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University of Maine Board of Agriculture
5782 Winslow Hall, Room 101
Orono, Maine 04469-5782

February 13, 2004

Senator Bruce Bryant
Representative Linda Rogers McKee
Committee on Agriculture, Conservation and Forestry
115 State House Station
Augusta, Maine 04333-0115

Dear Senator Bryant and Representative McKee:

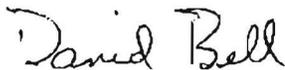
I am pleased to submit the updated Maine Agricultural Center Long-Range Plan to fulfill the requirement of the Board's annual report to the Legislature.

When the Legislature created the UM Board of Agriculture it required the Board to develop a Long Range Plan for agricultural research and extension at the University. This plan was presented to the Maine Legislature in January of 2000. In October of 2002, the Board met with the then new Chancellor, Joseph Westphal. As a result of that meeting, the Board decided to update the plan during 2003. The updated Long Range Plan summarizes the accomplishments to date, identifies current opportunities, and renews and updates the directions forward.

You will note from the updated Long Range Plan that a lot of progress has been made in recent years thanks to the support of the Legislature for agricultural and value added food research and development. We want to especially acknowledge the support of the Legislature, Governor, and the people of Maine for the inclusion of \$1 million in the spring "jobs bond" last year to address capital needs at the University research farms. Support of this infrastructure is critical in the pursuit and effective use of research and development grants that supports Maine's \$1.5 billion agricultural and food processing sector. Without the support of this Legislature and the hard work of individual Legislators, this investment would not have been possible.

I and members of the Board would be pleased to meet with the Committee at your convenience to briefly review the updated plan and answer your questions. Thank you again for your support of agricultural and value added food processing research and development.

Very Truly Yours,



David K. Bell, Chair
Board of Agriculture

*Re: sent to ACF Committee
4/12/04 in Augusta*

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, Education 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.