Institute of International Agriculture

INTERNATIONAL BENEFITS *to* MICHIGAN AGRICULTURE

MICHIGAN STATE
UNIVERSITY
EXTENSION

International Benefits *to* Michigan Agriculture

FOREWORD

International interests and activities in the College of Agriculture and Natural Resources take many forms. They include teaching domestic undergraduate students about global agricultural, food and natural resources systems; research relevant to solving problems important to Michigan, U.S. and international needs; and an array of outreach functions. Funding for these activities comes from many sources, including the U.S. Agency for International Development, the U.S. Department of Agriculture, United Nations organizations such as the Food and Agriculture Organization of the United Nations and the United Nations Development Program, the World Bank and regional banks, commodity groups and state appropriations.

Faculty members and students agree on the importance of the international components of their programs. The benefits of these programs to Michigan, however, are often not recognized. This brief summary of a few important benefits from international activities during recent decades has been assembled to provide an overview.

This account owes much to faculty members and students whose work is summarized, and to an earlier publication, Michigan's International Roots, published in 1985 and now out of print. Staff members of the Institute of International Agriculture and Outreach Communications played essential roles in developing this publication.

Many important advances facilitated by international activities have been omitted for the sake of brevity. The faculty members and administrators of the College of Agriculture and Natural Resources hope the vignettes included help the reader appreciate the value to Michigan of international activities at MSU.

Donald R. Isleib
Associate Dean and Director
Institute of International Agriculture

Did You Know . . .

- That Michigan's $300 million alfalfa crop has been free of its most serious pest—the alfalfa weevil—because of help received from France during the 1970s?
- That a Costa Rican bean variety helps Michigan keep its lead position in dry bean production?
- That every other row of beans produced in Michigan is exported and that the state's reputation for the volume and quality of its bean exports to Great Britain has been an important springboard to other markets in Europe?
- That blueberry research in Chile, supported by MSU scientists, will help consumers in Michigan enjoy fresh blueberries all year round?
- That 50,000 Japanese stores sell Michigan cherries?
- That the Michigan Milk Producers Association uses the MSU pilot testing plant to test milk dessert mixes for export to Mexico and Middle Eastern countries?

By Way of Introduction . . .

None of the major crop and livestock commodities that generate a farm value in excess of $1 billion annually are native to Michigan.

Of all of those products commonly thought of as "from Michigan" — Christmas trees, blueberries, dry beans, tart cherries and pickling cucumbers — only blueberries are native even to North America. And all of our major agricultural commodities — including alfalfa, apples, beef and dairy cattle, corn, soybeans and wheat — owe a great debt to genetic material and technology from around the world.

This booklet highlights how the vitality and future of Michigan's agriculture are so much a part of the global village.

Michigan's competitive edge in agriculture and the continued enjoyment of our natural resources depend on keeping our international connections.

Over the past 10 years, some of the international benefits to Michigan were:

- New crop varieties and animal breeds that are more resistant to diseases, environmental stresses and pests.
- More productive and sustainable crop and animal production.
- A more competitive food processing and packaging industry that is also more responsive to changing consumer preferences.
- Higher value natural resources.
- Improved research capacity.

Our international connections help to:

- Keep Michigan agriculture competitive in the world marketplace.
- Provide Michigan consumers with an incredible array of wholesome foods at low prices.
- Provide opportunities for MSU students, faculty members and others to get insights into other cultures and agriculture/food/natural resources systems.
- Add to global understanding at home and abroad.
- Support the objectives of U.S. foreign policy, including improving the quality of life in developing countries and ensuring opportunities for peace to replace war as the common denominator of international relations.
- Initiate linkages between Michigan agribusinesses and other business segments and their counterparts elsewhere in the world. This enhances employment and economic health in Michigan.
- Keep MSU agricultural research competitive by linking university scientists to their colleagues around the world.

EXPORT

Export markets are keys to the future of Michigan agriculture. Agricultural and food products worth more than $2.5 billion are shipped out of Michigan each year. This creates jobs and benefits the state economy. Michigan State University helps Michigan producers and agribusinesses be more competitive. MSU helps Michigan farmers, commodity groups and food processors gain access to global markets and boost demand for Michigan products.

Michigan both buys and sells abroad, and it is host to many multinational corporations. Its stake in the development and economic health of its trading partners is very high. The spirit of shared interest guides the College of Agriculture and Natural Resources search for opportunities for educational exchanges and cultural understanding and characterizes MSU international activities.

Commitment

Michigan State University's international commitment is important on a *global scale* to:

- Advance science.
- Reduce poverty.
- Increase food security.
- Protect natural resources.
- Increase trade.
- Improve disease resistance of Michigan crops and livestock.
- Improve crop and livestock production.
- Improve forest and ornamental tree science.
- Improve sustainability of agricultural production and natural resources systems.

International insight and experience are important in preparing MSU students to be educated Americans and informed world citizens. Preparation for these roles, and for employment with U.S.-based international companies, includes intensive learning experiences in trade, food and production. MSU's aim is to provide:

- Improved opportunities for Michigan students to study in other countries through student and scholar programs.
- A teaching faculty with increased and current international knowledge and interest enhanced through faculty international development.
- An opportunity to study with students from different cultures and backgrounds and participate in international components of the College of Agriculture and Natural Resources curriculum.

Assistance

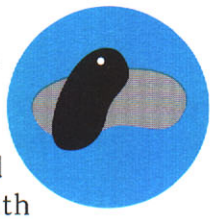
Through its agricultural research and education of Third World agricultural, governmental and business leaders, Michigan State University has helped prepare these leaders to achieve food security and improve the quality of life while developing economic benefits to Michigan firms selling products to these developing countries.

Providing adequate food is the first requirement in meeting people's needs. Beyond that, a dynamic agriculture is a prime requisite for energizing development in the world's poor countries.

Benefits to Michigan

Genetic Improvement

Beans



MSU researchers have used black bean germ plasm from Central America to help increase Michigan farmers' earnings by developing varieties that can be planted more intensively and harvested with reduced losses.

The work with erect black bean varieties is also the basis for the development of other seed types that are used to help diversify Michigan bean production and strengthen our market role.

Pickling Cucumbers

The development of virus-resistant varieties of pickling cucumbers from Chinese and Japanese varieties played an important role in Michigan's emergence as a leading producer of pickling cucumbers.

MSU breeders also looked to Japan for powdery mildew resistance, to Burma for resistance to bacterial wilt, and to the Netherlands for the introduction of the non-bitter characteristic.

The industry today continues to depend upon varieties with resistance to several viruses, obtained from a Chinese cucumber line, and a multiple fruiting habit from an Indian variety.

Tart Cherries

Genetic material from eastern Europe promises to help diversify Michigan's $20+ million tart cherry industry and to strengthen the MSU tart cherry breeding program, which is the only such program in North America. With germ plasm collected in eastern Europe, the MSU Clarksville Station may be one of the most diverse tart cherry orchards in the world.

Diversity is particularly important to Michigan's tart cherry crop because Michigan's top spot in tart cherries is based on only one variety, Montmorency, a 400-year-old

French selection. With only one variety, all the fruit ripens at the same time. This puts the crop at risk of late frost or disease and could limit the availability of cherries to consumers.

Diversity should also help the Michigan cherry industry respond to European penetration of the U.S. cherry juice market.

Improved Management

Forages and Intensive Grazing

- Alfalfa has traditionally been the gold mine of Michigan's forage production. For years, pure-seeded alfalfa has dominated the hay market and helped make hay the second most valuable crop in Michigan. Grass species from Europe and New Zealand, however, are helping MSU researchers improve the quality and productivity of the state's pastures. Turnips, rape, kale and swedes—grown for forage in Europe for many years—may also offer Michigan's northern producers some forage alternatives.
- Michigan can thank a cattle farmer from the Upper Peninsula who took a trip to New Zealand in the mid-1980s under the Michigan Agricultural Leadership Program for an idea that might revolutionize cattle grazing in Michigan.

  New Zealand and Australia lead the world in grazing technologies. The grazing systems of legumes and grasses developed in these countries appear to have important potential for northern Michigan producers. The intensive rotational grazing systems from "down under" appear to offer a workable alternative to conventional energy-intensive, costly dairy forage production in northern Michigan.
- The use of Israeli-developed irrigation technology has lowered infrastructure and operational costs so that MSU researchers could set up an experimental grazing system at the Lake City Research Station.

Nutrients and Pesticides

MSU scientists want to help farmers grow acceptable yields with only as much fertilizer as plants can utilize. Doing this means developing more accurate models, which are being pioneered in Sweden and the Netherlands, to help identify what happens during the complex nitrogen transformation processes in the soil.

Also, Swedish and Dutch scientists are helping us to understand how we might take better control of the flow of nitrogen into our groundwater, phosphorus into our surface water and ammonium into the atmosphere.

As one MSU scientist observed, "In a global situation . . . what happens in another country is something we ought to know about . . . for the new ideas about the kind of research we need to do to make more efficient use of fertilizer — to make Michigan yields more competitive."

Integrated Pest Management

A parasitic wasp introduced almost 20 years ago from the Carpathian Mountains in eastern Europe is mainly responsible for helping to keep Michigan's $100 million wheat crop largely free of damage from the cereal leaf beetle.

Wheat varieties from Syria, Portugal and Turkey have been used by MSU breeders to develop resistance to the Hessian fly. Outbreaks are now only sporadic and relatively insignificant in the state.

These innovations with international origins are important in keeping Michigan wheat competitive.

Natural Resources

The Sichuan Pheasant

With help from the people in Sichuan Province in China, Michigan is revitalizing its pheasant population and the expected $500 million hunting industry based on it.

Remarkable progress has been made in the introduction of Sichuan pheasants in Michigan, thanks to an innovative international collaborative effort between MSU, the Michigan Department of Natural Resources, and the

Sichuan Province Forestry Department in the People's Republic of China.

For almost 10 years, this collaborative effort has helped MSU researchers to introduce and increase Sichuan pheasant populations in the brushy non-agricultural habitat of the native ring-necked pheasants. Increasing the amount of habitat available to pheasants has helped increase Michigan's pheasant population.

Zebra Mussel

Zebra mussels have disrupted many Michigan industries and completely shut down some operations. The proliferation of the mussels in Saginaw Bay is also of growing concern to agriculture.

One hope is that more than 30 years of research on mussel management in the Netherlands, Poland and Germany can help us prevent the migration of zebra mussels into the drainage ditches used by bean and beet growers and other producers inland from the Saginaw Bay.

The solution might be as simple as replacing our corrugated drainage tiles—which offer the zebra mussel nooks and crannies to attach to—with smooth PVC pipe. MSU researchers are also trying to identify a significant mussel predator and ways to control zebra mussels without using chemicals.

To ward off the problem in overhead irrigation systems, the international collaboration may expand to western parts of Russia, where agricultural producers have been working for years to keep mussels out of their intake pipes.

Mussels are more of a problem in the United States right now than they are in Europe. One MSU scientist remarked, "We have a lot to learn from our European colleagues. They have a wealth of knowledge to share with us, and this has direct implications for Michigan farmers."

Collaboration with scientists in Europe may offer insights in dealing with harm done by mussels to the state's recreation industry. Mussels damage boats and detract from such recreational activities as shipwreck diving and beach walking. Many shipwrecks are virtually unrecognizable after colonization by mussels, and beach walking is dangerous and unpleasant when the razor-sharp zebra mussel shells wash ashore and the creatures rot. It is estimated that the mussel will cost Michigan billions in recreation revenues over the next 10 years. Additional collaboration with European researchers is needed to minimize these losses.

Blackflies

No one in Michigan enjoys blackflies. They are annoying, their bites are painful, and they can turn a relaxing camping or fishing trip into a miserable nightmare. Consequently, as MSU entomologists point out, "Anything we can learn about blackfly management will benefit Michigan."

In pursuit of this goal, MSU scientists have teamed up with British experts on blackflies to look at ways of controlling the blackfly population in Michigan. With support from a collaborative research grant from the North Atlantic Treaty Organization, this international team is trying to learn more about blackflies' natural predators. The team is also evaluating the effectiveness of bacterial control agents.

The team recently expanded their research program to examine the feeding habits of mosquitoes.

—Our Research Capability— Staying Competitive

Animal Diagnostics

Diagnostic procedures developed by Dutch and Swiss scientists reduce diagnostic time at MSU and help our Animal Diagnostic Laboratory serve the animal industry more effectively.

Nursery Micropropagation

The English commercial micropropagation industry is far ahead of the U.S. industry. Learning more about the organization of this industry offers ways for our scientists to help assure the duplication of plants that will thrive in Michigan.

SUMMARY

International activities in the College of Agriculture and Natural Resources at MSU produce many benefits to Michigan, and the biological and technological innovations described herein generate high returns to everyone. These returns also include the tremendous value of good will, technical cooperation, trade relations and income that arise from the international students and scholars who study at MSU. Not only do these students return to their home countries as friends of MSU, Michigan and the United States — they influence many family members, friends and co-workers, and they contribute to the national mood of friendship and enthusiasm for Michigan and U.S. values and goods. As the United States grows progressively more globally interdependent and Michigan continues to be both an exporter and an importer, the importance of international capabilities in MSU graduates, both domestic and international, will become even greater.

Additional information can be obtained from the MSU Institute of International Agriculture or from MSU Extension.

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