30 May 2009

Attn: Michele Simmons
Research, Education, and Extension Office (REEO)
U.S. Department of Agriculture
Mail Stop 0114; 1400 Independence Avenue, SW.
Washington, DC 20250-0114.

via email to: Roadmap@osec.usda.gov

Re: REE-2009-0001, USDA Roadmap for Agricultural Research, Extension and Education.

To the Director of the Office of Research, Education and Extension:

We are pleased to submit comments regarding USDA's preparation of a roadmap for agricultural research, extension and education. We appreciate your Office's engagement of public opinion in identification of current trends, constraints, major opportunities and gaps that should be addressed.

We have organized our comments according to the key questions laid out in the Federal Register notice, beginning with a specific Priority Action for USDA ("Promote Organic Agriculture and Systems to Slow Global Climate Change and Support Rural Economic Development").

Thank you for your thoughtful consideration of our proposed priorities for the roadmap. We would be pleased to engage in further conversation with you and members of your office as you evaluate these issues over the coming months.

Sincerely,

Marcia Ishii-Eiteman, PhD
Senior Scientist, Pesticide Action Network North America

Lead Author, International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD), Global Report

mie@panna.org

(Please see next page for list of partners endorsing these comments)

Signing on behalf of:

Molly Anderson, PhD, Food Systems Integrity, MA

M. Jahi Chappell, PhD, Department of Science & Technology Studies, Cornell University, NY*

Jeannie Economos, Farmworker Association of Florida, FL

William H. Friedland, PhD, Research Professor and Professor Emeritus, University of California, Santa Cruz, CA*

Dona Hipert, Oregon Toxics Alliance, OR

Mark Lipson, Organic Farming Research Foundation, CA

Kathleen McAfee, PhD, Professor, International Relations, San Francisco State University, CA*

Rachel O'Malley, PhD, Professor and Department Chair, Environmental Studies, San Jose State University, CA*

Fawn Pattison, Toxic Free North Carolina, NC

Mark Riskedahl, Northwest Environmental Defense Center, OR

Ginger Souders-Mason, Pesticide-Free Zone, CA

Heather Spalding, Maine Organic Farmers and Gardeners Association, ME

Alexander Spieldoch, Institute for Agriculture and Trade Policy, MN

Rachel Sumner, No-Spray Nashville and BURNT, TN

Rebecca Thistlethwaite, UC Santa Cruz Center for Agroecology & Sustainable Food Systems, CA*

Angus Wright, PhD, Professor Emeritus of Environmental Studies, California State University, Sacramento* and Coordinating Lead Author, IAASTD North America and Europe Report, CA

**Organizational affiliation provided for identification purposes only*

Comments on a USDA Roadmap for Agricultural Research, Extension and Education
From Pesticide Action Network North America and Partners
30 May 2009

High Priority Action for USDA

Promote Organic Agriculture and Systems to Slow Global Climate Change and Support Rural Economic Development (USDA)

Action Needed: Support conversion to organic, regenerative agricultural systems and other organic practices. Promote existing mechanisms, including the Environmental Quality Incentives Program (EQIP), to support the conversion. Join the international community in making concrete commitments to implement the policy options outlined in the UN International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD), approved by 60 countries worldwide. USDA should develop an action plan with specific goals and timeline to transition the US agricultural economy to ecologically-based and organic production systems that support local, small-scale and family farmers as a solution to today's food, economic, energy and environmental challenges.

Rationale: We urgently need to begin the expedited national and worldwide conversion to organic systems to manage agricultural and other landscapes. The data from The Rodale Institute's Farming Systems Trial (FST), perhaps the longest running organic comparison study (began in 1981), shows that organic farming is one of the most powerful tools in the fight against global climate change. Carbon sequestration in organic no tillage (no till) farming systems is two to four times greater than in chemical-intensive no till systems. At the same time, the Rodale data shows reduced energy needs on the organic farm (37 percent less than conventional) with consistently high yields. The FST's two organic systems have shown an increase in soil carbon of 15-28%, while the conventional system has shown no statistically significant increase. For the organic systems, that translates into more than 1000 lbs of captured C (or about 3670 lbs of CO_2) per acre-foot per year—without taking into account the reductions in CO_2 emissions represented by the organic systems' lower energy requirements. A comparative analysis of FST energy inputs, conducted by Dr. David Pimentel of Cornell University, found that organic farming systems use just 63% of the energy required by conventional farming systems, largely because of the massive amounts of energy required to synthesize nitrogen fertilizer.

According to Rodale, if we think of this in terms of the equivalent number of cars that would be taken off the road each year by farmers converting to organic production, we would be taking 117 off the road for each 320-acre farm that converts to organic practices. If all 160 million acres of conventional corn and soybeans in the U.S. were converted to organic production, that translates to 58.7 million cars off the road (25% of the national total) or 733,750,000,000 car miles not driven—or 116,666,666 round trips from New York City to Los Angeles not taken. Finally, if all 431 million acres of U.S. cropland were converted to organic, the carbon sequestered would be equivalent to 158,177,000 cars being taken off the road (over half of the national total) or 1.98 trillion car miles not driven.

In addition, the organic systems reduce nitrate and other nutrient runoff into waterways. While significant numbers of consumers in the marketplace have shown their commitment to organic, we now need government attention to helping with the national conversion to organic systems. The

organic solution is real. Now we must elevate this market, moving it from the "exception to the rule" to national and international goals for total conversion, in recognition of organics' importance to our future.

The House and Senate Agriculture committees adopted conference report language in the 2008 Farm Bill recognizing USDA authority to restrict pesticide use, finding it is entirely consistent with the current regulatory program administered by EPA. The adoption of new organic provisions, and the affirmation of USDA authority to curtail pesticide use or adopt mitigation measures, enables the Department to play an increasingly important role in helping to reduce pesticide contamination and advance environmental and organic practices.

Answers to USDA's Specific Questions relating to REEO 2009-0001

1. **What types of current and future critical issues (including those affecting citizens, communities and natural resources) does agriculture face** that no USDA entity could address individually?

The convergence of today's climate, energy, food and economic crises calls for a substantial re-orientation of our food and agricultural systems towards sustainability, health, equity, diversity and ecological resilience. This requires new approaches to agricultural knowledge, science and technology that can successfully integrate cross-cutting priorities in the agriculture, health, environment, labor and energy sectors, with direct implications for research, extension, education, policies, institutions, trade, markets , enforcement and investments.

The USDA should therefore prioritize improving equitable access to, and the adaptive capacity and ecological resilience of our food and agricultural systems, by reducing farm and rural communities' vulnerability to natural disasters, climate change impacts and existing, new and emerging environmental and economic system stresses and shocks. Increasing the resilience of US food and agricultural systems can be accomplished along two main axes:

- *Physical and biological means:* for example, habitat and crop diversification; *in situ* conservation of local/indigenous seed and germplasm diversity; maintenance of natural enemies' species diversity; increased carbon sequestration; improved water capture and moisture retention.
- *Institutional, socio-cultural, economic and political means*: for example, diversification of farming systems and local economies; technical, legal, financial and social support networks for small to medium farm enterprises, beginning, minority and organic farmers, and rural and low-income communities. These supports reduce socio-economic vulnerability and strengthen adaptive knowledge processes. Other examples include introduction of democratic institutional arrangements to facilitate greater public engagement and input into policymaking processes through, for example, local and state food policy councils.

Our ability to correctly identify critical issues in agriculture is enhanced by the recognition that ***agriculture is multifunctional***, with many interconnected dimensions and roles. Thus agriculture is not only about producing commodities; it also directly affects community and public health and well-being, livelihoods, ecosystem function and services, landscape amenities and cultural heritages. USDA should

ensure that its research, extension and education efforts address not only the productive, but also the social, cultural, environmental and economic functions of agriculture.

Critical issues facing US agriculture that require broad intra- and inter-agency, cross-disciplinary and multi-stakeholder attention include accounting for, and managing, US agriculture's contribution to the following sets of challenges:

Environment[1]

- **Climate change and greenhouse gas emissions** (methane, nitrous oxide) particularly through US agriculture's heavy reliance on fossil fuels and petrochemicals. Fertilizer applications account for most all of the world's nitrous oxide emissions (298 times more potent than CO_2), and agriculture contributes two-thirds of all methane emissions (25 times more potent than CO_2).
- **Water scarcity**. Irrigated agriculture and industrial livestock production together account for nearly 70% of freshwater withdrawn for human use worldwide. Water resource availability, including groundwater recharge and groundwater levels, are expected to decline significantly in important agricultural regions of the US, exacerbated by climate change-driven shifts in temperatures, seasonality of river flows and patterns of rainfall, evaporation and hydrological cycles.
- **Pollution of land, air and waterways**, due to synthetic chemical pesticide drift, and pesticide and fertilizer runoff and deposition; contamination and loss of natural and agricultural plant and animal biodiversity.
- **Erosion of ecosystem services** (for example, pollination, carbon sequestration, nutrient cycling, air and water purification, natural pest and disease control, etc.).
- **Dependence on non-renewable energy sources (fossil fuels)** and vulnerability to oil price fluctuations; need for increased on-farm renewable energy production such as biogas generation (or "methane recycling"), bio-diesel fuels, and solar, wind, geothermal, and hydropower energy generation.
- **Soil erosion, loss of topsoil, decline in soil organic matter and soil health**; addressing fertilizer run-off and animal waste from large-scale intensive livestock operations.
- **Introduction of invasive plants, animals and pests** and the impacts to native ecosystems, in addition to the impacts of **dispersion of genetic material from genetically engineered crops**.
- **Increased herbicide resistance in weeds and Bt resistance** in insect pest populations caused by widespread cultivation of transgenic crops in the US.

Health[2]

- **Prevalence of diet-related diseases** (e.g. obesity and diabetes – both of which are correlated to lack of access to fresh fruits and vegetables, and an over-abundance of artificially inexpensive

[1] This section synthesizes findings from McIntyre, Beverly D., Hans R. Herren, Judi Wakhungu and Robert T. Watson, ed. 2009. *International Assessment of Agricultural Knowledge, Science and Technology for Development: North America and Europe Report.* Washington DC: Island Press.

[2] This section draws from American Public Health Association. 2008. Toward a Healthy, Sustainable Food System: APHA Policy Statement. Policy # 200712. Washington DC: APHA.

processed foods made with subsidized commodity crops such as high-fructose corn syrup). A shift to recommended consumption levels would require substantial changes in agricultural production and a rebalancing of national crop allocation priorities to favor less corn and soy production, and more fruit and vegetable production.

- **Nutritional quality**. Intensive crop production methods and selection of crop varieties for yield or other production-oriented qualities, rather than for nutritional value, have been shown to lower food crop nutritional quality. Meat from corn and soy-fed animals is high in omega-6 fatty acids (as compared with grass-fed animals which are higher in beneficial omega-3 fatty acids and linoleic acid). The high omega-6:omega-3 ratios prevalent in many industrial Western diets may be associated with adverse health outcomes (cardiovascular disease, cancer, osteoporosis and inflammatory and autoimmune disease).
- **Food safety:** food-borne diseases relating to (1) infectious agents from industrial animal production; (2) pesticide residues (cf. recent studies of organophosphates in conventional vs. organic diets, (3) animal feed ingredients (e.g. organic arsenicals added to US chicken feed, growth hormones), with implications for development of antibiotic resistance and possibly contributing to early menarche in young girls).
- **Public and occupational health and safety** (new and emerging diseases and epizootics, acute and chronic health impacts associated with direct exposure of farmworkers and rural communities to synthetic chemical pesticides through several avenues of exposure, including through drift, contamination of rural homes and drinking water, etc.)
- **Children, women's and seniors' health and the health of the developing fetus**: these demographic groups have additional health challenges including elevated disease levels for some and developmental disorders (in children) related to diet and exposure to pesticides.
- **Farmworker wellbeing**: US farmworkers' health and safety, livelihood (living wage) and rights are frequently at risk or denied.[3]

Social/Economic[4]

- **Land concentration, loss of farmland and family farms**, increasing median age of farmers; threats to the vitality of American rural communities.
- **Inequities in our food system** that have created "food deserts" in which lower income communities and vulnerable populations (children, seniors) have inadequate access to fresh, healthy and affordable food.
- **Increased concentration of agribusiness control** over production, processing, distribution and marketing of agrifood inputs and products; corporate harassment of farmers over alleged patent infringement in the case of transgenic crops; vertical integration of the food industry and monopolistic behavior which constrains American farmer innovation while also weakening

[3] Reeves, M. and K.S. Schafer. 2003. Greater risks, fewer rights: US farmworkers and pesticides. Int. J. Occup. Environ. Health 9:30-39.
[4] McIntyre et al. 2009.

direct rural-urban linkages and constraining urban consumers' access to fresh and healthy food.[5]

- **Lack of comprehensive comparative technology assessments**, which are needed to inform public debate and policy decisions, particularly regarding controversial technologies such as genetic engineering, nanotechnology and synthetic biology, where independent assessment of the medium and longer-term social, cultural, environmental, economic, legal and political impacts is urgently required because these impacts are still very poorly understood.
- **Tensions** between consumer demand for cheap food, workers' need for a livable wage, ecosystem needs and farmers' need for fair pricing and reduction in price volatility.
- Need to **revitalize local and regional food systems** and foodsheds, rural-urban linkages, local value-addition and viability of small to medium scale rural enterprises, urban and peri-urban agriculture.
- **Limited public and policymaker understanding** of the social (e.g. health, labor, equity), political, legal, economic, cultural and environmental consequences of our food and agricultural systems, both at home and abroad.
- **Current trade policies advocated by the US** and practices such as dumping surplus US food products in developing countries at below cost of local production, which disrupts local food production and rural economies in those countries. US trade policies have had in many cases a negative impact on poverty, rural livelihoods, environmental quality and social equity in developing countries.[6] The political and social instability that results has a direct feedback effect on US national security, as well as on US efforts to demonstrate leadership and encourage international cooperation towards global social and environmental goals.

2. What criteria should USDA use to prioritize agricultural science (i.e., research, education, and extension) investments to address these issues?

2.1 Defining Agricultural Science

First, we urge USDA to interpret "agricultural science" broadly to include systems approaches in the natural sciences as well as the social sciences, political economy, political ecology, etc. Social science analysis is necessary to guide USDA in asking the right questions. We also encourage the Department to prioritize not only formal science, but also agricultural *knowledge and innovation processes* when considering elements of research, extension and education. This requires integrating formal and informal science, farmer-to-farmer extension, social learning and other knowledge and social and technological innovation processes.

The direction-setting process must be deeply participatory, cross-disciplinary and multi-stakeholder (including government, non-government, academia, private sector, farmers, etc.), and pay particular attention to the inclusion of historically marginalized groups: small to medium scale and family

[5] Hendrickson, Mary, M. Miele, R. Burt, J. Chataway, et al. 2009. Changes in agriculture and food production in NAE since 1945. *In*: B.D. McIntyre et al, ed. *IAASTD: North America and Europe Report.* Washington DC: Island Press, pp. 20-78.

[6] Nathan, Dev, E. Rosenthal, J. Kagwanja. 2009. Trade and Markets. *In:* B.D. McIntyre, H.R. Herren, J. Wakhungu and R.T. Watson, ed. *IAASTD: Synthesis Report*, Washington DC: Island Press, pp. 65-70

farmers, new and minority farmers, organic farmers, etc. Maintaining a narrow interpretation of what constitutes "agricultural science" will limit the Department's ability to assess past and prioritize future investments.

2.2 Assessing past investments

Before USDA can identify priorities for future investments, it is necessary that it first conduct an evidence-based assessment of the *impacts* of its past investments and the political and institutional conditions that *influence* the effectiveness of those investments in the real world. It is therefore imperative that USDA work with multiple stakeholders to*:*

- **Assess the social, environmental, economic and especially the *distributional* impacts** of past and current investments in agricultural research, extension and education, as well as any tradeoffs involved. *Who benefits from specific technologies, research and extension processes, contracts, rules and industry trends such as concentration and vertical integration? Who does not? How and why?* To answer these questions, the USDA must take into account the **broader institutional and policy context that influences the effectiveness of investments.** This context can enable or constrain positive outcomes, and includes issues such as access to resources, who is making decisions over budgetary allocations, how are existing policies and institutions (trade, rules, norms) affecting the distributional impacts of those investments.
- Make use of the wide range of tools that exist to **assess the sustainability and effectiveness of investments.**[7] Decision-makers have relied heavily on economic Rate-of-Return analyses, which do not adequately capture the complexity of impacts. Also important are non-economic methods, inequality indices such as the GINI coefficient and other measures of well-being.

  For example, ***full-cost accounting*** is increasingly recognized as essential good economic practice to better inform agricultural policy decisions by providing a more comprehensive assessment of the environmental, social (e.g. health, labor, equity) and economic consequences (historically considered "externalities") associated with different production systems. But questions remain regarding how to integrate the information from quantitative and qualitative measures. Thus investment in refinement of these tools and methodologies is warranted.
- ***Conduct comparative Technology Assessments.*** It is not enough to evaluate a technology by itself, in the proverbial box. Developing capacity to compare existing and emerging technologies for their impacts on the environment, their social and economic outcomes and opportunities, and the relative costs of their development, enables policymakers to better grasp the consequences of investing limited public resources in one technology rather than another.

  Also vital is investment in training and capacity-building in conducting transparent, participatory multistakeholder assessments of investment impacts. ***This requires building research capacity in social science, political economy, political ecology and practical experience in conducting participatory assessments, new methodologies.***

[7] A thorough analysis of tools to assess agricultural investments is provided in Beintema, Neinke., A. Koc, P. Anandajayasekeram, A. Isinika, F. Kimmins, et al. 2009. Agricultural knowledge, science and technology: investment and economic returns. *In*: B.D. McIntyre et al. ed. *IAASTD: Global Report.* Washington DC: Island Press, pp. 495-550.

2.3 Investment priorities for agricultural sciences (research, extension and education)[8]

We recommend that USDA invest in natural and social science research, extension and education that identifies appropriate policy interventions and institutional mechanisms to achieve the following:

2.3.1 Environment: Conserve biodiversity, scarce resources (e.g. land, water), ecosystem services and mitigate and facilitate adaptation to climate change.

i. Develop management practices, technologies and policies that will **mitigate the effects of agrifood system on climate change** and **reduce the ecological footprint of agriculture** (for example, measures that increase crop diversity and reduce dependence on fossil fuels, pesticides and fertilizers through organic no-till, ecological pest management, integrated soil, nutrient and water management, mixed farming, agroforestry and organic agricultural practices. These practices increase soil organic matter, carbon sequestration, water and moisture retention, etc. Better rotational strategies and perennialization with various existing crops can reduce nitrogen leakage that contributes to oceanic dead zones far more effectively than simply utilizing low till or reducing nitrogen application.)

ii. **Strengthen existing systems with a proven track record in biodiversity and resource-conservation and ecosystem-service support** (i.e. low external input sustainable agriculture, ecologically-based integrated pest management, organic agriculture, etc.) through research and market support; integrate formal science with local knowledge of resource-conserving practices.

iii. Develop new and emerging strategies to **reduce the vulnerability of agriculture to climate change.** This requires changes in land use patterns, cropping systems, more efficient water use (particularly reducing irrigation waste from source to farm gate but also utilizing less water-intensive production methods) and shifts in production areas. These strategies will require drawing on diverse bodies of knowledge and advances in conventional breeding, agroecology, soil, water and moisture management, informed by social science research.

iv. **Enhance research in basic sciences, ecological and evolutionary sciences, social sciences and extension capacity** to devise and improve management options to support the multiple functions of agriculture. This calls for a more interdisciplinary ecological and evolutionary approach to agroecosystems for better water, soil, livestock and biodiversity management at landscape scales, while improving preservation of plant and animal genetic resources. Basic sciences including plant physiology and pathology, entomology, functional genomics and systems biology (to name a few) are of continuing importance.

v. **Improve standards of soil and water management, including irrigation, to increase water efficiency.** Regenerative soil practices build soil organic matter (SOM) and in so doing, sequester substantial quantities of carbon, improve water and moisture retention and improve farm system resilience to drought.

vi. Increase research, extension and education in **ecological pest management** within a national framework to **reduce reliance on synthetic chemical pesticides hazardous to human health and the environment.** High priority research topics for USDA include the impacts of climate change

[8] Many of the priorities listed here are drawn directly from IAASTD. 2009. *IAASTD North America and Europe Report: Summary for Decision Makers.* Washington DC: Island Press.

on pest populations and comparative assessment of diverse pest management options in terms of their contributions towards ecological resilience to system stresses, public and occupational health and productivity benefits; lethal and sublethal effects of pesticides on pollinators, amphibians and other vulnerable species; strengthening efficacy of biological, cultural and natural controls of current and emerging pests and pathogens; contribution of biodiversity, landscape and ecosystem design to safe and sustainable pest management; biological substitutes for agrochemicals; conventional breeding for pest tolerance; market and economic research to strengthen the biocontrol and biopesticide industries; ecological pest management approaches to replace organophosphate, fumigant and persistent organic pollutant (POPs) pesticides; and complete life cycle (cradle to grave) analyses that fully reflect the true cost savings of transitioning from reliance on hazardous chemical pesticides towards safer pest management practices.

2.3.2 Health: Establish regulatory frameworks and incentives to reduce incidence of obesity and diet-related disease, and support a transition towards safe and healthier food and agricultural systems, at local, regional and national levels.

i. Prioritize regulatory frameworks and incentives to **assure food quality and safety**, reduce diet-related illnesses, better align US agricultural production with the Dietary Guidelines for Americans, and boost immune system health.

ii. **Improve occupational and public health** (for example by reducing pesticide and antibiotic use in agriculture and thereby reducing farmworker, consumer and rural community exposures to chemical pesticides; reduce work-related injury and illness).

iii. **Undertake research on health impacts of conventional vs. organic** and alternative food and agricultural systems **on vulnerable groups:** women, children, seniors, low-income communities, rural communities, farmworkers and other food system workers.

iv. **Prioritize monitoring of air quality in rural communities** with respect to pesticide drift and volatilization, incidence of asthma and other respiratory disorders possibly related to burning of e.g. sugar cane fields and airborne dust from unplanted plowed fields**.**

v. **Promote greater availability of and access to affordable and healthy food in rural and low-income urban communities.**

2.3.3 Rural livelihoods, vibrant markets: revitalize and Improve the sustainability of local and regional food and farming systems.

i. **Strengthen rural economies**, invest in basic services, foster direct rural-urban market linkages. Identify and reduce barriers to obtaining sustainable, locally produced, fair trade and healthy foods.

ii. **Collaborate with farmworker health, safety and policy organizations to determine policy changes that will lead to improvement in the working conditions, job security and accessibility, housing, disaster assistance, and welfare of migrant and temporary farm labor.**

iii. **Enhance sustainable production of diversified cropping systems** (particularly fruits and vegetables), while supporting rural culture, livelihoods and local and regional economic opportunities.

iv. **Support farmers' conversion to—and ability to continue in—organic farming by providing high quality technical assistance** (research, extension, farmer-to-farmer programs, K-12 and higher education)**, financial incentives** (good stewardship payments, transitional payments and loans, credit and crop insurance, tax rebates, certification subsidies), **marketing support** (collection and dissemination of price and market information, public sector organic procurement policies, support for organic distribution networks particularly that help small to medium size growers) and **public support** (resolutions prioritizing organic agriculture production as a public good, public education about the benefits of organic, establishment of local food policy councils).

v. **Strengthen small to medium agricultural enterprises**—including especially family farms—and **increase access of lower income, new, organic, minority and immigrant farmers to resources**, credit, infrastructure, markets, information and communication technologies (high speed Internet in rural areas), value-added processing of agricultural products as well as basic services.

vi. **Encourage participatory research partnerships** between farmers, farmworkers, researchers, extensionists, educators, students and community-based groups, in which farmers, farmworkers and affected communities have a central role in the problem-identification and research direction-setting process.

vii. Establish **interactive knowledge networks** and processes that involve, inform and empower stakeholders, in particular **women, Indigenous peoples** and other practitioners whose knowledge, experience and innovations are critical to meeting agrifood system sustainability and social justice goals.

viii. **Revise intellectual property laws** to recognize and protect farmers' rights to save and exchange seed, protect *in situ* conservation of biodiversity and prevent misappropriation of local knowledge.

2.3.4 Governance and institutional innovations

i. **Explore models for fundamental restructuring and integration of US departmental responsibilities** to address food system issues at the highest level, and to integrate public health, rural affairs, labor, environment, energy and agricultural concerns within a single department. Examine the efficacy of UK's new Department of Environment, Food and Rural Affairs (see question #3 below).

ii. **Provide funding for and support the establishment of local, state, regional and national food policy councils**. These councils ensure that food and agricultural policies and institutions meet broadly agreed-upon societal goals. Research the efficacy of past and existing food policy councils to better understand the benefits and advantages, as well as limitations and constraints facing food policy councils in contributing to the realization of healthier food and agricultural systems and policies.

iii. **Establish geographic, fair trade and sustainable production labels**, affordable third-party **certification** and programs that support consumers' **right to know** about the genetic, economic, environmental and social conditions behind production and distribution,.

iv. Research and develop **policy instruments to internalize current environmental and social externalities of agricultural production,** support **diversity of scale in agricultural enterprises,** and reward **the provision of agroenvironmental services**.

v. Identify measures to **curb excess commodity speculation,** strengthen **antitrust provisions** and develop international rules to **govern competition and prevent monopolistic behavior**.

vi. **Assess the broad social impacts of intellectual property rights** and identify measures to facilitate the generation, dissemination, access and use of agricultural knowledge, science and technology by larger communities, within and outside the US. For example, promising measures include cross-licensing of patents among public institutions and the private sector, patent exemption to facilitate research and local innovation, open-source technology, etc.

vii. Facilitate public policy discussions and development of **"common property regimes" to ensure equitable and sustainable use and management particularly of scarce natural resources**.

viii. **Conduct comparative evidence-based analysis** of new, emerging and existing food and agricultural systems, technologies and products (including, for example, agroecological and organic approaches, integrated natural and agricultural resource management, transgenic organisms, nanotechnologies, synthetic biologies) regarding their *relative* ability to support the multifunctional dimensions of agriculture (in particular, their ability to sustainably mitigate climate change, protect ecosystem services, improve health, social equity and rural livelihoods, rebalance power in the food system, and revitalize local and regional food systems, etc). This comparative assessment process would also evaluate the opportunity costs associated with investing in one technology over another, and should be open, transparent and broadly participatory, to ensure feedback and analysis from all affected stakeholders, and to inform public debate and research, development and policy decisions. **Suspend research, development, field-testing, commercialization and extension of new transgenic organisms until they have been subjected to such comprehensive comparative assessments, followed by public debate to inform research priorities and policy decisions regarding appropriate allocation of scare resources to achieve public good outcomes.**

ix. **Understand the processes and consequences of international trade and market liberalization, and identify actions to promote fair trade and market reform**. In coordination with other US agencies, reformulate US policy on agricultural trade to ensure fairer rules. Specifically, such a reformulation would support principles of national policy flexibility (special and differential treatment, special safeguard mechanisms, elimination of escalating tariffs) to encourage the establishment of vibrant food-producing economies in developing countries that will help strengthen local and national food and livelihood security in those countries and help prevent future food crises and social and political unrest.

2.4 Effective allocation of public resources requires good governance and transparent multistakeholder decision-making processes.

We encourage USDA to integrate the priorities identified above into a comprehensive *portfolio of integrated goals*. In sum, the portfolio would prioritize sustainable production, conserving scarce resources, supporting culture and livelihoods, protecting ecosystem function and providing ecosystem

services. This requires a gradual shift of public funds towards programs that advance long-term health, environment and food security goals. A roadmap towards a sustainable food and agricultural system for the nation will necessarily include benchmarks, timelines, public reporting on progress and mechanisms for public engagement and feedback.

Transitioning towards the programs and policies described above is not without cost. As a first step, we encourage the USDA, in partnership with other key agencies, to conduct a participatory multistakeholder assessment of the full costs of food and agricultural systems, programs and public investments across sectors, calculated over different time scales. This would inform the identification of societal priorities and particular needs of vulnerable groups in the US. A gradual redirection of investments from costly programs with high externalities towards those likely to advance long-term health, environment and food security goals can minimize system disruptions. Such a rethinking of investment will often benefit from cross-sectoral collaboration, for instance, between departments of health, agriculture, environment, education, labor, etc. Upfront transaction costs may not be insignificant, but in most cases will ultimately be offset by reduced externalities and more efficient attainment of policy objectives.

National "Green Accounts", energy analyses and "total material flow estimates" are beginning to inform public policy formation. Sweden, for example, has based its national food and agricultural policy in part on the findings of a full-cost analysis of the energy, environmental and other ecosystem service costs embedded in Sweden's food system. As a result, Sweden aims to increase the proportion of its productive land devoted to organic farming and organic food procurement by public agencies to 20 and 25% respectively by 2010. This type of cost analysis continues to inform Sweden's policy decisions, as it strives to transition towards a carbon-neutral economy.[9]

Additional public revenues can be generated by taxing health and environmental harms and by levying equitably-adjusted user fees. Significant savings can be secured by removing unnecessary or counterproductive budget allocations, such as high export production subsidies.

2.4.1 Market-oriented incentives

Market-oriented public policy options to reorient food systems towards sustainability include provision of incentives, e.g. payments for ecosystem services and for organic transitions along with credit, crop insurance and tax exemptions for sustainable practices. Public investment in local agro-processing and marketing infrastructure enables value-addition and creates off-farm rural jobs. Public policy initiatives can facilitate direct farmer-to-consumer sales (i.e. by providing infrastructure for urban farmers' markets, for example).

Other promising options include encouraging geographic, fair trade and sustainable production labels, establishing programs that support consumers' right to know about the economic, environmental and social conditions behind production and distribution, and ensuring availability of affordable third-party certification. This can increase opportunities for commercializing sustainably produced goods. Unsustainable practices can be reduced by levying taxes on health and environmental harms (e.g. the polluter pays principle) and carbon and energy taxes based on whole-system energy budgets and greenhouse gas emissions analysis.

[9] Johansson, Susanne. 2008. The Swedish Foodshed: Re-imagining Our Support Area. *In*: C, Farnworth, J. Jiggins and E.V. Thomas, ed. *Creating Food Futures: Trade, Ethics and the Environment*. Aldershot UK: Gower, pp. 55-66.

2.4.2 Public vs. private sector contributions and obligations

The impact of public policies and investments can be substantially strengthened through appropriate mobilization of the private sector. Rewarding private investment in safe, sustainable and locally appropriate crops, seed systems, technologies, in situ reserves and food markets (through tax breaks, etc.) can stimulate private sector engagement.

At the same time, the public sector has a responsibility to ensure that impacts of private investments actually benefit the health and food security of all. The USDA in collaboration with other public agencies can initiate competitive bidding for public funding based on a private enterprise's proven capacity to meet public interest goals. USDA and public institutions (including land grant colleges) should also establish and enforce codes of conduct to prevent conflict of interest and strengthen corporate accountability both to shareholders and to the public, where public-private partnerships are concerned.

Implementation of anti-trust and competition regulations can begin to counter some of the adverse effects associated with increasing concentration and vertical integration of the global food system. President Obama has already indicated support for improving US competition regulations.

Transnational buyers (trading companies, agrifood processors, input manufacturers) typically dominate globalized food chains.[10] As a result, primary producers such as family farmers capture only a fraction of the international price of a traded commodity. Building countervailing negotiating power, for example through farmer co-ops, and establishment of local agro-processing facilities provide important ways for lower-income farmers to increase their share of "value-added."[11]

Recognizing both the potential but also the limitations associated with private sector investments in the food system helps to clarify the particular responsibilities of the public sector. Because the private sector will not be attracted to certain areas of research due to lack of exclusion mechanisms or uncertainty regarding economic profit margins, USDA and other public agencies have a unique responsibility to invest in explicitly public goods-focused research, extension and education, i.e. work that may or may not immediately yield high capital returns, but is likely to yield substantial social (health, labor, gender equity) and environmental returns.

3. **How might USDA better coordinate agricultural sciences** among its various agencies and with its partners?

We recommend that the United States consider *fundamentally restructuring* US departmental responsibilities to address food system issues at the highest level, and to integrate public health, rural affairs, labor, environment, energy and agricultural concerns. This ensures that political decisions concerning food systems are made in conjunction with other relevant interests. For example, the UK has established a Department of Environment, Food and Rural Affairs, which provides a compelling model. Costa Rica created a new Ministry of Environment, Energy, Mines, Water and Natural Resources that enabled the country to transform 98% of its energy to renewable sources; its agricultural policies and research and extension priorities likewise now take account of water scarcity.

[10] Hendrickson et al. 2009.

[11] Izac, Anne-Marie, H. Egelyng, G. Ferreira, D. Duthie, B. Hubert, N. Louwaars et al. 2009. Options for enabling policies and regulatory environments. *In*: B.D. McIntyre et al. ed. *IAASTD: Global Report.* Washington DC: Island Press, pp. 441-494

In the meantime, USDA, EPA, the Department of Public Health and the Department of Labor need to conduct more joint funding, joint reports and joint research. USDA should establish a research agency similar to the Economic Research Service that covers the environmental and social impacts of agriculture as thoroughly as the economic and production/productivity impacts. In terms of labor, currently farmworkers' conditions are assessed through the National Agricultural Workers Survey, administered through the Department of Labor. But it has been difficult to obtain high quality, consistent longitudinal information about conditions for workers in food processing and other sectors.

6. What else might USDA do to **improve coordination** of science; **enhance USDA's ability to identify issues and prioritize investments**; and **elevate its role in science implementation and coordination**?

The success of future agriculture will be determined largely by our capacity to adapt to expected and unexpected shocks to the system. Food system impact analyses will thus increasingly need to take account of global water, energy and climate "foodprints." The central scientific and technical challenge facing agriculture today is to transition rapidly towards improved and sustainable production based on long-term agroecosystem health and ecological resilience in the face of these stresses.

Reorienting USDA's entire mission to sustainability would vastly elevate the department's relevance and the potential for relevant science implementation and coordination. Increased public support to public institutions (land grant universities, etc) is needed, as well as mechanisms to ensure that private support to these institutions meets public interest goals (see section, "Public vs. private sector contributions and obligations" under "Investments" above).

We strongly encourage USDA to open up its scientific and technological problem-identification and direction-setting processes to a broad array of stakeholders, ensuring that historically marginalized and vulnerable groups are well represented. Such an opening would help ensure that agricultural research efforts are geared towards meeting public interest and environmentally sustainable goals.

For example, USDA should encourage establishment of democratic representative food policy councils at local, state and national levels. These councils ensure that food and agricultural policies and institutions meet broadly agreed-upon societal goals.

USDA should also support and reward public agency efforts to localize and/or regionalize food processing, procurement and distribution. Research is needed to identify best practices, assess impacts (i.e. in terms of reduced transportation costs, stronger rural-urban linkages, improved consumer access to fresh and healthy diets, etc) and publicize examples of local procurement programs established by public agencies and institutions (schools, municipalities, prisons, hospitals, etc.).

Finally, USDA would benefit enormously from establishing a Multistakeholder Food System Advisory Council. This Council would be responsible for assessing the state of local, state and national food systems utilizing open, transparent and broadly participatory feedback mechanisms to glean input on a regular ongoing basis from actors outside USDA. The Council would also assess linkages between our domestic practices and policies and the global food system, paying particular attention to impacts on equitable and sustainable development in developing countries. The Council would be responsible for providing integrated policy recommendations on how to transition towards a fair and environmentally sustainable food system at home, and contribute to an early warning system regarding future critical

issues. The Council should include representation from the social sciences as well as natural sciences, regional and gender balance, and balance among consumers, farmers (small, medium and large scale, new, minority and immigrant), private enterprises (with representatives from the full length of the food and agricultural value chain), affected communities (especially rural, farmworker and low-income urban), environmental, hunger and labor groups, and representatives from state and municipal food, agriculture, health, labor and environment agencies.

The recommendations in this letter are supported by the expert findings published in a growing number of scientific reports from research institutions, universities and UN agencies around the world. We would in particular like to direct USDA's attention to the **International Assessment of Agricultural Knowledge, Science, and Technology for Development (IAASTD)**,[12] an intergovernmental assessment cosponsored by the Food and Agriculture Organization, UN Development Programme, UN Environment Programme, UNESCO, the Global Environment Facility, the World Bank, and the World Health Organization. The IAASTD, produced by over 400 scientists and development experts from more than 80 countries, and approved by 60 countries, provides a thorough analysis of the successes and failures of the world's food and agricultural systems, and a comprehensive list of policy, institutional and investment options to reorient towards equitable and sustainable food systems that will meet development goals agreed upon by all nations. We strongly encourage USDA to study the IAASTD report and ask you to join the international community in making commitments to implement its options for achieving equitable and sustainable development.

[12] IAASTD (International Assessment of Agricultural Knowledge, Science and Technology for Development). 2009. *Executive Summary of the Synthesis Report*. Washington DC: Island Press. Available from: http://www.agassessment.org [Accessed May 20, 2009.]