THE PINKHAM FARM PROJECT:

KEEPING OPEN THE AGRICULTURAL OPTIONS FOR COASTAL MAINE

A Summary of Activities
September 1975 - September 1978

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Appendices*

*These appendices are not attached but are available at the Coastal Resource Center.

INTRODUCTION

The five sections of this report summarize the activities of the Coastal Resource Center as it has considered the problems of conserving agricultural land along the coast of Maine. The overall project has addressed the issue where most of the land use decisions are being made: by members of town planning boards and by farm families themselves. The project has not attempted to explore commonplace solutions suggested elsewhere: preferential land use taxes, direct marketing schemes or transferrable development rights; instead it suggests that coastal farmers explore aquaculture as a source of supplemental income on salt-water farms, and secondly, that planning boards conserve agricultural land not be making direct concessions to farmers but by making available non-agricultural sites to residential and commercial developers. Indeed, this report and its detailed appendices must be taken as part of the whole discussion of the multi-faceted issue of agricultural land. Few people in Maine continue to think that the state will ever gain total agricultural independence from the rest of the nation; but more and more people are taking the issue of land conservation seriously, recognizing that the land can be husbanded in such a way as to produce a higher percentage of Maine's present agricultural demands. With that in mind, the Coastal Resource Center is happy to contribute a small parenthesis to the overall discussion.

SECTION I: Maine Agriculture, the Coast and the Pinkham Farm Project

Farming in the coastal area of downeast Maine has never been highly profitable. The land is rocky and except for small pockets, the soils run to clays laid down as sediment when this part of the continent was covered by the ocean. Nonetheless, the people of the land between the Gulf of Maine and the climax spruce-fir forests to the north have always managed to grow and husband agricultural products to meet some of their needs.

Beginning in the 1920's, Maine's rural areas lost population to the urban centers in New England. People were looking for ways to attain a higher standard of living, and even with Sears and Roebuck Co. catalogues, life on the farm couldn't deliver the variety of goods people wanted. This desire for bigger, better and faster was based in large part on the availability of cheap energy; even early profits of the oil barons did not seem to stop the headlong rush toward the promises of progress.

In the years after WW II, the New England salt water farm, by comparison to the operations by larger farms on the fertile midwestern plains, provided less and less of people's overall food needs. In the century after the Civil War, farms had been abandoned. By the 1960's some were being bought by speculative developers who saw the coastal land as potential recreational housing lots.

In the first years of the 1970's such speculation began to pay. Maine was within a day's drive of the megalopolis where people had more spendable dollars and leisure time than ever before. Lot plans were drawn on paper, sales were picking up. And towns faced with inflationary spirals in the cost of education and services began to see great potential in raising the needed revenues through property taxes.

The bubble burst in 1972. The oil embargo was followed by recession. People couldn't be sure of their income, let alone gasoline supplies. The bottom dropped out of speculative recreation lot schemes and the threat of large scale recreational development in Maine receded, at least temporarily.

The problem, observed within an overview of natural resource economics, stems from a basic supply and demand relationship. Land, as with any natural resource, has varying degrees of quality. The best land, with soils and slope which allow the best return on investment, is located and consumed first, leaving lesser quality sites for future use. Land good for agriculture is just as often good for other human uses: housing, transportation, commercial development and industrial siting. The use with the highest short-term return often outbids the others.

Thus, agricultural land in the downeast coastal areas is subject to many pressures, affected by national trends as well as local concerns. In response to these pressures the farm has received a good deal of attention from many levels of government and from the private sectors. In 1974, the staff and directors of Maine Coast Heritage Trust, a land conservation group, became involved in the issue as they talked to Carleton Pinkham, a farmer in Lamoine, Maine.

Pinkham owned and managed a 1,000-acre parcel of land which surrounded Partridge Cove, off the Skillings River. About half the acreage was in hay field, half in woodland. Mr. Pinkham raised hay with which to feed a small dairy herd. However, as costs of the operation increased and the price of milk remained the same, Mr. Pinkham made a gradual shift toward relying on non-farm income to support his family, until in 1974, he had sold most of his own cows. Instead, he grew hay for sale and boarded a few young cows.

In the early 1970's, a developer reportedly offered Mr. Pinkham $750,000 for his farm, intending to sell recreational housing lots. Having already sold a hundred-acre parcel for that purpose, Mr. Pinkham decided that he wanted to keep the rest of the land intact as one unit. But as a member of Lamoine's planning board, Mr. Pinkham saw several implications to the offer.

First, if land was being bought and sold for that kind of money, Lamoine could look to rising income from property taxes.

Second, if his land was worth that much, there was a chance that the town assessor would begin to value that land accordingly; the tax burden would force sale of the land, because there was surely not the income from the land with which to pay. Mr. Pinkham has already seen this happen to a farmer in a neighboring town.

And finally, as a result of this kind of pressure, farmland in Lamoine and other coastal towns would gradually be devoured by developers and spit out into postage stamp size lots demanding increased town services. Agriculture, even on the limited scale in which he was involved, would cease to become a viable use for land. The land, once taken out of farming, would probably never return. And as someone who knew farming, he found that objectionable.

Further east in Trescott, Alton Bell, another dairy farmer, had also seen the writing on his tax bills and had helped the Maine legislature see the benefits of a preferential tax on agricultural land. The Farmland and Open Space Tax Law of 1971 made it possible for owners of agricultural land to apply for lower assessments at tax time.

While a preferential tax rate may have helped Carleton Pinkham, Maine Coast Heritage Trust suggested a broader approach to the problem. Contacting extension and soils specialists at the University of Maine at Orono, they began discussions which eventually encompassed representatives from the College of the Atlantic and the Coastal Resource Center. A project was mounted, with funding support from the Coastal Resource Center and committments from the University. Since the tax problems had already been addressed, the project outline included the selection of alternative incomes to the owners of agricultural land, the importance of soils in decisions on land use, and an overview of land speculation and the costs for towns which choose to permit recreational development.

The project was begun in the fall of 1975. In the interim, investigators have fulfilled some of the original goals and discarded others. This report will attempt to summarize their findings and present recommendations which may give those concerned with conserving agricultural land - farmers, community officials, and legislators alike - a better base of information with which to make decisions.

SECTION 2: Rethinking Land Use Policies

One hundred years ago agriculture in Maine was very different than it is today. At that time, Maine imported a very small percentage of its food for consumption; most of commercial manures and all of the feed for livestock was available from sources within the state. Farms numbered over 60,000 and farm acreage was in excess of 6.5 million acres.

A century later, where is Maine agriculture? Only one farm in ten remains; only about twenty-five percent of the farmland is still in use; Maine imports seventy percent of its feed grains; and in a century, organic and commercial manures have been replaced to a large extent by fertilizers made up of petroleum based chemicals.

When petroleum was cheap, these changes were not without some logic. The farm had become much more productive, that is to say an hour of a farmer's labor yielded far more food than before and harming techniques and fertilizers had increased yields per acre. Despite fewer people working on farms, fewer farms and fewer acres, food production remained partially responsive to demands and the ease of transportation brought in to the state whatever else was desired by consumers.

Then petroleum was no longer cheap. Maine, as did the rest of the nation, was forced to scrutinize its patterns of consumption of goods, and subsequently of land itself. People looked around and wondered what would happen if higher transportation costs suddenly cut Maine off. "Where would we get our feed?" "How much food could Maine grow?" "Why was not Maine agriculture able to grow enough for our tables?"

And because only a small percentage of Maine people were farmers, very few people knew the answers. In the years since the oil embargo, however, "agricultural awareness" has risen along with interest in home gardening, and direct farmer-consumer marketing. Organizations such as Maine Audubon, the Maine Organic Farmers and Gardeners Association and others have questioned state and local policies on land and agriculture. The University of Maine and the Cooperative Extension Service have been challenged to find answers to questions about Maine's ability to move ahead towards agricultural sufficiency.

But one of the issues lay outside the realm of the agronomists, soil scientists and agricultural economists: the availability of farmland. Maine is covered by a vast forest stretching from the Allagash and St. John to the Gulf of Maine. Agriculture continues to be an important user of land in Aroostook County and central and western sections, but along the coast and near Maine's cities and larger towns, residential and recreational development have gobbled up active and abandoned farmland at an alarming rate. Although that phenomenon is ultimately controlled by the demand for land, or other so-called market factors, two important groups of people have more tangible linkages to that trend: the developers, and the people living in communities.

In the best of situations, the developers are aware of the wishes of the community and are bound by regulation and ordinance to comply. However, in the case more commonly found, the developers act in their own interest because the communities have failed to determine directions and parameters for growth and development. Developers and the people who buy houselots may take existing farmland out of production and most certainly diminish the agricultural productivity of any acreage used. And unless the communities take steps to the contrary, development also has a detrimental pressure on those acres which remain as productive farmland. Thus, while Maine's people have a growing awareness of the need for Maine to reduce the percentage of food imported for consumption in the state, the reality on the landscape is that development is reducing Maine's ability to move in that direction.

There is at least one current option open to a community which wishes to preserve agricultural land: Maine's current use property tax law for open space and farmland.

The prevailing property tax system is based on the principle of highest use. The taxes are levied according to the highest value conceivable. If the economics of agriculture show a particular income which can be derived from an acre of land in a particular section of Maine, then a farmer who wishes to expand his operation will spend $150 to $500 per acre, depending on the crop. If he pays more, his operation will not be profitable. A tax assessor, using the highest use principle, will look at that same land and figure that land could command from $1,000 to $2,500 from a developer, who could still turn a profit. And the tax will be collected on the higher valuation.

The Farm and Open Space Law provides for a current use property taxation. As we saw in the description of the highest use principle, the farmer pays property taxes on the potential use of land. The Farm and Open Space Law sets up a county by county range of values for farmland, based on farm productivity and what could be paid for an acre of land if a farm wanted to expand. However, the current use tax attacks only the symptoms of the problem. By reducing taxation, it is hoped that farmers will not have to shift their land to uses which bring a higher income per acre than agriculture.

The root of the farmer's dilemma is the soil below their feet. A profitable farm operation needs well drained, gently sloped soils with adequate texture and rooting depth. Those same characteristics are sought by those who would use the land for residential development. Therefore, even if tax pressures are reduced through current use taxation, as represented by the Farm and Open Space taxation option, farmland will continue to be a target of developers because of the suitability of those soils for construction of homes and septic systems.

Fortunately, towns already have at their disposal a powerful tool which can be used to remove the real pressures, and subsequently the taxation pressures. If a community wishes to support agricultural self-sufficiency and preserve farmland, it can use the work horse known as the comprehensive plan.

The overall resources, including soils and existing farmland, can be catalogued and decisions on future land use based on desirable rates of growth and

development. Just as a comprehensive plan can designate residential, commercial and industrial uses within certain land areas, it can also designate areas which should be used for agriculture.

In the past, this approach has met with opposition from developers who contend that soils in residential districts may not be as suitable for house construction as those found in agricultural districts. Not wishing to stop development entirely, communities have hesitated to create agricultural districts which would not allow residential growth. Towns require a new means of looking at soil resources which will allow preservation of agricultural land and growth at the same time.

SECTION 3: The Use of Soil Potentials in Land Use Planning

There is growing recognition that geology and soils are the basic building blocks for sound land use practices. While that has been a lesson somewhat earlier and better understood by farmers, environmental awareness has brought to the general public understanding of the relationship between soils and land use. And, as the state and individual communities require soils information in applications for new septic systems, there is legal precedence for soils to serve as the basis for decisions regarding various uses of land.

As the public became more aware of the importance of soils in making decisions on land use, soil scientists were already developing tools to allow better access to soils information. An extensive soils mapping or soils survey effort was undertaken by the Soil Conservation Service and is still underway. Based on that survey, state by state categorizations of soils were begun, resulting in guidebooks for suitability of each soil encountered for various uses.

In 1967 and 1975, the U.S. Soil Conservation Service, the Maine Soil and Water Conservation Commission, and the Maine Cooperative Extension Service published editions of their Soil Suitability Guide for Land Use Planning in Maine. Over five hundred soil types from the existing soil surveys in Maine were rated as to their overall suitability for agricultural, urban, industrial, recreational, forestry and wildlife habitat usages. Intended as a supplement to the information which can be gleaned from a detailed soils map by a qualified soils scientist, the guide provides a summary array of possible soil suitabilities to people planning land use and development.

Users of the guide begin by determining the soil types, and slope gradient for the land in question, either from soil survey maps or through an on-site investigation by a soil scientist, to compare against the proposed use. For each broad category of land use, the guide describes soil suitabilities for a variety of more specific uses. As an example, the section on urban and industrial uses contains ratings for septic sewage disposal, sewage lagoons, sanitary landfills, houses with basements, pipe and sewer lines, commercial buildings, cemetaries, and roads. The user couples information about soils, slopes and use and the guide rates suitability as good, fair, poor and very poor. These ratings are made with consideration of soil properties, impact to the environment and the ease or difficulty with which resultant hazards could be overcome with present technology.

In this way individual land owners, developers and members of town planning boards are able to judge the relative costs and impacts of a certain use on a particular piece of land. As a planning tool, a soils map and set of coloring pencils allow communities a step of sophistication. For instance, if a town beseiged by requests for subdivisions for housing development chose to color three maps, indicating the suitability of certain soils for septic systems, houses with basements, and roads, people in the town could see at a glance which of their lands were most suited for each use. Using overlayed transparencies a community could even depict which areas were best suited to all three uses, and therefore where housing developments could be located with the least environmental impact and cost to the builders and community as a whole.

However, if people in many towns do color town soils maps, a predominance of red would be evident; that color is generally used to depict those soils with very poor ratings for the uses in question. The limited area with a "good" rating is often the only land suited to agriculture. Quite understandably, this sets up a frustrating dilemma for the residents of those communities: with limited soils resources and competing uses, how are those resources allocated and to whose benefit. Left strictly to a "free market" situation, the use with the highest dollar return could be expected to win out over other uses. But as the concern grows for reserving some agricultural lands against a time when they might well be needed, people generally recognize the need for an approach other than allocating land use to the highest bidder.

Several researchers and soil scientists, using the Pinkham Farm Project as a focus, have developed the basis for such an approach by taking soils suitability guidelines one step further in a concept called soil potentials. Armed with an inventory of the soils found throughout their community, local planning board members can use the concept of soil potentials to balance the needs for their town's growth with the importance of agricultural land.

To understand the difference between soil suitability and soils potential, let us digress to include a synopsis of each from the report on soil potential included as an appendix to this report.

> SOIL SUITABILITY is a relative rating placed on a soil declaring how appropriate it is for a specific use. It is decided upon be examining pre-determined soil characteristics for a specific use and rating the soil characteristics for a specific use and rating the soil for the most limiting of the properties. For example, for use as pipe or sewer line installation, the soil characteristics examined are: drainage, slope, depth to bedrock, textural stability, flooding, surface stoniness and surface rockiness.

By contrast, soils potential ratings use tables of criteria in the suitability guide. SOIL POTENTIAL is concerned with determining the reason for the suitability rating and imposing modifications for improving soils conditions In other words, "Why does the soil have that suitability rating and can we correct the limitation to improve the capability of the soil?"

The soil suitability guide, in defining the "poor" class of suitabilities, notes, "Although soil conditions may be altered with special design and construction techniques, costs of initial development and/or costs of maintenance over the life of the use can be expected to be higher than on those soils rated good or fair." Thus, while the term "poor" has a negative connotation when used in determining suitability of various soils for various uses, the guide does not say that a soil rated "poor" can not be used under any circumstance. Instead, it says that to use that soil without significant environmental impact will cost more money.

What if, asked the soil scientists, communities knew what construction, designs or other techniques of soils use were available to lessen detrimental impacts of various uses? Could not they require developers to employ such techniques, allowing them to make use of marginal soils? And then, couldn't those communities then set aside valuable agricultural land for food production?

The answers to the first questions are in the affirmative. There is legal precedence for such response. The concept of public welfare is used in broad strokes to back up zoning ordinances subdivision regulations, fire and building codes, and environmental laws. Communities are already accustomed to laws which require that public good take precedence over individual action. The same case can be made for construction and use standards based on soils information.

As to setting aside agricultural land, while the public good, derived from a community's ability to grow food for its own people can be one element in the discussion, the question of how much land to set aside is in part political and in part based on available agronomic techniques. First, however, the community is best advised to return to those same soils maps which formed the basis for the suitability guide. An attempt should be made to determine how much land is presently used for agricultural purposes. At the same time, the soils suitability guide should be used to gauge the amount of that land with soils best suited for agriculture. Consultation with soil scientists and agronomists could help a community decide how much agricultural land might be needed.

Following this step, a corresponding analysis can be made with an eye toward the amounts of land needed for development. As noted previously, many towns will find that much of their lands have "poor" or "very poor" suitability ratings; the result is that, on the surface, there is little land suited to development. To alleviate that situation, the towns can consider adopting construction and design standards which make marginal soils "usable". Using the soil potentials approach a town can re-color its soils maps, assuming that the adoption of such standards might raise the classification by one degree. Soils previously indicated as "poor" in suitability could now be rated "fair", those formerly shown as "fair" might now be rated as "good". Further upgrading of construction and design standards would yield still more land as potentially developable.

The political process of compromise would continually balance the need for both agricultural and development land. And while in the past, some aspects of the cost of development were borne by the farmer through a property tax system of highest use, a community could place the burden of cost squarely on the shoulders of the developers, who will pass along those costs to the buyers. Farmers gain by paying land taxes based on the agricultural use of the land, and face reduced pressures to sell land for development purposes. The people of the overall community gains because they can set aside districts of land to meet future agricultural needs without sacrificing the towns' ability to grow at the rate they desire.

SECTION 4: Aquaculture as a Potential for Income for Owners of Coastal Agricultural Land

The owner of agricultural land along the coast of Maine faces continued taxation pressures as a result of trends which have little to do with the income potential of that land. Competing uses have bid up the value of the land, and along the coast especially, the demand for second homes has meant that developers will pay ten times the amount which a farmer considers the value of an acre of land. While relief may come through current-use taxation and the ability of a town to create agricultural districts, as mentioned in previous chapters, farmers are interested in finding their own ways which make their land more profitable. Part-time aquaculture was thought to hold some potential in this regard, and this chapter examines the findings of an investigation into the subject.

As a result of Carlton Pinkham's request for assistance in determining alternatives for his farmland in Lamoine, the Coastal Resource Center supervised the work of a College of the Atlantic intern who studied aquacultural ventures with the most potential. With the assistance of an extension agent of the University of Maine Marine Advisory Service, the intern measured the physical and environmental variables of the Partridge Cove estuary, which runs through the Pinkham Farm. Water temperature, salinity, dissolved oxygen content, turbidity and characteristics of the estuarine bottom were recorded.

During the same time, a literature search revealed several biological and economic characteristics important to any cultured marine species:

1. Ease of acquiring eggs or immature animals inexpensively and in large quantities;

2. ease of rearing and handling immature animals under a variety of artificial conditions;

3. ability of animals to feed, keep healthy, and grow in a relatively wide range of environmental conditions, particularly temperature and salinity changes;

4. ability to feed low on the food chain;

5. resistance to disease;

6. rapidity of growth to market size; and

7. marketability, including acceptable texture and flavor.

Based on these characteristics, ten species were selected for more detailed analysis: the European oyster, the blue mussel, coho salmon, rainbow trout, brook trout, brown trout, quahogs, soft-shell clams, winter flounder and marine worms. Of these, only the European oyster was site tested, as it was readily and inexpensively available.

A set of ten criteria were summarized for each species under consideration: biological constraints, landscape and construction, aesthetics, possible pollutants, possible introduction of exotic species, possible disease problems, time required for development of system, short term investment, long term investment, and marketability.

To gain a relative measure of the potential for a successful aquaculture operation involving each species, a matrix was constructed, using scales of 1 to 5 for each species and characteristics. Low numbers represented least constraint and highest aquaculture feasibility; high numbers indicated greater constraints and lower feasibilities.

The "best possible" score for a species was ten, with 55 the score indicating the least feasibility. The values in matrix of species ranged from 11 to 45. Marine worms and soft-shell clams had high feasibility while salmon and trout had low feasibility, mainly because of biological requirements and investments of time and money. Mussels and oysters had more or less median values.

The report concluded that ecological and economic constraints were of highest importance in choosing a species to culture on the Pinkham Farm. The aquaculture operations recommended as most feasible were mussel or oyster culture, or a trout fish-out operation. A combination of reasons were cited:

1. Partridge Cove estuary can support these species.

2. These operations can be run on a small scale which would not be capital intensive.

3. Equipment, space and fresh water resources are available for a trout fish-out operation, thereby reducing the higher costs associated with hatching and rearing.

The study of culturing marine species for supplemental income at the Pinkham Farm led the Coastal Resource Center to consider how other owners of coastal property might evaluate the potential of their own sites for aquaculture. The same intern who studied the Pinkham Farm also researched and drafted a handbook entitled Maine Aquaculture: Guidelines for Site Evaluation. In its present draft, it discusses biological requirements for ten species currently cultured or whose culture is contemplated in Maine.

The handbook was written with four objectives: 1) to describe the progress and position of aquaculture in Maine; 2) to list and describe briefly the culturable species, including an outline of biological requirements; 3) to describe what the culture of these species might involve and list some of the people who are experimenting with these species in Maine; and 4) to describe a general method for examining potential aquaculture sites.

Drawing in the work for the Pinkham Farm project, the handbook considers coho salmon, brown, brook and rainbow trout, mussels, soft-shell clams, quahogs, marine worms, European oysters, American oysters and bay scallops. Discussion

of each species includes biological requirements and, where possible, traces the economics of firms culturing those species in Maine. A breakdown of potential start-up costs and budgets for annual operations are presented, as well as some seat-of-the-pants market projections. All known Maine aquaculturists for each species are listed so that readers may seek out first-hand knowledge on their own.

For the reader who wishes to begin to answer the question: "Will my coastal land be suitable for an aquaculture venture?" the handbook includes a section on water quality requirements, suitability of aquaculture within various marine ecological zones, and the compatibility of aquaculture in Maine, the author has included an annotated bibliography to assist the reader in exploring the subject in more depth.

These exercises, the site specific query into aquaculture as a means of providing supplemental income on the Pinkham Farm, and the above handbook on Maine Aquaculture, have timid conclusions amidst the hue and cry that aquaculture is the salvation of protein-needy masses. Repeated discussions with the current "generation" of Maine aquaculturists relay optimism of the most cautious variety. Aquaculture has a future on the coast of Maine, but they are only taking the first tiny steps... they are learning how not to proceed as much as they are learning how to, and the next generation of folks farming the sea will surely benefit from their pioneering efforts.

A review of the present situation in Maine gives a clearer perspective to the owner of agricultural land. To this date, the majority of first generation aquaculturists have had to invest large amounts of start-up capital in their oyster, mussel, trout and salmon operations. Although there are many new entries in the field who hope to prove that this is not always necessary, none have yet to operate in the "black". At this point it would be premature to say that a farmer could gain supplemental income from such ventures. A farmer has most of his assets (and liabilities) tied up in machinery and equipment. And for most, agriculture is more than a full time occupation. The same holds true for most existing Maine aquaculturists. Any attempt to meld the two for higher income would seem unlikely without further developments.

Elsewhere aquaculture has different roots and grows in different ways. On the west coast and in the mid-Atlantic seaboard areas, large industrial interests are experimenting with aquaculture on a grand scale. They are fully capable of a vertically-integrated, "egg to market" form of operation and have readily available the money and expertise to make such a system work. In Maine the heritage of the independent artisan-fisherman, forester and farmer, remains as a basis for the present day approach to aquaculture. A handful of people are involved and the amount of money invested is small in comparison with the large scale operations by major industry.

However, as the desire to investigate and practice aquaculture in Maine grows, it may become easier to enter the industry. One way may be the growth of cooperatives that would allow aquaculturists to jointly own expensive equipment such as service rafts, grading machines, etc., thereby cutting down the start-up costs for the individual.

Another avenue might be the development of support activities related to the overall industry. Oyster and mussel "hatcheries" will require "grow-out" operations to caretake stock as they grow to market size. Fish operations may also move in that direction, for although it may be desirable for a firm to control the entire "egg to market" cycle of a species, the cost of equipment and requirements for space will probably out-strip the abilities of the present firms. As the first generation pioneers look for help, the well-informed amateur with some time and some money may be best suited to fill that need.

The title of this chapter raises a question which we have hesitated to answer directly. Can the owners of coastal agricultural land turn seaward in hopes of earning supplemental income from aquaculture? The work summarized here provides tools with which individual land owners can begin to answer that question for themselves. If one is willing to study the subject diligently, learn from the mistakes and successes of the past and present, spend time and energy with the same devotion to work as a farmer or fisherman, then there may be an economic reward at the end of the process.

Section 5: Aquaculture and Soils as a Part of the Whole

The Coastal Resource Center is aware that the project activities described on these pages address issues considered peripheral by some people who are knowledgeable of the overall issue of conservation of agricultural land. Nonetheless, the results of the project may add significantly to a full scale discussion of policy alternatives and private decisions regarding agricultural land. Before summarizing those results, however, it may be instructive to review briefly some of the other aspects of the issue as they are being considered in Maine: the farm and open space land tax, transferable development rights, development of direct marketing outlets for farmers, use of innovative technology appropriate to small scale agricultural operations, and development of better management techniques which includes integration of wood production with more traditional agricultural crops.

In 1971, the Maine Legislature had passed a tax law giving preferential rates to owners of productive farmland and open space. The intent of such land-use taxation was to relieve financial pressure on owners of agricultural land faced with rapidly spiraling land values. While few farmers took advantage of the law in its early years, larger numbers of applications are processed each year, according to a report by the Maine State Planning Office, dated Summer, 1978. But towns which have significant acreage which qualifies under the preferential tax law are looking very critically at the burden such a law shifts to other landowners. Understandably, therefore, the discussion on conserving agricultural land includes the issue of using tax policy to achieve social goals; and the growing debate over the property tax is bound to affect such a land use policy tool.

Transferable development rights is a concept often discussed as a partial solution to conserving agricultural land. Without going into great detail, the concept is based on the legal principle that land ownership is a bundle of rights which can be negotiated, among them the right to develop land to its highest economic use. If, however, a community decides that it is in its interest to zone certain land to remain in agricultural use, then the owner of that land may charge that his right to develop the land has been "taken" without the compensation due under the law. By "purchasing" those development rights, or arranging for land developers in other zones to "purchase" such rights, the community compensates the land owner. In practice the concept of development rights has met with some success in New York, New Jersey and Massachusetts. In Maine, however, the concept has not moved beyond the discussion stage.

In another facet of the agricultural discussion, attention has been given to stimulating direct linkages between consumers and growers of agricultural products. Farmer's markets have enjoyed varying degrees of success in many areas of Maine and have grown in number and volumes of goods sold over the last three years. Such marketing techniques serve to guarantee a grower a good price for everything he or she can grow, while providing local consumers with a variety of fresh produce at reasonable prices. The growth of consumer buying cooperatives means additional local markets and perhaps forshadows renewal of producers cooperative activity as well.

The owners of small farms are using collective action, through groups like the Maine Organic Farming and Gardener's Association and local cooperation extension service councils, to seek development of agricultural technology appropriate to small agricultural operations. This activity has taken the agricultural research community, based at the University of Maine at Orono and at agricultural experiment stations throughout the state, somewhat by surprise. While traditionally having supported the notion that larger is best, the land grant university concept is now re-thinking its approaches to respond to the needs of smaller operations. Such research includes exploration of alternative soil management techniques and appropriate agricultural engineering aimed at boosting the efficiency of existing, possibly older, equipment.

And finally, the agricultural debate includes other attempts at combating land speculation simply by making all of the farmer's land contribute to the operation. Managing woodlots can be integrated easily into agricultural operations, often utilizing the winter months when a farmer is spending least time on crop management. With all of these alternatives being discussed elsewhere, the Coastal Resource Center attempted to bring two new topics into the discussion: possible supplemental income through aquaculture, and the linking of soils data with construction and engineering innovations to take development pressure away from agricultural land. The preceding chapters and the two detailed appendices indicate first, that farmers should consider, besides their woodlots, their clamflats and estuaries as possible sites for aquacultural experiments, and secondly, that local planning boards with a desire to slow down residential development on agricultural land can use soils potentials as a tool to guide where else such development could occur.

Aquaculture is still very much in the formative stage of development in Maine. The risks taken by several pioneers have demonstrated the economic feasibility of aquaculture, given an established set of biological factors. Section 4 reviews those biological factors which are examined in more detail in Appendix II. Owners of agricultural land may begin to evaluate their own sites with material presented and the references cited in the appendix. The economic feasibility for most operations, however, will depend on a strengthening of the whole aquaculture industry, with a better established market and cooperative growing ventures.

The concept of using soils potentials as a tool for guiding the location of development is an important innovation. By upgrading construction techniques, communities may compensate for poorer quality soils, making them available for new housing. In this way, growth can continue to occur but not automatically at the expense of the communities agricultural land resources. The use of the soils potentials concept depends on a planning board dedicated to conserving farmland, a knowledgeable soils scientist and consultation with engineers familiar with construction techniques. The extra costs, for the more sophisticated construction methods, will be transferred to the consumers of new housing. In effect, as the demand for new housing rises, the people behind that demand are assessed for the cost of conserving agricultural land.

Overall, the discussion of agricultural land and the pressures facing it will include these aspects as well as others. In the final analysis, agricultural land, like any other resource, will be allocated primarily according to economic trends, and secondarily as an issue of social concern. However, considering the importance of the resource to the long term welfare of Maine's population, the time for coordinating the two forces has surely arrived, and it is hoped that this report and its appendices will be helpful in highlighting two aspects of the discussion.