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Maine Agricultural Center Long-Range Plan

Prepared by the

University of Maine Board of Agriculture

for the

Maine Legislature

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Including the

**Maine Agricultural Center
Long-Range Plan
Update**

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Contents

Executive Summary	2
Long-Range Plan for Agriculture-related Research and Extension Activities	2
I. Introduction.....	5
Background.....	5
Information Used to Prepare the Plan.....	5
II. Long-Range Plan for Agriculture-related Research and Extension Activities	6
Maine Agricultural Center	6
The Five Goals of AgCOM.....	9
Needs Identified through the Survey of Maine Agricultural Groups	10
III. Experiment Station Farm Plans	12
Aroostook Farm	13
Blueberry Hill Farm.....	13
Highmoor Farm.....	14
Witter Center/Rogers Farm.....	15
Roger Clapp Greenhouses/Lyle E. Littlefield Ornamentals Trial Garden.....	15
Other Improvements	16
APPENDIX A: Current Agricultural Situation and Future Outlook	17
Agricultural Outlook and Trends	17
University Outlook and Trends.....	21
APPENDIX B: Research and Extension Needs: Results of a Survey of Maine Agricultural Groups.....	23

EXECUTIVE SUMMARY

Although the University of Maine has a long history of service to Maine agriculture, by the mid-1990s many leaders of agricultural commodity groups and some state legislators perceived that the University was “less equipped to anticipate and respond to industry needs in an effective, systematic manner” (University of Maine System Agricultural Task Force Report, p. 9). In an effort to address these concerns, in 1998 the Maine Legislature formed the Board of Agriculture, and charged it with advising the Chancellor of the University of Maine System and the President of the University of Maine “on matters concerning the operation and management of agricultural research conducted by the Maine Agricultural and Forest Experiment Station and University farm-based programs, including those of the University of Maine Cooperative Extension” (An Act to Ensure Long-term Funding of the Maine Agricultural Experiment Station Research Farms Connected with Land Grant Colleges). The legislation that formed the Board of Agriculture also asked the Board to develop a long-range plan for agriculture-related research and extension activities. The plan was to be completed by January 15, 2000. This document represents the Board of Agriculture’s long-range plan as requested by the legislature.

Long-Range Plan for Agriculture-related Research and Extension Activities

Because the Maine Agricultural Center is charged with coordinating the agriculture-related research and extension activities at the University of Maine, a long-range plan written for it will fulfill the requirements for a long-range plan as requested by the legislature. In preparation for this plan, the staff of the Maine Agricultural Center referred to three sources of information: the Chancellor’s Task Force report; the Agricultural Council of Maine (AgCOM) Strategic Plan for Maine Agriculture; and the Board of Agriculture’s survey of agricultural groups. This long-range plan addresses the concerns of these three groups on a point-by-point basis. In addition the report presents plans for upgrading the farms operated by the Maine Agricultural and Forest Experiment Station.

Chancellor’s Task Force Report Needs

The Chancellor’s Task Force recommended the creation of a center for agriculture at the University of Maine to coordinate the activities of the Maine Agricultural and Forest Experiment Station (MAFES) and the University of Maine Cooperative Extension (UMCE) activities and to ensure a seamless delivery of services to the industry. In January of 1999, the University of Maine System Board of Trustees approved the establishment of the Maine Agricultural Center. The mission statement for the Center illustrates the way the University of Maine will implement the Task Force’s recommendations.

The mission of the Maine Agricultural Center is to work in partnership with Maine Agriculture

1. To provide the research and extension education resources needed to remain competitive in local, national and global markets;
2. To develop the knowledge, technologies and policy options needed to provide high-quality, safe products in an economically sustainable and environmentally sound system;

3. To improve the delivery of agricultural research and extension education to Maine agriculture by
 - integrating research and extension programs;
 - expanding the development of multi-disciplinary approaches to solving agricultural problems;
 - providing a highly visible focal point for agricultural research and extension activities;
 - enhancing communication and coordination among the University of Maine System, the University of Maine, and Maine agriculture; and
 - encouraging University of Maine research and extension faculty to participate in multi-state programs and projects that will benefit Maine agriculture.

The Five Goals of AgCOM

The five goals of AgCOM are (1) to increase market opportunities for Maine agricultural products; (2) to provide Maine farms with access to the research, information, and training needed for continued growth and success; (3) to enable farmers to produce high-quality food and fiber in economically sustainable and environmentally sound production systems; (4) to heighten public awareness of the contribution of a viable agricultural industry to the state of Maine; and (5) to sustain the state's agricultural industry by keeping farmland in production and supporting the next generation of Maine farmers.

Each of these goals contains implicit needs that can be addressed by research and extension activities, and the Maine Agricultural Center is actively involved in the implementation of the Agricultural Council of Maine's Strategic Plan for Maine Agriculture.

Needs Identified through the Survey of Maine Agricultural Groups

The Board of Agriculture reached out to the agricultural community of Maine with a survey in the summer of 1999. This survey requested information on current extension and research connections and asked what were their priority research and extension needs for the future. Respondents to the Board of Agriculture's survey identified seven general areas where they feel additional research and/or extension staff is needed. After carefully reviewing the feedback from the 22 responding organizations and groups, the Board is making the following staffing recommendations to the University. These recommendations were formulated at the December 2, 1999, meeting of the Board.

1. *Vegetables*: one FTE (full-time equivalent) in extension and research.
2. *Livestock*: one FTE in livestock with an emphasis on extension activities in ruminant animals.
3. *Entomology*: one FTE of economic entomology to work in integrated pest management and integrated crop management to support plant product industries.
4. *Food Science & Food Safety*: one FTE to work in value-added product development.
5. *Plant Pathology*: one FTE of research activity to support plant pathology work needed by commodities.

Experiment Station Farm Plans

The Maine Agricultural and Forest Experiment Station operates four farms that are used to conduct field research experiments and UMCE demonstration plots related to agriculture: Aroostook Farm in Presque Isle, Blueberry Hill Farm in Jonesboro, Highmoor Farm in Monmouth, Witter Center/Rogers Farm in Orono and Old Town. In addition to the four farms,

MAFES also operates the Roger Clapp Greenhouses and Lyle E. Littlefield Ornamentals Trial Garden located on the Orono campus.

During the period of budget cuts between 1990 and 1996, MAFES farm budgets were cut severely. The budgets of all the research farms were increased substantially when the research and development funds were recently received by the College of Natural Sciences, Forestry, and Agriculture. Many steps have been taken, or are in the planning stages, to improve the infrastructure at all MAFES farms. A brief outline of some of the actions taken and the actions that are planned for the near future are provided in this Executive Summary. More detail is provided in the section entitled "Experiment Station Farm Plans."

Aroostook Farm. Several steps have been taken to improve facilities at Aroostook Farm. These include the construction of a new potato sorting room; renovation of a utility building to provide additional work space and to alleviate safety problems; and major improvements in the heating system in the greenhouse. One of the higher priority needs at Aroostook Farm is the replacement of field equipment. Over the next several years, the highest priority farm equipment will be replaced.

Blueberry Hill Farm. While some general improvements have been made at Blueberry Hill Farm in the past year, major improvements are planned for the next few years. The irrigation system will be expanded and upgraded. The main building at the farm will be assessed to determine whether it can be renovated. If the cost of renovation is prohibitive, the cost of constructing a new building to accommodate these needs will be investigated. There is a need to upgrade computer and telecommunication systems at the farm.

Highmoor Farm. Several improvements have been completed during the last year at Highmoor Farm. These include the replacement of the heating system boiler in the main building, the upgrade of fuel tanks and chimneys, the repair of roofs on several of buildings, the repairs and upgrades of the hoop house, the purchase/lease of a tractor, and the planting of a new orchard for apple research. Additional improvements are also planned, including more roof repair; a new irrigation system; and a new generator system.

Witter Center/Rogers Farm. As at the other farms, several changes have occurred at the Witter Center/Rogers Farm. Several improvements have been made, including the installation of horse stalls, the construction of a calf facility, the repair of roofs, and the purchase of farm equipment to replace old equipment. Further major changes are also being planned: construction of a new heifer barn; construction of a livestock arena; construction of an outdoor riding area for the equine program; replacement of the old barn at Rogers Farm; and completion of the subsoil tiling at Rogers Farm.

Roger Clapp Greenhouses/Lyle E. Littlefield Ornamentals Trial Garden. Efforts began last year to begin replacing the worn out mechanisms that open and close the ridge vents and other ventilation systems in the Roger Clapp Greenhouses. New benches were also constructed to expand space for research. Over the next two years, the following improvements are planned: continuing to replace the mechanisms that open and close the ventilation system and building a security fence around the Lyle E. Littlefield Ornamentals Trial Garden.

Maine Agricultural Center Long-Range Plan

I. INTRODUCTION

Background

Although the University of Maine has a long history of service to Maine agriculture, by the mid-1990s many leaders of agricultural commodity groups and some state legislators perceived that the University was “less equipped to anticipate and respond to industry needs in an effective, systematic manner” (University of Maine System Agricultural Task Force Report, p. 9). In an effort to address these concerns, in 1998 the Maine Legislature formed the Board of Agriculture, and charged it with advising the Chancellor of the University of Maine System and the President of the University of Maine “on matters concerning the operation and management of agricultural research conducted by the Maine Agricultural and Forest Experiment Station and University farm-based programs, including those of the University of Maine Cooperative Extension” (An Act to Ensure Long-term Funding of the Maine Agricultural Experiment Station Research Farms Connected with Land Grant Colleges).

Concurrent with activities taking place in the legislature, the University of Maine System was responding to the concerns about agriculture-related research and extension education programs at the University. To this end, Chancellor Terrence MacTaggart appointed an agricultural task force. Their report, completed in 1998, provided recommendations on how the University System could better serve the needs of Maine agriculture. The centerpiece of the report was the recommendation that the University System form a Center for Agriculture based at the Orono campus. Acting on this recommendation, the University of Maine System Board of Trustees approved the formation of the Maine Agricultural Center in January 1999.

The legislation that formed the Board of Agriculture also asked the Board to develop a long-range plan for agriculture-related research and extension activities. The plan was to be completed by January 15, 2000. Because the Maine Agricultural Center has responsibility for agriculture-related research and extension activities, this plan was written to be a long-range plan for the Center itself.

This document represents the Board of Agriculture’s long-range plan requested by the legislature.

Information Used to Prepare the Plan

Constructing a meaningful long-range plan requires a substantial amount of information. A meaningful plan for Maine agriculture must be based on the current status of agriculture and the forces that are affecting it daily and at the same time realistically reflect the fiscal capacity of Maine Agricultural and Forest Experiment Station (MAFES) and University of Maine Cooperative Extension (UMCE). This information is presented in Appendix A. In addition, the long-range plan also must be based on an understanding of the needs of Maine’s agricultural sector. Three sources of information were used to measure the needs: the Agricultural Council of Maine’s (AgCOM) Strategic Plan for Maine Agriculture, Chancellor’s Task Force report, and the Board of Agriculture’s survey of agricultural groups.

II. LONG-RANGE PLAN FOR AGRICULTURE-RELATED RESEARCH AND EXTENSION ACTIVITIES

Maine Agricultural Center

Because the Maine Agricultural Center is charged with coordinating the agriculture-related research and extension activities at the University of Maine, a strategic plan written for it will fulfill the requirements for a strategic plan as requested by the legislature. In addition to the needs gathered from the three sources listed previously, the Maine Agricultural Center, through meetings with the Board of Agriculture, has gathered the input of these agricultural leaders on the future of the Center. The purpose of this section is to discuss the needs identified by the industry and to illustrate how the University of Maine, through the efforts of the Center, will respond to those needs in the future.

The Chancellor's Task Force recommended the creation of a center for agriculture at the University of Maine to coordinate the activities of MAFES and UMCE and to ensure a seamless delivery of services to the industry. In January of 1999, the University of Maine System Board of Trustees approved the establishment of the Maine Agricultural Center, which pulls together the agriculture-related programs of UMCE and MAFES.

One of the major functions of the Center is to better coordinate the activities of MAFES and UMCE. This linking has been accomplished by placing the Maine Agricultural Center directly under the directors of UMCE and MAFES. Hence, the Center will work with and report to both directors. To further strengthen the linkage, a director and associate director administer the Center, with the former being the associate director of MAFES and the latter being the agricultural program leader for UMCE, both existing University positions. This arrangement has several advantages. First, it facilitates integration and coordination of the agricultural programs offered by MAFES and UMCE. Furthermore, the Center director and associate director are, respectively, only one person removed from the directors of MAFES and UMCE. This improves the ability of the Center to coordinate its work with the directors of MAFES and UMCE. Finally, this arrangement minimizes the administrative staff required to operate the Center, thereby avoiding confusion among clientele groups.

The mission statement for the Center illustrates the way the University of Maine will implement the Task Force's recommendations.

The mission of the Maine Agricultural Center is to work in partnership with Maine Agriculture

1. To provide the research and extension education resources needed to remain competitive in local, national and global markets;
2. To develop the knowledge, technologies and policy options needed to provide high-quality, safe products in an economically sustainable and environmentally sound system;
3. To improve the delivery of agricultural research and extension education to Maine agriculture by
 - integrating research and extension programs;
 - expanding the development of multi-disciplinary approaches to solving agricultural problems;
 - providing a highly visible focal point for agricultural research and extension activities;

- enhancing communication and coordination among the University of Maine System, the University of Maine, and Maine agriculture; and
- encouraging University of Maine research and extension faculty to participate in multi-state programs and projects that will benefit Maine agriculture.

Providing Research and Extension Resources Needed to Remain Competitive

The Maine Agricultural Center is fully operational, and several steps have been taken to implement the goals over the past year. The personnel in UMCE and MAFES who work on agriculture-related issues have been invited to join the Maine Agricultural Center, and a total of 68 faculty and staff have joined. These people represent virtually all of the research and extension personnel who work on agriculture-related issues. The membership will increase slightly in the future as new faculty on the Orono campus and selected individuals from other University of Maine System campuses are invited to join the Center.

Furthermore, although the funding of the research is still supported by MAFES, the administration of all agriculture-related research performed by MAFES faculty has been transferred to the Maine Agricultural Center. A complete listing of all active MAFES research projects can be found at the MAFES web site (<http://www.umaine.edu/mafes/>).

The Center is also developing a process through which research and extension personnel can request special funds for research projects and extension education programs that address high-priority needs. Although the funds are limited, they provide the Center with the flexibility to respond to special short-term needs of Maine agriculture that otherwise could not be addressed. To ensure that these requests for funds reflect a real need for Maine agriculture, research and extension faculty will need to show that a Maine agricultural group supports the proposed activity before these funds will be allocated.

Developing Knowledge, Technologies, and Policy Options for High-quality Products

The Maine Agricultural Center brings together an array of expertise on many of the issues facing Maine agriculture. By listening to the concerns of Maine farmers, the Center will be ready to respond to the issues as they arise. As an example of how the expertise of the Center can be of use to Maine agriculture, following is a listing of what has been accomplished in the past year.

- The Center is supporting a study to determine the feasibility of growing wild blueberries in the St. John Valley of Aroostook County. This study is being done at the request of the Maine Legislature.
- The Center is working with the Maine Department of Agriculture, Food and Rural Resources to co-sponsor several meetings and conferences, including the recent Maine Rural Development Council Conference and meetings to determine the irrigation needs of Maine farmers.
- The Center is contributing needed information to statewide efforts to identify options to reduce the property tax burden on farmers.

Improving the Delivery of Agricultural Research and Extension Education

Integrating research and extension programs: Previously in the report it was noted that the structure and the administration of the Maine Agricultural Center were specifically designed to enhance coordination and integration of University agricultural research and extension education programs. To further coordinate the activities of UMCE and MAFES, the Center is working to create joint appointments where possible. In joint appointments, faculty have both a research and

extension appointment. These types of appointments ensure that the research and extension programs are well coordinated and integrated. The Center is currently working with four faculty who have requested joint appointments. Other joint appointments for faculty in MAFES and UMCE will be developed in the future.

Developing multi-disciplinary approaches to solving agricultural problems: Looking at agricultural problems at the ecosystem level can lead to new solutions to age-old agricultural problems. By combining the research and extension resources of MAFES and UMCE faculty, in addition to the range of expertise (soils, plants, pathology, entomology, economic, etc.), the Center is well positioned to develop these multi-disciplinary approaches.

Providing a highly visible focal point: To address the need for more visibility, the Center has compiled a directory that lists all of its members, the research/extension areas in which they work, and contact information. This directory is being distributed to agricultural groups to enable them to more easily identify and contact the researchers and extension personnel who may be able to help address specific problems. A brochure outlining the purpose and mission of the Center has also been developed. This brochure provides contact information for the Center, including a toll-free telephone number when calling within Maine.

Enhancing communication and coordination: The Center staff is working closely with agricultural groups throughout the state to ensure that the Center is aware of the needs of the different groups and to contribute the skills that the Center has to offer. For example, the staff has met with the Golf Course Superintendents Association, representatives from the deer and elk industry, the gourmet and specialty foods industry, the Ornamental Horticulture Council, the beef industry, the potato industry, the wild blueberry and cranberry industries, the Maine Sustainable Agriculture Society, and other groups. These types of meetings will continue in the future.

The Center is also working with the Maine Department of Agriculture, Food and Rural Resources to improve coordination between the University and state government. The missions of the two groups complement each other in certain areas and there are numerous opportunities for working together.

It was noted in the introduction that the Maine Agricultural Center is a University of Maine System entity. It was specifically designed to pull together all the expertise related to agriculture that exists within the University of Maine System. While most of this expertise is located on the Orono campus, there are individuals located on other campuses with interest and expertise in agriculture. These individuals will be invited to join the Maine Agricultural Center and will have access to the special funds described previously.

Finally, the Center staff is discussing the potential for people in other organizations to become affiliated with the Maine Agricultural Center. Discussions are currently underway with the Orono unit of the USDA Agricultural Research Service and with Wolfe's Neck Farm in Freeport. Both of these organizations have a research or an education mission related to agriculture in Maine. A closer working relationship between these groups would benefit all organizations involved and would improve the delivery of research and education services to the agricultural sector in Maine.

Encouraging participation in multi-state programs and projects: Both UMCE and MAFES are under federal mandates to increase participation in multi-state programs and projects. Participation in multi-state activities provides an efficient means of gathering data and transferring information. The sum of efforts generated by individual universities combine to produce a greater whole. Regional programs and projects are also interdisciplinary in nature, giving the project a full spectrum of expertise that assures an integrated approach to the issue. For Maine, participation in multi-state projects or programs is of particular importance. Unlike some of the larger state universities, the University of Maine often has only one or two faculty with expertise in a specific area. Through multi-state participation, an individual faculty member from Maine can share her or his knowledge and gain expertise from others to enhance the quality of research provided to the people of Maine.

These actions illustrate the steps the Center and the University of Maine System are taking to better serve the agricultural community of Maine. The Maine Agricultural Center is committed to improving the delivery of research and extension education services to the agricultural community and the Center will continue to work to fulfill its role as part of the modern land-grant university.

The Five Goals of AgCOM

Each of these goals contains implicit needs that can be addressed by research and extension activities, and the Maine Agricultural Center is actively involved in the implementation of the Agricultural Council of Maine's Strategic Plan for Maine Agriculture.

Goal 1—Increase Market Opportunities for Maine Agricultural Products

The University of Maine can find many ways to help increase market opportunities for Maine agricultural products. Both MAFES and UMCE faculty and educators will work on the development and adoption of new value-added products and the production processes used to produce them. MAFES and UMCE expertise in marketing studies will help to determine market opportunities for the new products.

Goal 2—Provide Maine Farms with Access to the Research, Information, and Training Needed for Continued Growth and Success

Providing Maine farms with access to the research, information, and training needed for continued growth and success relates directly to research and extension activities. In fact, the formation of the Maine Agricultural Center and the Board of Agriculture are viewed as major steps toward ensuring that the research and extension needs of the agricultural sector are addressed by the University.

Goal 3—Enable Farmers to Produce High-quality Food and Fiber in Economically Sustainable and Environmentally Sound Production Systems

Both MAFES and UMCE have major roles to play in helping farmers to produce high-quality food and fiber in economically sustainable and environmentally sound production systems. In the future MAFES and UMCE will continue work on the development and adoption of sustainable production systems, with expanded integrated crop management (ICM) programs, programs to improve soil quality, and economic feasibility studies.

Goal 4—Heighten Public Awareness of the Contribution of a Viable Agricultural Industry to the State of Maine

The University does work to heighten public awareness of the contribution of agriculture to Maine through a number of public events and targeted programs sponsored by UMCE. In addition to these programs, MAFES researchers will be conducting studies that measure the economic contribution of agriculture in Maine, which will serve to heighten public awareness of the contribution of a viable agricultural industry to the state of Maine.

Goal 5—Sustain the State’s Agricultural Industry by Keeping Farmland in Production and Supporting the Next Generation of Maine Farmers

Research and extension contributes to the understanding of the complex issues related to farmland preservation and the policy options available to achieve it. By doing so the University helps sustain the state’s agricultural industry by keeping farmland in production and supporting the next generation of Maine farmers. The University also supports the next generation of Maine farmers through the agriculture-related academic programs offered by the College of Natural Sciences, Forestry, and Agriculture and the continuing education programs offered by UMCE.

Needs Identified through the Survey of Maine Agricultural Groups

The Board of Agriculture conducted a survey of agricultural groups in Maine to determine their research and extension needs. A total of 55 agricultural groups was contacted in the spring of 1999. The groups were asked to identify their current extension and research connections and asked what were their priority research and extension needs for the future. The agricultural groups also were asked to indicate how the MAFES research farms are currently serving their needs and how they could serve their group’s needs in the future. The groups were asked to respond by July 15, 1999, and to identify their needs in the broad categories of production, marketing, value added, food safety, financial management, the environment and land use and other concerns. Near the end of July, all groups that had not responded to the survey were contacted again and asked to submit their input by September 15, 1999. Overall, 22 of the 55 agricultural groups responded to the survey and identified their research and extension needs. A listing of the groups that responded and the needs they identified are contained in Appendix B.

The respondents to the Board of Agriculture’s survey identified seven general areas where they feel additional research and/or extension staff is needed. These seven areas and the types of personnel needed are

- Two livestock extension specialists;
- Equine extension specialist;
- Extension nutrition educators;
- Extension food science specialist;
- Extension greenhouse specialist;
- Two vegetable positions—one in research, one in extension; and
- Plant pathology research faculty or technician for potato seed certification laboratory.

Additional extension personnel are requested in six of the areas and research personnel were requested in two of the areas. This difference probably reflects the fact that MAFES has been able to replace more faculty positions than UMCE. The vegetable and livestock areas stand out as high-priority areas—two new positions were requested in each of those areas.

Respondents also identified the following general programmatic areas that need to be addressed (with the number of groups mentioning the area in parentheses):

- Integrated pest management/pesticides (8)
- Marketing (7)
- Evaluation of feeds/forages (6)
- Plant disease (6)
- Value added (5)
- Business/finance/other economic studies (5)
- Economic impact studies (3)
- Food safety (3)
- Livestock genetics (3)
- Livestock nutrition (3)
- Waste/nutrition management (2)
- Animal disease (1)

After carefully reviewing the feedback from the 22 organizations and groups, the Board is making the following recommendations to the University. These recommendations were formulated at the December 2, 1999, meeting of the Board.

Critical Staffing Needs for Maine Agriculture

1. *Vegetables*: one FTE (full-time equivalent) in extension and research. The vegetable and small fruit growers have been receiving limited University support for more than three years. The extension small fruit specialist has been doing a commendable job attempting to support the educational needs of the vegetable producers; however, the needs of this growing industry far exceed what is currently available.
2. *Livestock*: one FTE in livestock with an emphasis on extension activities in ruminant animals. The beef, sheep, venison, and dairy commodities all expressed the need for greater University support. The loss of an extension livestock specialist has been keenly felt by these industries. There is a need for the University to bring these groups together to determine what the highest priorities (nutrition, livestock/crop rotations, etc.) will be for this position. Many of these industries are growing in the number of producers and/or animals in Maine.
3. *Entomology*: one FTE of economic entomology to work in integrated pest management (IPM) and integrated crop management (ICM) to support plant product industries. Currently the University is unable to supply all of the entomological needs of the plant commodities. The IPM staff of UMCE is a valued resource but is limited to specific commodities and too small to respond to the needs of Maine's agricultural community. This position will help producers understand the many changes that are occurring in pest management strategies and the appropriate use of new pest control products where appropriate and necessary.
4. *Food Science & Food Safety*: one FTE to work in value-added product development. This should also include small companies wishing to increase production or to add new products. Maine has a large number of home-based businesses that specialize in food product production. There is an acute need for product testing and new product development. The cost for this work is prohibitive for most small business owners. The University is the unique resource that can assist with the analysis of new food products. New facilities being constructed at the University, including a new food manufacturing pilot plant, will also

enhance the University's ability to serve the agriculture industry in development and testing of new value-added products.

5. *Plant Pathology*: one FTE of research activity to support plant pathology work needed by producers. The University has been asked to assume the responsibility of the potato seed-testing laboratory that currently operates under the Maine State Department of Agriculture, Food and Rural Resources. To assume responsibility of the seed-testing program, the University will need a pathologist capable of conducting this work. It is expected that this position would also respond to other pathology needs as well.

These critical staffing needs do not meet all the needs identified on page 10. These recommendations focus on the highest priority needs as perceived by the Board. The assessment of needs is an ongoing process. It is the Board's opinion that other needs listed in the responses to the survey should be evaluated and prioritized at future Board meetings. The Board recommends that the University strive to fill these staffing needs through a variety of methods. For example, the Maine Agricultural Center is managing newly formed split appointments with existing and new staff. These appointments have research and extension responsibilities that will enhance the University's abilities to respond to the needs of Maine's agricultural community. Another method is to consider the reallocation of existing resources toward these staffing needs. This may mean redirecting a current faculty member's work or the reallocation of funds. A third opportunity, especially for UMCE, is to seek external grants and contracts that will fund new staff. The Board recognizes that these funds are often for fixed-length and for specific projects; however, external funds represent an opportunity to meet unmet needs.

The Board feels that the agricultural industries need to support the University in finding the resources to implement these staffing recommendations. We acknowledge that a number of commodities are already making significant contributions of time and funding to the University. This practice needs to continue and to grow wherever possible. Lastly, we recommend that UMCE and MAFES seek greater allocations of funding through the University of Maine's budget process to rebuild priority research and extension capabilities. Finding new funding is a formidable challenge; however, in order to fulfill the mission of the land-grant institution the University of Maine must assist citizens engaged in the broad area of agriculture.

III. EXPERIMENT STATION FARM PLANS

The Maine Agricultural and Forest Experiment Station operates four farms that are used to conduct field research experiments and extension demonstration plots related to agriculture. The four farms, their location, and the types of research conducted at each farm are listed below:

- Aroostook Farm in Presque Isle: research and extension education programs related to potatoes, alternative crops, soil amendments, and crop rotations;
- Blueberry Hill Farm in Jonesboro: research and extension education programs related to wild blueberries;
- Highmoor Farm in Monmouth: research and extension education programs related to apples, other pome, and small fruits and vegetables;
- Witter Center/Rogers Farm in Orono and Old Town: research and extension education programs related to large animals (dairy, equine, beef, sheep), composting, crop rotations, and sustainable agricultural practices.

In addition to the four farms, MAFES also operates the Roger Clapp Greenhouses and Lyle E. Littlefield Ornamentals Trial Garden located on the Orono campus. The greenhouses are used for teaching as well as agricultural and forestry research. The Lyle E. Littlefield Ornamentals Trial Garden is used for ornamental horticultural research, teaching, and public viewing. MAFES turf grass research is also conducted in the Lyle E. Littlefield Ornamentals Trial Garden.

During the period of budget cuts between 1990 and 1996, MAFES farm budgets were cut severely. After a failed attempt to operate the dairy herd on a commercial basis, the herd at the Witter Center was sold, and the money was used to correct major problems with the facility. In addition, plans were made to close Highmoor Farm in an attempt to save money. Highmoor Farm was targeted for closure because it was not as heavily used for research and extension activities as the other MAFES farms.

The budgets of all the research farms were increased substantially when the research and development (R&D) funds were recently received by the College of Natural Sciences, Forestry, and Agriculture. For example, the operating budget of each farm was increased at least 30 percent in FY99 and Highmoor Farm's budget was brought back to full parity with the other farms. In addition, each farm received an additional increase of about eight percent in FY00.

Many steps have been taken, or are in the planning stages, to improve the infrastructure at all MAFES farms. The actions taken and the actions that are planned for the near future are summarized for each farm below. Note that completion of some of these actions is dependent on MAFES receiving University bond or R&D money.

Aroostook Farm

Several steps have been taken to improve facilities at Aroostook Farm. These include the construction of a new potato sorting room; renovation of a utility building to provide additional work space and to alleviate safety problems; and major improvements in the heating system in the greenhouse. The work to fix the heating system also included additional work to alleviate safety problems in the greenhouse. Work was also done to upgrade the electrical wiring in several of the buildings at the farm. In addition, all the buildings at the farm are being equipped with electrical boxes that will allow a generator to provide power to the buildings in the event of extended power outages. This will be completed in FY00. Finally, a new vehicle was purchased to replace one that was more than ten years old. These projects could not have been undertaken without the infusion of R&D funding.

One of the higher priority needs at Aroostook Farm is the replacement of field equipment. The tractors, potato planting/digging, and other equipment are quite old and repairs are becoming more difficult and costly. A list of the priority equipment needs is being prepared at this time. Over the next several years, the highest priority farm equipment will be replaced.

Blueberry Hill Farm

While some general improvements have been made at Blueberry Hill Farm in the past year, major improvements are planned for the next few years. An assessment of needs has been conducted, and the following improvements are in the planning stages:

- The irrigation system will be expanded and upgraded. This will require drilling another well and upgrading and expanding the distribution system. The irrigation system will be designed so that research related to wild blueberry production can be conducted. This

research is a high priority to the wild blueberry industry. The irrigation system will be expanded and improved in FY00-01.

- The main building at the farm will be assessed to determine whether it can be renovated. Renovations needed include modernizing the two laboratories in the building (replace asbestos floor and install spill-resistant floor, new lab benches, upgrade electrical, heating and plumbing systems, install laminar flow hoods and air conditioning, and replace windows). Other needs in the main building include office space, meeting space (conference room), and space for growth chambers and walk-in refrigeration and backup electrical generators. If the cost of renovation is prohibitive, the cost of constructing a new building to accommodate these needs will be investigated. Construction of a new building may require the purchase of additional land.
- There is a need to upgrade computer and telecommunication systems at the farm, including a GIS mapping system so that the entire farm can be mapped and a history of past research conducted on each plot can be developed. This work will commence in FY00 and completion will be tied to the renovation/construction of a new building.
- There is also a need for a new, modern two-bay shop building. This need depends partially on whether the main building is renovated or a new building is constructed. This work will proceed on the same schedule as that developed for the work on the main building.
- There are plans to establish demonstration plots showing three levels of management of wild blueberries and the economic returns associated with each level of management. This may require additional land at Blueberry Hill Farm. Options being investigated include purchase and lease of land adjacent to the farm.
- One of the technician positions at the farm will be upgraded to the position of assistant farm manager. The person in this position will work with the current farm manager until he retires. This will minimize potential problems associated with the change in farm managers. The assistant farm manager also will use the GIS system to map the farm and develop the research history. The assistant farm manager position will be filled in FY00.
- MAFES will base fund a technician to be stationed at Blueberry Hill Farm; however this position may require significant time spent at laboratories in Orono.

Highmoor Farm

Several improvements have been completed during the last year at Highmoor Farm. These include the replacement of the heating system boiler in the main building, the upgrade of fuel tanks and chimneys, the repair of roofs on several of buildings, the repairs and upgrades of the hoop house, the purchase/lease of a tractor, and the planting of a new orchard for apple research. Additional improvements are also planned:

- More roof repair work will be conducted in FY00 and FY01.
- A new irrigation system will be installed. This will require a new drilled well and a new water distribution system. This will be done in FY00 and FY01.
- A new generator system is being installed to power the buildings during extended power outages. This will be completed in FY00.

In addition to the improvements in the infrastructure, a concerted effort is underway to expand the research and extension activities conducted at Highmoor Farm. New research on small fruits and vegetables is planned. The pomologist position is being refilled and an extension

specialist on a fixed-length appointment will be stationed at Highmoor Farm for the next two years. This new specialist will provide education to farmers on nutrient management and integrated farming systems. Discussions are also underway to determine the feasibility of providing a site at Highmoor Farm for research on the hardiness of chestnut trees. Other research and extension options are also being explored.

Witter Center/Rogers Farm

As at the other farms, several changes have occurred at the Witter Center/Rogers Farm. Most notable are the reestablishment of the dairy program, the development of an equine program, and the establishment of the UMCE Compost School at the Witter Center. The dairy and equine programs were initiated, and are operated, by students. A memorandum of understanding was developed by MAFES and UMCE to govern the use of the Witter Center by the UMCE Compost School. The school attracts participants from many parts of Maine and other states and countries.

Beef cattle and sheep have also been donated to the Witter Center to round out its large-animal emphasis. Several improvements have been made to support these programs, including the installation of horse stalls, the construction of a calf facility, the repair of roofs, and the purchase of farm equipment to replace old equipment. Further major changes are also being planned:

- Remove current heifer barn and construct new one in different location. This is planned for FY01.
- Construct livestock arena on the site of the current heifer barn. This arena will be used for livestock and equine activities as well as for research, training, and teaching purposes. This project is also planned for FY01.
- Construct an outdoor riding area for the equine program during FY00.
- Replace the old barn at Rogers Farm with a new barn that will accommodate pesticide storage/mixing and bathrooms.
- Complete the subsoil tiling at Rogers Farm in FY01-02.

Roger Clapp Greenhouses/Lyle E. Littlefield Ornamentals Trial Garden

Efforts began last year to begin replacing the worn out mechanisms that open and close the ridge vents and other ventilation systems in the Roger Clapp Greenhouses. New benches were also constructed to expand space for research. Over the next two years, the following improvements are planned:

- Continue to replace the mechanisms that open and close the ventilation system in the Roger Clapp Greenhouses.
- Build a security fence around the Lyle E. Littlefield Ornamentals Trial Garden to keep out wildlife that is damaging the plants in the garden.
- Build a golf green for testing different varieties of bent grass for cold tolerance and hardiness under playing conditions. The Maine Golf Course Superintendents Association will help in the building of the green by donating labor and materials needed for construction.

Other Improvements

In addition to the improvements mentioned above, efforts are underway to install a modern weather station at each of the farms managed by MAFES. A committee of research and extension personnel has been formed to evaluate the different types of stations available, to determine the needs for each farm, and to recommend the type of weather station that should be installed at each farm. This action should be completed by FY02.

The R&D funds provided by the Maine Legislature has given MAFES the opportunity to repair and replace facilities and equipment at the farms. These improvements have enhanced the ability of research and extension personnel to conduct programs beneficial to Maine agriculture. The infusion of these funds has allowed MAFES to correct many of the budget problems that existed in the early 1990s at the farms. The list of planned improvements presented above indicates that more work needs to be done to improve the facilities at the research farms. However, the plans also indicate that MAFES is committed to using the R&D funds to invest in the infrastructure required to deliver the agricultural research and extension education programs needed by the industry. Some of the improvements outlined above, however, are dependent on additional R&D or University bond money.

APPENDIX A: CURRENT AGRICULTURAL SITUATION AND FUTURE OUTLOOK

Planning for the future of Maine agriculture requires a good understanding of the current situation facing agriculture and the outlook for the future. Because Maine agriculture participates in national and global markets for agricultural products, we begin with a summary of current trends and outlook for U.S. agriculture followed by a discussion of Maine agriculture and the issues and opportunities it faces.¹

The Maine Agricultural Center plan must also be realistic in terms of the current situation at the University of Maine. Therefore, this Appendix also contains a brief summary of the current financial situation facing MAFES and UMCE.

Agricultural Outlook and Trends

National Trends

Agriculture, perhaps more than most industries, has been in a transition for many years. In the 1860s when the land-grant college system was established, the U.S. was an agrarian society. More than one-half of the population made its living by farming and ranching. Since that time, improvements in the efficiency of agricultural production, many of which are credited to the land-grant system, have resulted in a steady decline in the number of people working in agriculture. Currently, only about two percent of the population relies on farming as their primary occupation. It is estimated, however, that more than 13 percent of the U.S. gross domestic product is related to agriculture when the value of manufacturing, processing, marketing, and distribution is added to the value of farm production.

Although the number of farms and the number of people employed in production agriculture have declined, the average size of farms in the U.S. has increased and agricultural output has grown substantially. Agricultural production in the U.S. has become so efficient that farmers today can produce enough food to satisfy the needs of U.S. consumers and still export more than \$50 billion in agricultural products annually. In the future, farmers will continue to adopt more efficient production technologies to reduce production costs.

Farmers operate in a competitive economic environment. Consequently, farmers are not the beneficiaries of the production technologies that have made agriculture more efficient. The benefits associated with the new technology are passed on to consumers in the form of lower food prices. Today, Americans only spend about eight percent of their consumption expenditures on food, compared to 15-20 percent for most other developed countries. Furthermore, these new technologies that farmers are adopting rely more on inputs that must be purchased off farm, rather than on inputs that can be produced on farm. This has contributed to the decline in the number of farms in the U.S.

¹ The information needed to construct the overview and outlook for agriculture was compiled from several sources, including the Census of Agriculture and USDA reports, Maine Department of Agriculture, Food and Rural Resources sources, University studies, the Agricultural Council of Maine Business Plan and the Chancellor's Task Force on Agriculture.

Another change is that Americans are spending a higher percentage of their food dollar on food consumed away from home. This increase in eating out is only one of many changes in the consumer preferences that are affecting agriculture. Generally, consumers are demanding high-quality, easily prepared foods. These trends are expected to continue in the future, thereby placing greater importance on the development of new processing techniques and products that will be attractive to busy consumers, restaurants, and other institutional buyers.

Arguably, the most serious problem facing U.S. agriculture today is profitability. Although the overall economy of the U.S. has enjoyed robust growth during the last eight years, most farmers have not shared in the good times. Due to extremely low prices for agricultural commodities, many farmers are experiencing difficult financial times. Prices received by farmers for some crops today are lower than the prices received 40 to 50 years ago, *before* adjusting for inflation.

Several factors have contributed to the problem of low prices. One is the increased efficiency of production agriculture. Higher levels of production have driven prices downward as the growth in supply has outstripped the growth in demand. The international financial crisis over the last two to three years has also contributed to the problem. The countries experiencing the financial crisis substantially reduced their purchases of U.S. agricultural products, thereby adding to the surplus problem. Still another factor is the change in federal policies toward agriculture. With the passage of the Federal Agricultural Improvement and Reform (FAIR) Act in 1996, the federal government eliminated the supply management programs used in agriculture for 60 years and replaced them with policies that would allow agriculture to transition to a free market environment. This adjustment to a free market environment has also contributed to the oversupply problem. The change in federal policy, however, has had less of an effect on Maine agriculture because Maine does not grow many of the crops that were included in the supply management programs. Nonetheless, low commodity prices are expected to continue for the next two to three years, barring natural events that would drastically reduce the supply of agricultural products, such as poor weather conditions.

Another major trend in U.S. agriculture is the “industrialization” or market consolidation that is occurring in selected sectors of the industry. For example, thirty years ago there were large numbers of independent broiler producers who produced products for local and regional markets. Today, however, the market is national and only a few “supply chains” serve these markets. This consolidation is achieved through producer cooperatives, vertical integration of food processors, and alliances among producers and processors. In this “new” agriculture, contract growers raise broilers in a highly controlled environment and under very specific instructions. This highly controlled production process is used to guarantee the consistency and quality demanded by consumers. Contract production is also designed to keep highly automated processing plants running at full capacity. This integration of production and processing has reduced the number of companies in the U.S. that are currently growing broilers to 47, and the top 20 companies account for more than 85 percent of the production. Furthermore, the top three companies account for more than 40 percent of the production.

Other sectors of agriculture are also experiencing some degree of consolidation, and experts believe that the trend toward consolidation will continue in some areas of agriculture, such as in hogs, in dairy, and perhaps in processed row crops. However, few sectors are expected to reach the level of consolidation achieved in the broiler industry because the economies of size in other agricultural sectors are not strong enough to achieve the same type of efficiency.

Taxation issues have plagued agriculture for many years. The two most troublesome taxes have been estate taxes and property taxes. High federal and/or state estate taxes have made it difficult to pass farms from one generation to the next within a family. Often, part of the farm must be sold to pay the estate taxes. Federal estate tax laws were modified in 1997 to reduce some of the problems related to keeping the farm in family ownership. Property taxes are another burden on agriculture, which by definition, is a land intensive activity. Taxing land at its “highest and best use” is problematic for agriculture because the rate of return on land used for agricultural production is much lower than that for more intensive uses, such as residential and commercial development. Many states have passed “use value” assessment legislation for agricultural land, whereby the land is taxed on its current value in agricultural production rather than on its potential development value. This reduces the tax burden on agriculture, but does not eliminate it because of the large amount of land owned by farmers.

Although farmers are generally good stewards of the land, they continue to face environmental issues. Soil erosion and the run-off of animal waste, chemical fertilizers, and pesticides are all forms of non-point source pollution associated with agriculture. Farmers have taken many steps during the last 20 years to reduce these problems, including reduced tillage, better cover crops, improved manure handling systems, and reduced use of chemical fertilizers and pesticides. More needs to be done, however, and further progress in the immediate future will be influenced by the profitability of agriculture.

Finally, food safety is another issue facing agriculture. Although U.S. food is considered to be the safest in the world, occasional outbreaks of food-borne diseases continue to occur. Producers and processors are continually seeking better methods to reduce the risk of food-borne illnesses and to make food even safer. The current controversy related to the health and environmental effects of genetically engineered food products is another example of the complex health and environmental issues facing the agricultural sector.

Maine Trends

As one would expect, Maine agriculture is experiencing some of the same trends as U.S. agriculture; however, there are important exceptions that should be noted.

Like the agriculture in the rest of the U.S., Maine agriculture is experiencing financial difficulties. For example, the net profit margin of Maine agriculture (net farm income as a percent of gross farm income) has declined steadily from about 30 percent in 1950 to only about 10 percent in 1998. This means that the amount of money a farmer has to reimburse family labor and management expertise and to provide a rate of return on the large capital investment in the farm is only about ten cents out of every dollar the farmer receives in gross revenue. Low commodity prices are generally to blame for the problem. In addition, Maine has higher production costs for some commodities than other states. Low profitability can halt progress on other issues, such as environmental improvements, as farmers are forced to cut expenses to survive financially.

On the other hand, Maine differs from the U.S. in terms of the trends in the number and the average size of farms. Nationally, the downward trend in the number of farms is continuing, while the average size of farms continues to increase. In Maine, however, the number of farms in 1997 was essentially unchanged from 1987. Furthermore, the average farm size has decreased in recent years. The average size of a Maine farm peaked in 1974 at 237 acres per farm. In 1997, the average farm size in Maine was only 184 acres, 22 percent smaller than in 1974. About two-thirds of Maine farms have fewer than 180 acres.

Several factors contribute to the smaller farm size and stable farm numbers in Maine. One factor is an increase in the number of small, part-time farms. Today, fully half of Maine farmers derive the majority of their household income from sources other than farming. Another factor is that Maine farms are becoming more diversified. Rather than relying on a single commodity (such as potatoes or milk) for the bulk of their income, many farms are growing several different crops. Diversification reduces the financial risk and may also offer environmental benefits as land is placed in crop rotations. Diversification often results in the production of higher-value crops and more labor-intensive farming operations as well.

One of the interesting facts about Maine agriculture is that a bimodal size distribution is developing. In their attempt to survive, farms are either becoming larger, or are becoming smaller, more diversified operations. Hence, medium-sized farms are disappearing. This has implications for the Maine Agricultural Center and its programs. The Center needs to be positioned to serve two types of agricultural enterprises in the future: smaller diversified (and part-time) farms and larger, specialized, commercial farms that still concentrate production in one or two commodities.

Maine's agriculture is also quite diverse in terms of the types of commodities grown. Potatoes, dairy, and eggs continue to be the three major agricultural enterprises. Other enterprises are growing rapidly, however, including aquaculture, nursery and greenhouse products, and wild blueberries. Other important agricultural products include fruits and vegetables, and livestock, including beef, sheep, hog, and even deer and elk. Production practices are also quite diverse. A growing number of farmers are using organic production methods and others are implementing other sustainable production systems. The Maine Agricultural Center must provide research and extension education programs that serve the full array of production systems being used and the wide variety of products grown in the state. It must also find ways to serve the needs of emerging and growing segments of the agricultural sector.

These differences between Maine and U.S. agriculture also have implications related to the potential for market consolidation in Maine agriculture. Consolidation occurs through specialization; therefore, the trend toward diversification in Maine suggests that large amounts of consolidation probably will not occur in Maine agriculture. It should be noted, however, that egg production in Maine is already highly concentrated, and MAFES has eliminated its poultry research as a result of that concentration. Large supply chains rely on their own research and do not look to public institutions to provide it. There will continue to be consolidation in Maine agriculture as reflected by larger farm sizes in some commercial sectors such as dairy, potato processing and perhaps blueberries. However, Maine agriculture will not see the level of consolidation that is occurring in other parts of the U.S.

An important issue for Maine is a need to increase market opportunities for Maine agriculture. Maine lacks key infrastructure facilities needed to provide marketing opportunities. For example, Maine has limited meat slaughtering and processing facilities and grain milling capacity, both of which hinder the growth of the livestock sector in Maine. Maine also needs to expand both on-farm and off-farm processing capabilities so that value can be added to the raw products produced in the state. The lack of infrastructure forces farmers to seek individual solutions, which makes it difficult to penetrate the larger marketing opportunities, such as the supermarket chains that operate in and outside Maine. At the same time, the agricultural sector needs to develop strategies that allow it to take advantage of consumer perceptions that Maine produces high-quality products, and the propensity of Maine consumers to purchase locally produced items.

Maine has been a leader in environmental issues, and this is true for Maine agriculture as well. For example, Maine has been a leader in the development of sustainable agricultural practices that protect/enhance soil quality and minimize negative environmental impacts. Maine has also been a leader in the adoption of integrated pest management practices. While substantial progress has been made in the environmental area, new challenges exist, including effective nutrient management programs for livestock operations, continued minimization of reliance on pesticides and chemical fertilizers, and development and adoption of irrigation methods that preserve the long-term viability of Maine's surface and groundwater supplies.

Finally, it should also be noted that Maine agriculture's future is intertwined with a wide array of social issues, including changing consumer preferences, government policies and taxation issues, and competition for scarce resources. Consequently, the Maine Agricultural Center needs to be prepared to conduct research and extension education programs that address broader policy issues. Policy analysis will be a crucial factor in the years ahead. For example, urban and suburban sprawl affects agriculture by raising land prices and property taxes. On the other hand, agriculture can be a key component in a program to reduce sprawl and preserve open space. Policy analysis on these types of issues is important to the future of Maine agriculture.

University Outlook and Trends

As noted above, the University of Maine has a long history of serving agriculture. Both UMCE and MAFES have had ongoing programs to support agriculture for many years. University research and extension education programs have assisted agriculture in many ways, including the development and implementation of cultural practices that tripled blueberry production over the last 20 years, the introduction of integrated pest management programs, integrated cropping systems and procedures to enhance soil quality for all farmers. Furthermore, the current programs provided by UMCE and MAFES address key issues facing the industry, such as nutrient management, food safety, improved cultural practices and marketing and policy issues.

During the first half of the 1990s, the University of Maine experienced six years of budget cuts. These cuts were related to the national economic recession that occurred at the start of the decade and was more prolonged and severe in Maine. This resulted in a substantial decline in state tax revenues and the need to cut state expenditures. Both MAFES and UMCE experienced substantial cuts. In the case of MAFES, the cumulative effect of the cuts was an overall reduction of about \$1.7 million in state funding. Similarly, UMCE incurred budget cuts of about \$1.0 million during the time period.

One of the methods used to implement the budget cuts was to not fill personnel positions, as they became vacant. Hence, individuals who retired or accepted positions elsewhere were not replaced. This resulted in a reduction in MAFES and UMCE positions between 1990 and 1997. This situation still exists to some extent today. It should be noted, however, that while the budget cuts had a significant impact on agriculture-related programs, other programs within the University also were severely affected. Over the last two to three years, MAFES has refilled many of the positions that were vacated earlier in the decade. However, UMCE has not been able to fill as many of the positions lost during the period of budget cuts. UMCE has a broad scope of programs and agriculture is one of them; however, all program areas are facing critical staffing needs.

The current situation for the University is much brighter than a few years ago. This is due, in large part, to the legislature's passage of the R&D initiative for the University System.

Because of this initiative, MAFES received an increase in base funding of about \$958,000 in FY1999 and another \$150,000 in FY2000. A portion of these funds was allocated to the agricultural research programs supported by MAFES and administered by the Maine Agricultural Center.

Unfortunately, UMCE has received a much smaller amount from the R&D funds. UMCE did not get any increase in base funding through the R&D funds in FY1999. UMCE did receive one-time R&D funds of \$16,000 and \$17,000 of base funds from the Provost's Office. It also received \$50,000 from the state legislature through the University System specifically for cranberry work. In FY 2000, UMCE will receive \$220,000 in one-time R&D funds. Without an increase in base funding, it has been more difficult for UMCE to replace the agriculture-related positions and resources lost through budget cuts earlier in the decade.

In terms of future outlook, the funding level for MAFES and UMCE depends on many factors. Barring another recession and a reduction in state revenues, funding for both units should remain relatively stable. However, federal funding for both MAFES and UMCE has seen a greater emphasis on competitive projects with base funding remaining level. The long-term result on the University of Maine is unknown. Any increases in future state funding will depend on University funding priorities. Both UMCE and MAFES will request additional funding and will work within the University structure to obtain their share of any future funding increases for the University. Both units also will continue to request additional resources from the R&D funds.

APPENDIX B:
RESEARCH AND EXTENSION NEEDS: RESULTS OF A
SURVEY OF MAINE AGRICULTURAL GROUPS

Maine Beef Industry Council/Maine Beef Producers Association:

1. Extension livestock specialist.
2. Reclaim market share for Maine-grown beef.
3. Finishing dairy beef.

Maine Cranberry Growers Association:

1. Need research on root rot.
2. Evaluate a new design for bogs that require less water. Such a system exists in Maine and needs to be evaluated.
3. Maintain cranberry extension specialist for industry.

Maine Dairy Industry Association:

1. Need research on the production and feeding of roughage and concentrates for dairy cattle (feed and forage trials).
2. How marketing and value added can be used to increase milk prices.
3. Improve food safety: more effective and efficient cleaning of on-farm equipment, workshops on antibiotics and impact on milk safety.
4. Financial planning workshops.
5. Environment/land issues (nutrient management, need current use taxation of land).

Maine Dairy Promotion Board/Maine Dairy and Nutrition Council:

1. Additional extension nutrition educators to offer dairy-related nutrition programs.

Maine Deer and Elk Farmers Association:

1. Nutritional needs of four farmed deer species (most effective types of feeds, feed conversion studies, costs of feeding deer).

Maine Equine Industry Association:

1. Research and education on production of horse quality hay—both nutritional and respiratory disease aspects.
2. Waste management problems—nutrient management, composting and other technologies appropriate for suburban as well as rural area.
3. Educational programs that promote equine small business—business startup, equine facility design, marketing equine agriculture as a tourism business (trail rides, equine competitions, camp horses).
4. Nutritional management of horses.
5. Disease prevention and management.
6. Identification and eradication of poisonous plants in forages and pastures.
7. Equine-related 4-H and FFA programs.
8. Animal welfare as related to horses.

9. Economic impact study of equine industry.
10. Extension equine specialist.

Maine Farm Bureau:

1. Support research and extension activities related to insect control in blueberries; favor increased emphasis on harvesting and marketing of blueberries and less emphasis on production.
2. Support research and extension activities related to use of genetic engineering in agriculture; conduct research/extension programs related to *Bt* corn for use in Maine.
3. Support continued extension activities related to cranberry production in Maine.
4. Support use of chemicals in agriculture and the continuous scientific appraisal of chemical residues where appropriate.
5. Support continued federal funding of potato research, continued funding for UMaine potato breeding program, support potato industry notification prior to any personnel and program changes that affect direction of current research/extension programs or establishment of new programs.
6. Support increased emphasis of agriculture in extension programs, support at least 50 percent of extension's budget being allocated to furthering commercial agriculture in Maine.
7. Expand extension programs related to forest management.
8. Support continued operation of Blueberry Hill and Highmoor experimental farms.
9. Support the concept of placing Cooperative Extension under the Dean of the College of Natural Sciences, Forestry and Agriculture.

Maine Gourmet and Specialty Food Producers:

1. Need research/extension programs to improve efficiency and modernization of manufacturing methods.
2. Need to develop more packaging options—packaging important part of marketing and presentation. Need new packaging than captures consumers' attention and is cost effective.
3. Need help in developing and testing, and marketing new products.
4. Support a cooperative manufacturing plant that has modern production and packing equipment.
5. Hire an (extension?) entrepreneurial advisor with food science and marketing skills to work with industry.
6. Identify new food processing industries that can coordinate farm production with entrepreneurs.

Maine State Grange:

1. Uncertain about current research being conducted (need information on this); extension needs are being met inconsistently.
2. Women's programs widely used and are important part of extension.
3. Identify options for intergenerational transfer of farms so farmer can choose the one that fits their needs.

Maine Hog Producers:

1. Nutritional studies of hog rations to evaluate new feeds produced in Maine (including soybeans, small grains and waste agricultural products).
2. Education programs related to the genetics and breeding of hog production and programs to help farmers grade their hogs.
3. Shortage of slaughtering and processing plants limits markets and value added products.
4. Need help in getting meat from producer to consumer.

Maine Landscape and Nursery Association:

1. Research is done but results are not available to the industry.
2. Need research that gives producers a competitive advantage compared to big chain stores, such as research on native Maine plants that can be developed for commercial purposes.
3. Need report on the cold hardiness trial on *Chamaecyparis thyoides* that is underway.
4. Financial advice for small businesses.
5. All research on environmental issues is important to industry.

Maine Maple Producers Association:

1. Have not had research/extension assistance for years.
2. Need research on production efficiencies without sacrificing quality (new boiler designs, etc.).
3. Need genetic research to improve the genetics of trees that provide sap.
4. Need marketing help—new products, promotion, creating buyer/seller networks.
5. Food safety—need inspection program and testing for adulteration and other programs to insure safety and reputation of the industry.
6. Need study to measure impact of maple industry. Need programs to help producers cope with financial issues (profitability, capital needs, depreciation, etc.).
7. New pests becoming a threat to industry—need program to prevent introduction of these pests.

Maine Organic Farmers and Gardeners Association:

1. Focus on systems analysis. Need interaction among researchers and/or extension personnel; Potato ecosystem project good example of systems approach.
2. Look for biological solutions. Biological solutions in the form of botanical pesticides, predators, or crop or fertility interactions are highest priority.
3. Expand vegetable production research. Seen no long-term research focus on vegetable crops for several years.
4. More emphasis on grass for grazing and as a stored feed. More forage research needed.

Maine State Pomological Society:

1. Bring Highmoor Farm back to its glory days. Install modern, automated weather station at farm. Expand research/extension programs at farm.
2. Retain split appointment position of fruit specialist to conduct research and extension activities.
3. Research/extension programs on apple diseases.
4. Research/extension programs on alternative pest control strategies.
5. More advanced studies on IPM, nutrition, ground-cover management, irrigation trials, apple thinning trials and additional rootstock studies.

6. Food safety issues: Cider safety—alternatives to pasteurization, nutritional and residue analysis.
7. Seek additional funding for research/extension programs through task force approach.

Maine Potato Board:

1. Development of profitable rotation crops.
2. Improved soil quality and management practices to reduce plant stress and increase yields.
3. Pest management, including control of soil-borne diseases.
4. Seed management: impacts of physiological age, spacing, stem populations, seed size.
5. Breeding to develop new varieties for specific end uses, disease resistance, and market niches.
6. New production techniques.
7. Irrigation—especially irrigation timing and its effect on tuber quality.
8. Cost control, including production, processor and marketing costs.
9. Development of value-added uses for potato, including market niches and uses for off-grade potatoes.
10. Development of export markets.
11. Determination of consumer preferences to meet market demands.
12. Storage technologies for optimal energy efficiency, disease control, sprouting control, and overall tuber quality.
13. Timely market information.
14. Investigate and possibly move the Seed Potato Certification Lab to the Experiment Station.

Maine Sheep Breeders Association:

1. Extension livestock specialist.
2. Improve infrastructure of existing enterprises—slaughterhouses, processing plants, transportation system; intertwine crop and livestock enterprises (feed for livestock, organic matter for crops).
3. Programs on production costs for different markets—break even prices for different markets (weights at slaughter) better record keeping.
4. Program outlining how genetics affect costs and returns.
5. Determine cost effectiveness of out-of-season lambing, accelerated lambing and wool sheep vs. hair sheep.
6. Determine feed value of Maine grown feed products.

Maine Sustainable Agriculture Society:

1. Crop varieties that extend marketing seasons.
2. Cover crops in terms of nitrogen production and availability.
3. Effective crop/livestock integration.
4. Nutrient management.
5. Vegetable varieties with more emphasis on pest management and less on appearance and yield.
6. Animal breeds most appropriate for integrated systems, breeds for health, maintenance and yield, bees/insects for fly control in enclosed areas.
7. Economics of sustainable systems, including questions of scale and integrated strategies, optimum mix of crops and size, how do margins in integrated systems compare to specialized systems?

8. Rotation crops to replace continuous corn production.
9. Evaluate dairy breeds in anticipation of component pricing.
10. Testing seed for maturity date.
11. Phosphorus take-up in anticipation of nutrient management rules.
12. Manure separation—separate solids from liquids and best use of solids.
13. Training for insect scouts.
14. Appropriate grain/forage combinations with potatoes considering various livestock grown.
15. Better forage mixes needed for grazing.

Maine Vegetable and Small Fruit Growers Association:

1. Two new positions: 1 FTE of research and 1 FTE of Extension; both would be split appointments.
2. Weed Management tools and methods.
3. Alternatives to current pesticides.
4. IPM practices.
5. Vegetable variety trials and screening.

Mid-Maine Greenhouse Growers:

1. Unbiased trials and evaluation of new pesticides.
2. Greater input on the cultivars being tested at Rogers Farm.
3. Need additional extension specialists to work with industry.
4. Recycling program for plastic containers.
5. More information and testing of native Maine products for the industry.
6. Need more representation on BOA.

Wild Blueberry Commission:

1. Fertility research based on micronutrient needs.
2. Weed, insect and disease management based on IPM/ICM approaches.
3. Pollination research.
4. Determine cold tolerance.
5. Optimum water use requirements.
6. Three levels of ICM demonstration at Blueberry Hill Farm.
7. Methods to remove berries damaged by fruit flies from processing line.
8. Food safety.
9. Health benefits of wild blueberries.
10. Market studies.
11. Renovate main building at Blueberry Hill Farm and expand irrigation capability.
12. Extension position in food science to assist small value-added processors.

Maine Agricultural Center Long-Range Plan Update December 2003

I. Introduction

In January 2000 the Board of Agriculture submitted a report entitled “Maine Agricultural Center Long-Range Plan” to the Maine Legislature. The report fulfilled a legislative requirement that a long-range plan be developed for the operation of the Agricultural Experiment Station and Cooperative Extension agricultural programs, including plans for the research farms, joint research/extension appointments for faculty, and close coordination of the research/extension needs of each agricultural commodity in the state. Because the newly-formed Maine Agricultural Center (MAC) was designed to address the types of issues requested in the legislative report, a long-range plan for MAC was developed to guide its activities during the early years of its existence, as well as to provide the Legislature with the information it had requested.

Since the report was completed three years ago, substantial progress has been made in addressing many of the issues that were highlighted in the report. Furthermore, new issues have emerged that require the attention of MAC, Cooperative Extension (UMCE) and the Maine Agricultural and Forest Experiment Station (MAFES). As noted in the initial plan, agriculture is a dynamic industry that is continually changing. Arguably, that change is occurring more rapidly in Maine than in many other states. Hence, new issues are becoming crucial to the industry.

The ultimate purpose of this update of the MAC long-range plan is to identify the key issues that the MAC, UMCE and MAFES should address to provide maximum benefit to the agricultural community over the next 3-5 year time period. To accomplish this, two types of information will be presented. First, some of the accomplishments related to issues addressed in the original plan will be reviewed to provide an overall view of the activities undertaken and the progress that has been achieved. Issues that have not been addressed will also be noted as they may continue to be priority items. Second, some of the newly emerging trends and issues will be presented along with the implications they have for Maine agriculture. Based on this information, the issues to be addressed will be identified and prioritized with the input of the Board of Agriculture. Plans will then be developed to address the selected issues.

Section II of the report contains a discussion of the issues addressed over the last three years and the items accomplished. Items that have not been addressed are also noted. Section III outlines the current issues and trends that are influencing Maine

agriculture. Finally priorities and actions to be taken to address the issues are discussed in Section IV of the report.

II. Past Progress and Current Status

Maine Agricultural Center

Although the formation of the Maine Agricultural Center (MAC) predates the original long-range plan, it has played an important role in the accomplishments of the last few years. This is a testament to the foresight of individuals who served on the Chancellor's Task Force on Agriculture in 1998 and suggested the formation of such an organization within the University System. The Center was formed during the winter of 1999 and has worked to address many of the issues related to the University's role in the agricultural community.

MAC fulfills several important needs. For example, it provides a unified, highly visible focal point for the University's agricultural research and extension programs; it also enhances the University's ability to deliver educational and research programs to the agricultural industry and to respond in a timely manner to emerging needs. Finally, MAC enhances communication and coordination between the University of Maine and the agricultural industry, as well as between MAFES and UMCE. All of these actions contribute to the overall goal of MAC, which is to insure that the agricultural community has access to the research and extension education resources needed to operate profitably in the competitive agricultural environment. Currently, over 90 faculty and extension professionals are members of MAC and are committed to this goal. Hence, the development of the Maine Agricultural Center is one of the major accomplishments made possible by the closer working relationship developed between the University System and the agricultural community during the late 1990s.

While the Maine Agricultural Center is operating effectively, like every other organization, there are additional roles that it could undertake. One is to assume a larger role in encouraging and coordinating efforts to seek large integrated research/extension grants through the U.S. Department of Agriculture (USDA), especially the Cooperative State Research, Educations and Extension Service (CSREES). If successful, these efforts would provide additional funding for agricultural research and extension education activities at the University. Another is to complete the task of insuring that faculty at other UMS campuses with an agricultural-related educational/research interest become members of MAC.

Crucial Research/Extension Positions

Another area in which there has been major progress in the last three years is in filling several key faculty positions related to agriculture. MAC and the Board of Agriculture conducted a survey of all known agricultural groups in Maine during 1999 to identify needs related to agriculture. Based on the information obtained from

the survey, the Board of Agriculture identified five high-priority faculty positions that were needed to serve the immediate needs of the industry. They are:

- 1) An extension/research position to work with the vegetable and small fruit growers;
- 2) An extension/research position to work with the ruminant livestock industries of Maine, including, beef, sheep, and the growing red deer/elk industry;
- 3) A teaching/research position in entomology to conduct integrated crop management research to serve the plant industries of Maine;
- 4) An extension/research position in food science to work on food safety and value-added food product development; and
- 5) A research/teaching position in plant pathology to supervise the operation of the seed potato-testing laboratory and to conduct research on plant diseases.

After identifying the positions, representatives of the Board of Agriculture, UMCE and MAFES met with the higher administration of the University and obtained a commitment to fill most of the positions. Currently, four of the five positions have been filled. The vegetable position is 75% extension and 25% research, and the livestock position is 80% extension and 20% research. The entomology position is 50% teaching and 50% research.

The plant pathology position was redesigned and filled as a part-time professional position. The incumbent is operating the seed potato-testing laboratory and is doing an excellent job. The research component of the plant pathology position became less important when the USDA Agricultural Research Service hired a plant pathologist to work on diseases associated with crops grown in Maine and New England.

Hiring a person to fill the food science position was postponed by University administration, but a search to fill the position was initiated during the summer of 2002. A person was selected for the position and she accepted it but recently decided to not come to Maine. Consequently, another search is being initiated to fill the food science position.

In 2001, the Board of Agriculture again identified faculty positions that were crucial to the industry. Those identified include the food science position discussed above, a research/extension position in farm management, a teaching/research position in quantitative genetics to work with the potato-breeding program, and a teaching/extension position in ornamental horticulture. Searches are underway to fill the first three positions. Specifically, a second search to fill the food science position is currently underway; the farm management position is being filled with grant money from the Risk Management Agency in combination with some Cooperative Extension base funding. A more secure funding source is needed to insure the long-term

existence of that position within UMCE. The quantitative geneticist position is base funded in the College/Experiment Station through the College's genomics initiative, and a search is underway to fill the position. No action has been taken on the ornamental horticulture position at this time because of the uncertainty surrounding current and future levels of funding for the College and the University as a whole.

Research Farm Facilities and Infrastructure

Land and facilities are needed to conduct the agricultural research and extension activities needed by the Maine agricultural community. MAFES farms provide space and resources needed to conduct that work. The farms are also crucial to the success of research and extension faculty in obtaining competitive grants from USDA and other federal agencies. The USDA and other agencies expect the University to have modern, up-to-date farms and equipment that can be used to conduct the research and extension projects they fund. Consequently, it is very important to maintain and continually update the facilities and infrastructure at the research farms to insure that the University is competitive for external grants and contracts, and to insure that the research/extension programs needed to assist the agricultural community can be conducted at the farms.

Given their importance, substantial improvements have been made at the research farms in recent years. Furthermore, the operating budgets of each of the farms have been augmented over the past five years as well, providing about a 40 percent increase over the funding level received in 1998. Some of the specific improvements and current needs are summarized here for each farm.

Aroostook Farm: Much of the work at Aroostook Farm has been done to correct safety problems. Electrical wiring has been upgraded, and significant work has been done to improve the electrical and heating system of the greenhouse. New potato-sorting areas have been constructed and remodeling of the utility building resulted in additional workspace. Some new equipment has been purchased for the farm, but much more is needed, including new tractors, and potato harvesters. Currently, the two most important needs at Aroostook Farm are a new greenhouse and a new grain storage facility. The current greenhouse, built in the 1940s, is in very poor condition, inefficient to operate, and insufficient to support modern research. The current grain storage facility is a safety hazard and not designed to work effectively.

Blueberry Hill Farm: A new well has been drilled at the farm and will be operational this spring. This will make it possible to irrigate all the farm's blueberry fields. Computer and telecommunications systems between the farm and campus have been upgraded and additional land has been leased to accommodate additional research and extension education demonstration plots. The main building at the farm has been evaluated and cannot be renovated to provide the needed services at the farm. Therefore, the highest priority at Blueberry Hill is a new building to house two field laboratories, a farm shop, meeting space and offices. Efforts are underway to

identify sources of funding that could be used to construct the new building. Funding of \$112,500 has been obtained through the federal government, but more is needed.

Highmoor Farm: All of the roofs have been repaired or replaced, along with the heating system for the main building. Office space has been renovated and a conference room has been added. A new orchard has been planted and some of the old orchards have been removed. A new well for irrigation was drilled, but no water was obtained at a depth of 900 feet. Another well will be drilled in another location this summer. The equipment storage building has been demolished and a new building will be constructed during the coming year. Perhaps most importantly, the amount of research and extension work taking place at Highmoor Farm is increasing. A second small fruit/vegetable specialist has been stationed there and the Compost School has relocated to Highmoor Farm. The Farm has also entered into an agreement with the Maine Chestnut Association to establish a Chestnut nursery at Highmoor. Current infrastructure needs include the planned equipment storage facility, and renovation of the cold storage facility.

Witter Center/ Rogers Farm: A new barn with a large-animal handling area and a calf barn were constructed at the Witter Center; horse stalls, shelters, and an equine outside riding arena also have been built. Several pieces of new equipment have been purchased, including a rotary mower, milk tank, tractor, and feeding wagon. At Rogers Farm, the old storage barn was torn down, as it was a safety hazard. A new pesticide storage and mixing facility was constructed at Rogers Farm. Current needs include a multi-purpose indoor livestock arena and remodeling of the bunk silos used to store feed for the dairy herd at the Witter Center. The arena would be used for teaching, research and extension activities, and would be partially funded through private donations. A new storage facility (with bathrooms) is needed at Rogers Farm and tractors and other equipment are needed at both locations.

Roger Clapp Greenhouses/Lyle E. Littlefield Ornamentals Trial Garden: All the mechanisms that open and close the ridge vents and other parts of the ventilation system have been replaced in the greenhouses, and new benches have been constructed to expand research space. At the Littlefield Garden, a security fence has been built around the public viewing part of the Garden to protect the holdings from deer and other wildlife. A golf green has been constructed to test different varieties of bent grass for cold tolerance and hardiness for use at Maine golf courses. The Maine Golf Course Superintendents Association assisted with the construction of the green. Current needs include providing electrical service to storage garage/shop and replacing the fence around that part of the Garden that is not protected by the new fence.

In summary, substantial progress has been made at the research farms in recent years; yet much more needs to be done. Some of the high-priority current needs are summarized in Table 1. New sources of funding are required to make the improvements noted above. One possible source of new funds is the various bonds sponsored by the state or the University System. Examples include state research and

development bond initiatives, economic development or “jobs” bonds and bond initiatives proposed by the UMS. For example, the research farm needs identified in Table 1 were suggested for inclusion in the recent jobs bond. Although none of the Table 1. Summary of Infrastructure Needs at the Research Farms.

Aroostook Farm: Replace Greenhouse and Grain Storage Facility	\$140,000
Blueberry Hill: New Building to house Laboratories, Shop, Meeting and Office Space	\$900,000
Highmoor Farm: Renovate Cold Storage Facility	\$60,000
Witter Center/Rogers Farm: Multi-purpose Livestock Arena Equipment Package Improve Feed Storage Facility Storage Barn with Bathrooms	\$1,250,000 \$100,000 \$65,000 \$85,000
Lyle Littlefield Ornamentals Trial Garden: Fencing and Electrical Service for Shop	\$50,000
All Farms: Irrigation Equipment	\$200,000
Total:	\$2,850,000

farm needs were originally included in the jobs bond, the efforts of members of the Board of Agriculture and the Senate Chair of the Appropriations Committee and other Legislative members were successful in including \$1.0 million in the bond package to address the infrastructure needs of the research farms. Now that the jobs bond has been passed, the \$1.0 million will be used to complete some of the projects outlined above. Obviously, not all the projects can be undertaken since the total cost of all the projects outlined above is estimated to be \$2.85 million. The effort to identify other sources of funding will continue.

Finally, it should be noted that very few of the accomplishments noted above, including those at the farms and the new positions that have been filled, could have been accomplished without the infusion of Research and Development funds that the Maine Legislature appropriated, beginning in 1999. Without this new source of funding, the money needed to undertake and complete these actions would not have existed. The agricultural community, the University, UMCE and MAFES are appreciative of the Legislature and the individuals and groups that made these funds a reality.

III. Current and Emerging Trends

Agriculture and the realm in which it operates are constantly changing. Consequently, new issues develop quickly that need to be addressed. Some of the larger issues facing Maine agriculture currently are long-term profitability, sustainable water use or irrigation and biosecurity. These issues are multi-faceted and are considered in more detail in this section of the update.

Enhance the Profitability of Maine Agriculture

From an economic perspective, agriculture is a perfectly competitive industry that produces homogeneous products; prices for these products are determined through world/national/regional supply and demand parameters, depending on the product. Competitive markets of this type place the grower or producer in the position of price taker. That is, the price for the product produced is set in the market and the individual grower must “take” or accept that price. Hence, the only way the grower can improve his/her financial situation is to reduce unit production costs by becoming more efficient in the production process. If market prices stay constant, and the grower is successful in reducing operating costs per unit, the net returns to the producer are enhanced. However, efficiency gains and lower production costs eventually result in even lower prices for the product, thereby placing the producer in the continual cost-price squeeze that has become a trademark of agriculture. In the long run, it is the consumer, and not the producer, that reaps the benefits of more efficient production methods in the form of lower prices for their food. This explains why Americans spend a smaller portion of their income on food than people in any other nation.

Agriculture has faced the cost-price squeeze for many years, and it is one of the factors that have contributed to the large decrease in the number of farms in the U.S. since World War II. With the exception of a few years in the 1970s, the pressure on U.S. farms to reduce production costs as a way of surviving falling relative and even real product prices has been great. Currently in Maine, the dairy industry is in a serious cost-price squeeze, but the problem exists in other commodity areas as well. For example, the current price for wild blueberries is below the cost of production; hence, growers are incurring financial losses on their current crop. The potato, beef, pork and other agricultural industries in Maine and the nation have faced similar situations in the past. Solving this problem for Maine farmers is not easy, because the root causes extend well beyond state borders and, indeed, U.S. borders for many agricultural commodities.

However, there are some things that can be done to change the current situation and to improve the chances that agriculture can continue as a profitable endeavor in Maine. Some of those steps are noted below.

One possible set of actions revolves around ways to modify the market environment so that individual growers have some level of control over the price they receive for

their products. That is, growers need to be able to set or at least influence the price they receive for their products. One way to do this is to make the switch from “commodity” agriculture where all products are considered homogeneous, to “product” agriculture where the growers differentiate their product in some way from that produced by most other growers. By differentiating the product, or making it somewhat unique in the eyes of the consumers, growers gain some level of control over the price received for their product.

There are a number of ways farmers can differentiate their products from those produced by most other growers, such as using special production techniques (e.g. organic), value-added processing after harvest, and marketing the product in a way so that consumers perceive the product to be substantially different to that available elsewhere. Arguably, Maine is farther along in the transition from commodity agriculture to product agriculture than many other states. However, more effort in this direction is needed and can occur at the state level (through programs to make Maine products appear unique in local and out-of-state markets) and by individual growers as they undertake steps to differentiate their products. One of the primary reasons that the food science faculty position discussed above is given such a high priority is that the person in that position is expected to work with growers to develop new products, and the value-added processing associated with the new products, and to help people “scale up” their small operations to a commercial scale. Product development and value-added processing are considered to be key factors in Maine’s continued transition from commodity to product agriculture.

One thing is sure: product agriculture changes the nature of product development, marketing and customer relations, compared to these efforts in commodity agriculture. Hence, more research and educational programs related to marketing and product development for growers and producers is one way for the University to assist the transition. Product agriculture is not the answer for all farmers, but it is a piece of the solution to enhance the long-term viability of agriculture in Maine.

There is another major trend in the economy that may have implications for the survival of agriculture. Historically, markets have been characterized as the interaction of buyers and sellers involved in the exchange of products. That is, suppliers take products to market and sell them to anyone willing to pay the price determined by the market. Some have argued that buyers and sellers are being replaced by “service providers” and “people (or other firms) who access services”. This change is illustrated by the fact that many cell phone companies now give you the “product” (the cell phone) if you purchase the “service” (one or two-year service contract). Hence the product becomes secondary to the service. The same phenomenon exists in the transition from purchasing an automobile to leasing one.

What are the implications of this trend for agriculture? Perhaps it suggests again that marketing, product development, forging long-term relationships with consumers and diversification are important to survival and long-term success in product agriculture. In over simplified terms, even farmers who participate in direct marketing usually

produce for the “market” rather than for individual consumers. For example, a grower may produce sweet corn and beans because they are easy to sell at a “reasonable” price at the farmers’ market. An alternative approach is for the farmer to contact specific consumers prior to planting and offer to grow exactly what they want in the quantities they desire. By doing so, the grower develops a long-term relationship with his/her customers and the emphasis shifts from the production of the product to satisfying the needs of the consumer. Such a relationship also allows the grower to provide other services that may be desired by the consumer, such as compost for their flowerbeds or other services that mutually benefit both parties. This shift in emphasis from products to service is an important trend in the overall economy and it should be carefully examined to identify its implications and opportunities for product agriculture.

Another way to enhance the long-term viability of agriculture in Maine is to recognize and reward farmers for the other, non-market products that agriculture contributes to the culture and character of Maine. A good example of this is the pastoral settings and open space that agriculture provides in Maine. It is well noted that maintaining open space and rural settings is a valued “product” in Maine. Maine agriculture provides this “product” to the people of the state; however, there is no “market” through which growers are paid or compensated for this “product”, which is often referred to as a “non-market good”. It is conceivable that the value of the non-market goods provided by Maine agriculture exceeds the value of the agricultural products produced and sold by Maine farmers. The question then becomes one of devising socially acceptable ways to compensate growers for the “non-market goods” they provide. Obviously, this has to involve the state and/or federal government in some form.

Several tools are available to compensate farmers for the amenity values they provide. Purchase/Leasing of development rights and conservation easements are used to compensate farmers and to insure that the amenity values associated with agriculture are maintained. The Land for Maine’s Future program has funded the purchase of conservation easements of some agricultural land and could serve as a model for a broader program. However, these programs are expensive and rely on government funding at a time when state funding is highly uncertain. A reduction in property taxes is another mechanism through which farmers can be rewarded for the amenity values they provide. This may also require the state to reimburse the municipalities that lose property tax revenues through the program.

Nevertheless, work in this area should continue. Measuring the amenity value of agriculture and identifying policy options to compensate landowners for these values are two issues that should be pursued within the University.

Sustainable Water Development

For the vast majority of Maine farmers, irrigation was not an issue as recently as fifteen years ago. Maine normally receives abundant rainfall for agricultural

production; however, the geographic and temporal distribution of the rainfall during the growing season is highly variable. Lack of rainfall at critical times can affect both the quality and the yield of the crop, thereby adversely affecting the financial status of the farm. Furthermore, consumers, processors, and other intermediaries in the marketing chain are placing greater emphasis on product quality and consistency. Quality and consistency can be provided only if farmers have access to water for irrigation at critical times during the growing season when natural rainfall is insufficient to produce a quality crop. Hence, irrigation is becoming more of a necessity for many farmers.

However, a major increase in irrigation in Maine raises questions about the water sources available to supply the water. Again, surface and ground water are generally abundant in Maine, but are subject to shortages during extended periods of drought—the time period when the most water would be needed for irrigation. Furthermore, there is a lot of confusion on the preferred source of irrigation water among federal and state agencies. Some agencies seem to prefer the construction of irrigation ponds to reduce the amount of water utilized from rivers and streams; other agencies favor removal from rivers and streams over ponds that could alter wetlands. Farmers are often caught in the middle and are prevented from pursuing either approach. Finally, the listing of wild Atlantic salmon as an endangered species, and the concomitant requirement to protect and enhance habitat further complicates the irrigation issue Downeast.

Currently, the University has very few resources allocated directly to irrigation research and education programs; furthermore, the exact nature of the needs are neither well specified nor prioritized. However, a report prepared by the Maine Agricultural Water Management Advisory Committee suggests three types of needs the Maine Agricultural Center can address. One is the need for decision models to assist growers in deciding whether the investment in supplemental irrigation is a sound economic investment for individual growers. These studies would establish economic thresholds indicating when it is profitable to adopt irrigation for all the major crops grown in Maine. Research is also needed to more fully define the water needs of crops grown in Maine, including total water demand and the timing of water applications. Finally, there is a role for the University to identify and communicate ways to minimize the need for irrigation by enhancing the water retention capacity of the soil, and improving the efficiency of irrigation methods, thereby reducing the total quantity of water needed to meet irrigation needs in the state.

The Maine Agricultural Center will continue to elicit the needs related to irrigation and water use in Maine and then define and prioritize additional actions that should be taken to address these needs. Possible actions include new positions to conduct research and/or develop educational programs related to irrigation issues, and using existing personnel to develop and deliver new information about irrigation that is needed by the Maine agricultural community.

Biosecurity and Food Safety

Due to the events of 9/11, threats to the nation's food supply have received more attention throughout the country. Terrorist acts represent a real and ominous threat; however, new disease outbreaks through natural sources also threaten several of Maine's agricultural sectors. Recent outbreaks of Chronic Wasting Disease, Foot and Mouth Disease, Potato Wart and Potato Mop Top Virus in specific locations throughout the world illustrate the current threat level. Biosecurity for organic crops also is a concern with the potential contamination of organic crops by genetically modified varieties. University research continues to examine this and other related issues. While some steps have been taken to address the high threat level, much more needs to be done at both the MAFES farms and at commercial farms in Maine. MAFES and UMCE should be a model for the industry to address biosecurity issues.

Furthermore, the University is a source of research and information for the industry. The Animal Disease and Diagnostic Laboratory, the analytical laboratory and the Seed Potato Testing Laboratory are all important resources to identify potential disease threats and to prevent the spread of new diseases in the state. The University needs to continue to be at the forefront of agricultural biosecurity for Maine farmers, processors and consumers, and to partner with other state and federal agencies involved in biosecurity activities. In the very recent past University faculty have provided educational information, training sessions and individual consultations on biosecurity.

IV. Specific Actions

Based on the current situation and emerging trends, there are several actions that should be taken by the Maine Agricultural Center, the University of Maine Cooperative Extension and the Maine Agricultural and Forest Experiment Station. These actions are presented below under the following categories: programs, research farms, staff positions and specific actions that should be undertaken by the Maine Agricultural Center. We begin with program needs.

Programs

Given the current status of Maine agriculture and the forces acting upon it, there are several actions relative to profitability, sustainable water use, and biosecurity and food safety that should be taken. Actions related to profitability are presented first; these actions are related to the discussion presented earlier in the report. It is important to remember that Maine agriculture will always consist of both commodity agriculture and product agriculture. Consequently, the research and extension programs of the University must address the needs of both sets of growers. However, we suggest that the programs in the Experiment Station and Cooperative Extension both need to place greater emphasis on the needs of product agriculture. This belief is reflected in the actions outlined below.

- Continue to provide the research and education programs needed for growers to remain competitive in commodity agriculture.
- Provide research and extension programs to identify and exploit new market opportunities as selected farmers continue the transition from commodity to product agriculture.
- Offer educational programs in marketing, product differentiation, consumer relations, etc., to assist farmers interested in transitioning to product agriculture.
- Investigate current market trends in other sectors of the economy to determine their usefulness/impact on agriculture.
- Develop research and education programs to assist farmers to diversify, become brokers, form networks and transition to the role of service provider rather than commodity provider.
- Measure the value people place on the non-market amenity (open space, pastoral scenes, etc.) goods that agriculture contributes to Maine's culture and landscape.
- Design and evaluate options that will allow farmers to be compensated for the non-market amenity values they provide to the state.

Sustainable water use is crucial to the future of agriculture in Maine. Both commodity and product agricultural producers need access to water to produce the quality and consistency required in the marketplace. The University currently is not well positioned to assist the industry with water use needs. Hence, the University needs to take several actions to develop its ability to respond to industry needs:

- Work with growers and agricultural officials to determine the most important research and education programs needed to assist in the development of irrigation technology in Maine. (Note: Acquiring the resources to conduct the programs is an action item under "Staff Positions" above.)
- Assess the environmental consequences of developing alternative sources of water for irrigation.
- Develop decision models and delivery programs that will assist growers in evaluating the economic feasibility of irrigation for selected crops produced in Maine.
- Determine the total water needs of major crops grown in Maine and the timing of applications to meet these needs.
- Develop research and education programs that improve the efficiency of irrigation methods and that enhance the water retention capacity of the soil.

Prior to 9/11 and the outbreak of foot and mouth disease in Great Britain in 2001, biosecurity on farms and within the food supply chain were not high priorities in Maine or the nation as a whole. Now biosecurity is a high priority and an essential element in homeland security even though many people related to agriculture are uncertain of the steps that need to be taken to enhance biosecurity. Food safety in general continues to be an important issue related to food production in Maine. The following actions should be taken to address biosecurity and food safety issues in Maine:

- Develop a staff plan to maintain the operation of the Animal Disease and Diagnostic Laboratory in an era of declining budgets and the pending retirement of a key faculty member.
- Develop the education programs to inform the agricultural community of the types of actions that need to be taken to improve biosecurity on Maine farms.
- Develop education programs for growers and processors to insure that appropriate steps are taken to protect the food supply from biosecurity and food safety risks.

Research Farms

The research farms are crucial to the agricultural mission of MAFES and UMCE. Neither organization could achieve its goals without the farms. Consequently, it is important to continually improve the infrastructure of the farms and enhance their ability to support the types of research and education programs required by the industry. This is not an easy task, as it requires large sums of money to maintain a modern farm system. Nonetheless, updating and improving the farms is essential and is addressed in the following actions to be taken:

- Secure alternative funding to address the infrastructure needs at the experiment station research farms.
- Update and improve the research infrastructure at the research farms as quickly as possible (See Table 1).
- Insure that the research farms have the equipment required to perform the irrigation research needed by the various commodity groups in agriculture.

Staff Positions

Cooperative Extension and the Experiment Station have been fortunate to fill several key staff positions over the last 4-5 years, many of which are joint extension/research positions. These positions have filled many of the gaps that existed in agricultural

expertise in the two organizations. However, several additional steps are needed to respond to current needs in the industry.

- Fill the food science extension/research faculty position and the quantitative genetics teaching/research position by January 2004.
- Identify base funding to support the farm management/risk management extension position for the long term.
- Work with industry representatives to determine the type(s) of position(s) needed to provide the irrigation-related research and education programs, and hire the people to fill the positions.

Maine Agricultural Center

As noted in Section II, the Maine Agricultural Center has been successful in maintaining a good working relationship with the agricultural community and in helping provide better coordination between the Experiment Station and Cooperative Extension. However, there some specific actions the MAC should take to more completely serve its mission.

- First, membership in MAC should be extended to faculty at other UM System campuses who have an interest and expertise in agriculture-related research and education programs.
- MAC should take leadership to encourage members to develop at least one large, integrated research-extension project for external funding each year.
- MAC should take steps to insure that research results related to key agricultural issues are available in formats that are useful to decision makers and the general public so the results can be considered when making individual and collective decisions.
- Finally, MAC should take every opportunity to further increase the number of agriculture-related faculty who hold joint extension/research appointments.

For additional copies call or write



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The Maine Agricultural Center is a joint undertaking of the
Maine Agricultural and Forest Experiment Station and the
University of Maine Cooperative Extension

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