

August 4, 2014

Kara Laney, Study Director
National Research Council
National Academy of Sciences

re: Composition of Committee tasked with Study on GE Crops

Dear Ms. Laney:

On July 16, NRC announced a committee slate for its new study, "Genetically Engineered Crops: Past Experience and Future Prospects." According to the announcement, "the committee was drawn from nominations submitted, considering the full range of expertise and experience needed to address the study's statement of task." NRC has offered the public an opportunity to comment on the committee's composition over the subsequent 20 days.

We, the undersigned 67 scientists, researchers, professionals and practitioners, have carefully considered the range of expertise, disciplinary backgrounds and relevant experience of the prospective committee members. While a number of excellent candidates have been identified, we are deeply concerned that the slate as currently configured does *not* contain the necessary expertise required to fully answer the questions outlined in the study's statement of task. Without the necessary expertise and balance, the committee will be unable to fulfill its duties.

Below, we review the panels' expressed statement of purpose, discuss our concerns and provide our recommendations.

Aims of the Study

The study statement of purpose includes several specific tasks. The first task is to undertake an examination of the "history of the development and introduction of GE crops in the U.S. and internationally," as well as of the "experiences of developers and producers of these crops in different countries." This task calls for careful appraisal, by experts familiar with social scientific methods, of the evolving social, institutional, and business processes through which GE crops have been developed. Such processes include scientific research, industrial commercialization strategies, policy decisions that allow or restrict access to germplasm, industry practices that affect the saving, exchange, and cultivation of seed, and efforts to limit gene flow and contain or segregate GE traits throughout the food chain, among others. The first task also necessitates exploration of the nature and causes behind varied responses to GE crops by diverse actors and sectors of society, both in countries where GE crops have been introduced, as well as in countries that have refrained from doing so and/or that have sought to restrict their introduction (e.g. India, Japan, many countries of the European Union and across much of Latin America). The range and complexity of responses and processes to be assessed requires strong panel expertise, particularly in the social sciences.

Numerous types of farmers—including smallholders, family farmers, and large corporate farms—have encountered or used GE crops or have had GE traits appear on their farms or enter their product after processing. Their respective perceptions and experiences may thus diverge substantially. As well, the introduction and use of GE crops globally has taken place in geographically, economically, culturally, and institutionally diverse settings that can differ greatly from the U.S. context, yet are profoundly affected by U.S. policies and approaches with respect to GE. Even within the U.S., significant regional and local variations exist between these production sites. We are pleased to see that the committee intends to take into account the diversity of

experiences with GE crops. However, to do so successfully, panel expertise is needed to recognize and evaluate the history and practices associated with GE crop use.

Secondly, the study aims to assess the “purported negative effects” of GE crops “and their associated technologies” (for example, herbicides). The list of effects includes a few specific measurable impacts such as yield reductions, increase in pesticide use, and the creation of herbicide-resistant weeds which are always contingent on the specific nature of the farming system in question. The list also refers to restrictions in seed choice and “negative impacts on farmers in developing countries.” These negative effects could include a wide range of social, economic, cultural, health and environmental effects resulting from both the adoption of GE crops and their associated technologies and the establishment of instruments and institutions developed to facilitate their uptake. These instruments include, amongst others, intellectual property regimes, biosafety laws and trade agreements. Furthermore, additional impacts on poverty, hunger, social inequity, food security, access to and control over germplasm and seed, and fulfillment of the right to food would fall in this category. Panel expertise in assessing these multiple interlinked negative effects, is therefore essential to a successful review.

Thirdly, the NRC study aims to assess a range of “purported benefits”, such as reductions in pesticide use, reduced soil loss, improved water quality, greater nutritional value potential, and improved resistance to drought and salinity. Presumably this will entail examining not only data from laboratory or company field trials, but also “in-the-field” evidence gathered from and by communities and countries where GE crops have been commercialized and produced. The NRC study will likely need to review, for example, whether reduced pesticide use is sustained over time and whether pesticides coupled with GE technologies may in fact increase toxicity for certain species or vulnerable human populations, even if there is a reduction in quantitative use. The technical feasibility of developing GE crops that aim to fulfill particular goals (e.g., drought resistance) will need to be tested against actual and future practice. Importantly, the benefits of GE may vary in their nature, magnitude and distribution across a range of actors and sectors (public and private), in different countries, calling for keen attention to the multiple variables that affect how such benefits are created and distributed.

The NRC study also intends to examine GE crops “through the lens of agricultural innovation and agronomic sustainability.” The study would benefit from comparisons of GE technology and crops with *other* agricultural technologies and practices such as conventional and participatory plant breeding, integrated and ecological pest, soil, seed, land and water management, crop diversification, and other practices, in terms of time required to develop practical applications, resources to implement, capacity to respond to changing environmental conditions such as climate change (system resilience) and the broad range of potential impacts identified above. Panel expertise that can accurately assess the harms and/or benefits of GE crops in their sites of application and under increasingly variable external conditions, including from the viewpoints of farmers, in comparison with other available and emerging approaches, will be critical to a successful review. Such expertise will enable the panel to avoid the limitations of a reductive approach that examines GE technologies in isolation, and strengthen its capacity to instead assess GE crops within the real-world context of more complex systems and options and towards broader agri-food system goals.

Lack of sufficient and relevant expertise

We note that the NRC seeks a balance of perspectives across its many studies in order to provide objective, independent, and nonpartisan scientific advice that is credible to U.S. policy-makers and many other actors. From the study statement of tasks, to achieve this outcome, it is immediately

clear that the Committee will require the expertise of a significant number of (1) **social scientists**, representing an array of disciplines (rural and development sociology, geography, political economy, political ecology, anthropology, macro-economics, history), (2) experts representing a full range of **professional backgrounds** (law, ethics, public and occupational health, trade, participatory community-based development, etc.); (3) a **more diverse set of biological, physical and medical/health scientists** capable of critically and fairly appraising GE and their associated technologies in comparison to other approaches; and (4) a **balance of perspectives** amongst committee members, in terms of their capacity to provide an adequate representation of experiences in the U.S., other industrialized countries, and developing countries.

Biophysical science expertise

The currently proposed slate falls short of meeting these requirements. The prospective panel is dominated by researchers from the biophysical sciences, the majority falling within a narrow range of disciplines and fields, with most scientists focusing their research at the cellular or molecular level (e.g. molecular biology, biochemistry, plant genomics, synthetic biology) and within a GE crop development framework. While it is encouraging to see one insect ecologist on the current panel, we were struck by the absence, for example, of plant ecologists, diversified farming system and agroecological scientists, all of whose research examines dynamics occurring at population, community, field, landscape, and ecosystem levels.

Social science expertise

Even more glaring is the paucity of social science expertise on the Committee. With only one sociologist included, the Committee cannot hope to begin to fulfill its broad mandate of examining the historical, social, political, cultural and other complex impacts of GE crops and their associated technologies on farmers and communities, whether in the U.S. or around the world. We strongly urge that the Committee incorporate expertise on **agri-food system history** (including the impacts of GE technologies on seed development and use), from **anthropology and development studies** (to better understand the ways in which diverse farmers and developing countries have experienced GE crops), and from **political economy** in order to gauge the socio-economic drivers that affect the introduction of GE crops into existing agricultural systems.

International expertise

The proposed slate appears to have a very limited number of experts possessing expertise and practical experience working in developing countries or European and international contexts. Furthermore, the expertise of those individuals who have worked in international contexts appears to be limited to the biophysical sciences and biotechnology development, e.g. in plant genetics, transgenic crop development, biosafety programs (e.g. for USAID or the Donald Danforth Plant Science Center), agronomy, and, in one case, food science. However, a complex, wide-ranging, globally-scaled study, such as that proposed by NRC for GE crops, calls for substantial expertise and insight into European and developing country conditions affecting the introduction, use, effects and distributional impacts of GE crops.

A considerably richer analysis of the histories and social, cultural, health, economic and ecological effects of GE crops in these countries, both negative and beneficial, as well as of the impacts of the legal, policy, intellectual property and aid or trade-related instruments that have accompanied the development and commercialization of these crops and their associated technologies, would benefit from the expertise of social scientists, health professionals and practitioners based in or having a significant degree of experience in Asia, Latin America, Africa and Europe. Here, it is also critical to include expertise from researchers from a broader base of institutional and professional backgrounds, including, for example, researchers at think tanks, NGOs, and independent- or university-affiliated policy institutes. Many such organizations have critically appraised the

relationship between GE technologies, international trade, and intellectual property regimes; they have included perspectives from farmers and consumers as well as from corporations and governments, in both developing and developed-world contexts.

Farmer representation

While the Committee seeks to examine the impacts of GE crops on farmers, it does not include a single farmer or professional with expertise in exploring farmer or community-level perceptions, experiences and behavior. This is likely to weaken the study's credibility for many in the audiences that the Committee hopes to inform. Previous NRC studies have included agricultural producers as highly valued contributors (e.g., in the 2010 Sustainable Agriculture Study). State-of-the-art multi-stakeholder assessments (including the Millennium Ecosystem Assessment and the International Assessment of Agricultural Knowledge, Science, and Technology for Development) and evidence from decades of participatory research and analysis has long since established the credibility and necessity of including directly affected communities. The knowledge and perspective of such communities in the assessment process itself—from the earliest stages of identifying the scope of research questions through the research process, analysis and final conclusions—is increasingly recognized as vital not only to effectiveness of the assessment project but to long-term prospects for achieving the goals it sets out. Farmers and plant breeders may provide important insights into evaluating how GE technologies may contrast to other plant breeding and development approaches in terms of meeting their needs and changing situations.

Gender balance

Finally, we note that the proposed slate appears to have a disproportionate gender balance: there are only 4 women out of a total of 19 committee members. This imbalance could be improved by including more representatives from the rapidly growing community of distinguished women researchers in the biophysical and social sciences. A skewed slate does not adequately reflect evolving expertise in agri-food systems, which is becoming substantially more balanced in gender terms. The NRC has a responsibility to foster the participation of qualified women in its studies.

Recommendations

We have identified several important limitations in the current panel composition with regard to the Committee's ambitious and complex tasks. These limitations pertain to the full range of expertise and knowledges needed to evaluate the history and experiences of GE crop introduction and use not only in the U.S. but in other countries, particularly in the developing world. If the limitations are not addressed at this stage of creating the Committee, we are concerned that the Committee will not be able to fulfill its duties and provide the high quality, objective scientific advice that it seeks to offer in this highly contentious domain. We therefore propose the following rebalancing of committee membership:

1. Include social scientists including rural and development sociologists, human geographers, anthropologists, political economists, political ecologists, historians, macroeconomists, ethicists, those with backgrounds in law, intellectual property, "science, technology and society" (STS) studies, trade and public policy, etc.
2. Include a more diversified array of biophysical scientists than currently in the slate, including agroecologists, plant/ weed/ insect ecologists, plant breeders, those with backgrounds in the research and development of more diversified agroecosystems.
3. Include more individuals with international expertise and experiences "on the ground" in Asia, Latin America, Africa and Europe that go beyond plant genetics and agronomy to

encompass social sciences, history of science and technology, health and development issues, and governance.

4. Include farmers and other civil society experts whose perspectives, direct experience and expertise is critical to the success of the study.
5. Improve the gender balance of the committee to reflect existing agri-food system expertise.

We also strongly recommend the creation of a mechanism for seeking out and engaging biophysical and social scientists as well as development experts from developing countries for input into the Committee's deliberations.

In closing, we applaud the NRC's efforts to convene this timely review. We hope that by deepening and broadening the range of relevant expertise included, the panel will be better equipped to make a judicious appraisal of GE in its many facets, advance the goals of sustainability, and uphold the ethos of evidence-based decision making that the NRC has long supported.

Sincerely,*

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