addressing the challenges of climate changes by producing renewable energy and providing carbon offsets. Climate change legislation with flexible carbon contracts provides better opportunities for agriculture than EPA regulation. The reluctance of farmers to participate in carbon sequestration program is mainly because of long-term commitment and unawareness. Even though participants believe that cap and trade provides better opportunities, concerns exists regarding the shift of cropland and resulting reduction in agricultural production.

The impact of climate change legislation on the processing sector is different from agricultural production sector. For example, with a carbon price of \$30/metric ton, the U.S. sugar production could be reduced by more than 50%. If the U.S. replaces the excess demand with imports from countries where GHG emissions are not regulated, the global reduction in GHG emissions becomes insignificant and U.S. sugar industry will experience a setback. A similar argument can be made for U.S. manufacturing sector. To overcome these hurdles, the climate change legislation should be implemented globally or a carbon tariff should be imposed on goods imported from countries where GHG emissions are not regulated.