David and Lucile Packard Foundation
Agriculture Strategic Plan

2009-2010 Grant Guidelines and Request for Proposal for: Synthesis, Analysis, and Research on Greenhouse Gas Emissions and Nitrogen Pollution

In March 2008, the Packard Foundation launched an Agriculture grantmaking strategy to support work aimed at achieving a:

- 20% reduction in projected net U.S. agricultural greenhouse gas emissions and nitrogen pollution by 2020; and,
- 20% reduction projected net greenhouse gas emissions and nitrogen pollution associated with global biofuel production by 2020.

This strategy is now being updated and a revised strategy will be posted in early September. As part of this revised strategy, the Foundation has identified several topics where we believe that additional synthesis and data analysis (and in some cases new research) could provide highly policy-relevant information that would further the goals of this strategy by informing the development of federal agriculture, climate and energy policy and informing the implementation of existing policies.

This document briefly describes these topics. We present one of these topics as a Request for Proposals (RFP). We plan to award one or more grants totaling between $200,000 and $300,000 in mid-November to carry out the work described under this RFP. For the other three topics, we have elected not to issue a formal RFP. Instead, this document should be treated as a detailed elaboration of a portion of the grant guidelines posted on the Agriculture subprogram website. As is the case with our other grant guidelines, we would be happy to receive and review Letters of Inquiry (LOIs) for possible projects addressing these four topics. We anticipate awarding several grants during 2009 and 2010 on these topics, but we do not have a set grant budget for the work and there is no deadline for submitting LOIs.

REQUEST FOR PROPOSALS

Greenhouse Gas and Nitrogen scenarios for U.S. Agriculture and Global Biofuels.

We are interested in supporting the preparation and dissemination of "business as usual" and "policy" scenarios for net changes in GHG emissions and nitrogen pollution associated with U.S. agriculture and global biofuels production from 2000 to 2020 (or 2030). We are not anticipating that this will involve substantial new research, but it may require new runs of existing models (and possibly some expansion of existing models). We expect the bulk of this analysis to draw on, synthesize and expand upon existing studies and reports that have examined these issues over the past several years. The intended audience for this work is: technically-trained staff of policymakers and decision-makers within the United States (for the agriculture component) and internationally (for the biofuels). The intended use of the information is to provide a greater understanding of what the possible 'baseline' range of emissions and pollution may be in order to add clarity to the

extent of the problem and the potential scope for solutions. The product should synthesize the work that exists, add additional modeling results as needed, clearly articulate assumptions and areas of uncertainty, and adequately portray the range of uncertainty in findings. The results of this work will directly inform the Foundation's grantmaking and will also be useful to other researchers and policymakers.

For the component of the work focused on agriculture in the United States, the scenarios would ideally:

- Include historical data since 2000 and scenarios out to at least 2020 or 2030. The historical component (2000 or earlier to present) should ideally seek to characterize current agricultural practices and their impacts on GHG emissions and sequestration and on nitrogen in order to provide a baseline; it should also characterize the uncertainty around that baseline.
- The analysis could address emissions, sequestration and N pollution from all land-use related sources (i.e., including forests) or instead focus only on non-forested lands (row crops, pasture, rangeland, livestock and poultry production).
- The analysis should provide disaggregated information for the contributions of different components of land use or agriculture.
- Ideally it would be possible to break the data down by region, pollutant, and 'sector' or commodity (e.g., livestock, rice, corn etc.). Possible regional breakdowns include USDA ERS Farm Resource Regions or USDA NRCS Major Land Resource Areas.
- Scenarios should include, at a minimum, a pre-2007 Energy Bill baseline and a post-Energy Bill scenario (with associated targets for biofuels production). It would be useful to include some consideration of the sensitivity of the scenarios to changes in assumptions (e.g., short periods of high commodity prices.)

For the global biofuels component of the work, we recognize that global scenarios will necessarily have high levels of uncertainty due to: the relatively limited modeling that has been done, the need for further model development to adequately handle indirect land use changes, and the limited data availability. Nevertheless, we would like to support the development of an assessment of the state of current scientific knowledge concerning emissions and nitrogen pollution associated with biofuels development and the development of quantitative scenarios to the extent that the current modeling and data allow. For this component of the work, the scenarios would ideally:

- Estimate historical emissions since 2000 and develop scenarios out to at least 2020 or 2030.
- Include emissions associated with both indirect and direct land use change.
- The analysis should provide disaggregated information by region, pollutant, biofuel, etc.
- Scenarios should include at a minimum a pre-2007 U.S. Energy Bill baseline and a post-Energy Bill scenario (with associated targets for biofuels production). It would be useful to include some consideration of the sensitivity of the scenarios to changes in assumptions (e.g., short periods of high commodity prices.)

We anticipate awarding a total of $200,000 to $300,000 for this work but are willing to consider larger or smaller proposals. We anticipate a time-frame of six to twelve months for this work.

Timing: **Proposals in response to this RFP are due no later than September 26, 2009.** We encourage individuals interested in this work to send a 2-page concept paper (objective, brief summary of approach, timeframe, estimated budget) to Walt Reid (wreid@packard.org) any time prior to that deadline. You will receive feedback within five days that can help you determine whether or not to prepare a full proposal. Guidelines for the preparation of the proposal are available from Laura Sullivan (lsullivan@packard.org). The proposal selected will be recommended to our Board for funding in either November or December, with funds available in early December 2009 or January 2010.

GRANT GUIDELINES FOR: SYNTHESIS, ANALYSIS, AND RESEARCH ON GREENHOUSE GAS EMISSIONS AND NITROGEN POLLUTION

In addition to the RFP listed above and the Agriculture program guidelines listed on the Foundation's website, during 2009-2010 the Foundation is particularly interested in projects addressing the topics listed below. The Foundation generally does not plan to support basic research or model development to address these topics and instead expects to support projects that apply or extend existing models and datasets to answer these questions and to disseminate the findings to policy-makers and decision-makers. To provide timely contributions to upcoming policy discussions, projects would need to be completed in no more than 12 to 18 months from the time of funding. We anticipate that grants for this work could range in size from $100,000 to $400,000.

1. **How much environmental improvement could be achieved through optimal targeting of existing farm bill conservation programs?** Many people have argued that existing conservation programs spread conservation funding far too broadly.
    a. If programs were instead designed to achieve the most cost effective environmental gains, where would the funds be spent and how would that change environmental outcomes that are the targets of existing conservation programs (e.g., water quality, soil erosion, habitat conservation)? Because the targeting needed for one environmental outcome is not necessarily that needed for another outcome, this analysis would need to both assess the appropriate targeting for each individual outcome and then assess and evaluate the relative performance of strategies that seek to simultaneously achieve multiple outcomes.
    b. Efforts to target existing conservation funding have been hindered by the institutional history and constraints of current programs. What are the institutional barriers that exist and how might they be overcome to yield better outcomes as might be identified under 1(a)?
    c. The current conservation programs were developed without consideration of greenhouse gas emissions or soil carbon sequestration. If existing conservation funding were allocated

in a manner that would achieve both current conservation goals and contribute to climate mitigation, where would the funds be spent and how would that change environmental outcomes (including changes in GHG emissions and carbon sequestration)?

d. If new funding were added to the farm bill conservation programs specifically to address climate mitigation opportunities in agriculture: what is the scope for emission reductions at different levels of funding and where would the money be spent to achieve the optimal impact?

The USDA Conservation Effects Assessment Project (CEAP) will be releasing results of work relevant to these questions beginning later this year. Work proposed for funding by the Packard Foundation in this area would need to clearly add value to the CEAP results and possibly be closely coordinated with that project.

2. **What is the domestic environmental impact of existing Farm Bill Title 1 programs and crop insurance programs? How could those programs be modified to yield the greatest environmental gains with least impact on the farmer safety net?** There are a number of reasons to believe that the structure of Title 1 programs and insurance programs may result in farming practices that are more harmful to the environment than would otherwise be the case. (For example, insurance programs may promote agriculture on environmentally sensitive lands; counter-cyclical payments may lead to greater acreage of crops with higher fertilizer needs, etc.). However, it is not clear what the magnitude of this environmental impact is, what aspects of the Title 1 and insurance programs have the greatest impact on environmental performance or where the biggest opportunities exist to modify these programs to improve environmental performance. While any aspect of current or proposed Title 1 and insurance programs may be appropriate subjects for analysis, it would be particularly timely to examine the impact of the expanding insurance and risk management programs (including ACRE) that are being proposed as alternatives to traditional crop subsidy and income support programs

3. **What is the U.S. GHG abatement cost curve for agriculture and what are the abatement cost curves for specific U.S. agriculture commodities?**[1] Cost curves developed at global, national, and sectoral levels are proving to be useful tools for orienting emissions reduction activities toward the most cost-effective opportunities.

[1] Evaluating "emission reductions" in agriculture is particularly challenging for at least two reasons: a) reductions in greenhouse gas emissions can sometimes be achieved through practices that increase other types of environmental pollution (e.g., reduction in N_2O emissions may result in increased nitrogen pollution in rivers); and, b) emission reductions that affect yield could have indirect impacts on emissions associated with land use change stimulated by rising prices for commodities. While it would be beyond the scope of the intended research here to fully address these issues, LOIs and proposals for work on these topics should explain how these issues will be addressed in the project.

a. At a national level, abatement cost curves exist for specific practices (soil carbon sequestration, methane digesters, etc.); however greater crop- and region-specificity would significantly enhance their policy relevance. In other words, if we wanted to achieve net reductions in climate forcing associated with US agriculture, what changes in practices for which crops in which regions would be most cost effective?[2] Possible regional breakdowns include USDA ERS Farm Resource Regions or USDA NRCS Major Land Resource Areas.
b. Commodity groups such as associations involved with rice, wheat, dairy, biofuels, pork, poultry, beef, etc. are facing significant challenges in seeking to provide guidance to their members on how to respond to, and ideally benefit from, emerging U.S. policies on reducing greenhouse gas emissions. For each of these commodities, the producers have many options for reducing emissions with different costs (or savings) for their operations. What are the abatement cost curves for different commodities?

4. **What scientific, economic and technical infrastructure is needed to address the need to reduce agricultural GHG emissions and nitrogen pollution?** Both the needs and the opportunities confronting the agriculture sector in the areas of GHG emissions, carbon sequestration, and reducing nitrogen pollution are significant. But does the technical and scientific infrastructure exist to address these needs and opportunities? What science, what data, and what technical capacity and training would really be needed to better target conservation programs? What science, what data, what technical capacity and training would really be needed to put in place an effective program to reduce agricultural GHG emissions and promote carbon sequestration? An evaluation of the capacity of the status quo scientific and technical infrastructure and how that infrastructure could be built through strategic new public investments in, and/or redirections of current public investments in that infrastructure would be valuable. And, how could public policy generate a significant investment from the private sector to help build this infrastructure?

[2] This work should ideally address the concern that abatement cost curves can provide misleading information if they do not adequately address institutional barriers and problems of scale. For example, a practice may have a low (or even negative) cost on the margin, but the cost of the technical assistance or monitoring needed to gain significant emission reductions may greatly increase the costs of a large program.