



IAPPS NEWSLETTER

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PRESERVING BIOLOGICAL DIVERSITY FOR FUTURE PEST RESISTANT CROPS

The best line of defense for a plant against insects and pathogens is to carry resistant or tolerant traits in its genetic makeup. Efforts have been strengthened to maintain genetic diversity that can be used for breeding such plants through holding germplasm from plants and animals around the world. Germplasm refers to plant parts, such as seeds, that are needed for reproduction. Repositories exist in numerous countries; currently there are 20 such repositories that comprise the U.S. National Plant Germplasm System. These hold germplasm from plants collected around the world for scientists to study, for breeders to grow, and for land managers to use. Greater restrictions in international germplasm exchange has increased the value of these repositories.

Germplasm doesn't last forever, and scientists are conducting research to develop methods for longer preservation. Periodically collections must be grown out and fresh germplasm harvested in order to maintain the collection. Seeds are stored at low temperatures under varying conditions, depending upon research findings on seed viability under a specific storage environment. The storage conditions stress seeds, and scientists are studying how to reduce stress or repair injuries. A number of factors, such as the amount of water content and the type of lipids, can influence the likelihood of storage injury. Post storage treatments prior to germination offer possibilities to avoid damage to some seeds. Preserving plants from the wild has been a particularly challenging task; however, this is very important since these plants are often a source of genes for pest and drought resistance.

This information is based on an article in the February 2003 issue of "Agricultural Research".

NEW DIRECTIONS FOR AGRICULTURAL RESEARCH

During the last 30 years many changes have taken place in agricultural systems around the world. Future directions of agricultural research are impacted by consumer preferences, globalization and trade liberalization, public concerns about food safety and the environment, the advent of biotechnology, and the relationship between agriculture and the rural community. Changes have been particularly noted in the so-called developed countries, where, in addition to efficient food and fiber production, agriculture is expected to deliver improved public health, social well-being, and a sound environment. Although the following information resulted from a report in the U.S., many of the recommendations for future agricultural research are similar to those that have been advocated in many other countries. Comments and contributions regarding these are invited for future newsletters.

In the U.S., private-sector investment in agricultural research now exceeds that of the public sector. The question is what sort of direction should public-funded research take to complement that of the private sector. The U.S. Department of Agriculture (USDA), in response to a congressional mandate, requested that the National Research Council conduct a study that would include recommendations for the future role of federally-funded agricultural research. The report indicated five areas for public agricultural research that would not be fully addressed through private sector research. They are:

- Globalization of the food economy
- Emerging pathogens and other hazards in the food-supply chain
- Enhancing human health through nutrition
- Improving environmental stewardship
- Improving quality of life in rural communities

Several agencies in the USDA conduct research. The report is directed to those within the Research, Education and Economics (REE) mission area. Action agencies, such as the Natural Resources conservation Service and the Animal and Plant Health Inspection Service, are outside the REE mission area. The recommendations are:

"RECOMMENDATION 1: REE should provide leadership for the agricultural community in exploring research frontiers in food, health, environment, and communities. REE should build on its historical strengths and become a scientific leader in using new technologies and emerging scientific paradigms to pursue strategic, long-term research goals. A greater emphasis on multidisciplinary work that engages all relevant disciplines will

be needed to address many new research frontiers.

RECOMMENDATION 2: The REE agencies need to identify clearly their unique positions relative to the other components of the agricultural-research system, identify high-impact activities through which targeted funding and resources could generate substantial and measurable progress toward meeting national needs, and coordinate planning and research support across agencies to minimize unnecessary duplication and maximize effectiveness. Those efforts should be informed by a clear articulation of the major national priorities for research and education and a system for anticipating, reporting on, and identifying strategies to address emerging needs.

RECOMMENDATION 3: The REE agencies should direct new and existing resources that currently support agricultural productivity research toward new research opportunities in health, environment, and communities.

RECOMMENDATION 4: To ensure that research funds are used to advance science in new directions and to address emerging and emergency issues in a timely and responsible fashion, the committee recommends the following: 1. Total competitive grants should be substantially increased to and sustained at 20-30% of the total portfolio. 2. Action agencies should receive or control discretionary funds to be used to meet critical programmatic needs complementary to those currently served by REE agencies. The agencies could thereby fund intramural USDA scientists, other agency scientists, or university researchers competitively on the basis of the researchers' availability and match of expertise to agency needs. 3. The REE agencies should pursue complementary research activities and tap broader expertise by dedicating a higher percentage of new funds to cooperative arrangements, to be awarded on a competitive basis for large awards, with academic or other public-sector researcher. 4. Congress should increase REE budgetary flexibility to move resources toward emerging and emergency needs.

RECOMMENDATION 5: To provide a forum for shared learning across agencies, REE should conduct a national summit every 2-3 years that would engage the four REE agencies and a broad representation of stakeholders at the local, national, and regional levels. The summit could assess national research needs and inform stakeholders how their input is used in agency decision-making.

RECOMMENDATION 6: REE should provide national leadership in developing intellectual property policy for agricultural research. REE should address the potential consequences of public-private collaboration with appropriate policies, practices, and organizational arrangements that promote the greatest public benefit from agricultural research, protect the public investment in research, prevent diversion of public resources away from research that can be carried out only in the public sector, and pursue strategic private-sector collaboration necessary to achieve public goals. To accomplish these objectives, REE should establish ways to measure the effectiveness of technology generation and transfer through private-sector collaboration.

RECOMMENDATION 7: The REE intramural research system should strengthen quality control for poor research performance. Mechanisms used in other federal intramural research agencies, including the re-direction of human or financial resources when quality is poor, could be implemented.

RECOMMENDATION 8: REE agencies should develop and adopt ways of measuring the national, long-term impacts of their research on the environment, human health, and communities. The tools should include measures and indicators that are influenced by agricultural research or that can be attributed to research outcomes, including how research supports the needs of action agencies. REE should strive to achieve greater transparency in communicating these impacts through timely electronic publishing of peer-reviewed results and through greater efforts to interpret these results for a general audience.

RECOMMENDATION 9: There is a national need for a high-level leader to represent food and agricultural research and to promote opportunities for the research system. Such a leader should be vested with the authority to develop the food and agricultural research agenda, redirect funds to emerging issues and emergency needs, integrate the efforts of the individual agencies, and facilitate collaboration and coordination with scientists outside USDA and elsewhere in the federally supported research system. The leader should be selected on the basis of outstanding scientific and administrative accomplishments and must command the respect of the agricultural community and the broad scientific community.

RECOMMENDATION 10: REE should increase the hiring of scientists in research fields that have the greatest opportunities to address societal goals. Those include integrative environmental science, ecology, economics, and sociology; human genetics (including statistical human genetics) and bioinformatics; and human nutrition, public health, and food safety. REE agencies should continue to develop new methods for recruiting and retaining women and members of ethnic minorities.

RECOMMENDATION 11: REE should undertake an analysis of the data development, management, and dissemination needed to support environmental and nutrition policy analysis. REE should work with other USDA mission areas to conduct an inventory of available social, economic, biologic, chemical, and physical datasets and to take stock of the data needs of the future. REE should take the initiative in coordinating with other USDA agencies and with other federal agencies to identify where and how data can be more efficiently and effectively used and shared. REE should put into place structures and systems to support data management and dissemination across its agencies.

RECOMMENDATION 12: The committee recommends that REE use objective criteria to decide which USDA facilities merit investment of budget resources for repair, modernization, or security improvement and which should be consolidated or closed because they are incapable of cost-effectively contributing to the REE research strategy without renovation. These criteria should be established in the public interest and mutually agreed on by key members of Congress and state and local legislators, as articulated in the principles and recommendations of the 1999 Report of the Strategic Planning Task force on USDA Research facilities. The closing, consolidation, or renovation of facilities should be implemented."

The complete report is "Frontiers in Agricultural Research - Food, Health, Environment, and Communities", published by The National Academies Press, Washington, D.C.

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IAAPS Mission: to provide a global forum for the purpose of identifying, evaluating, integrating, and promoting plant protection concepts, technologies, and policies that are economically, environmentally, and socially acceptable.

It seeks to provide a global umbrella for the plant protection sciences to facilitate and promote the application of the Integrated Pest Management (IPM) approach to a the world's crop and forest ecosystems.

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