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**How Can Agriculture Reduce Its Impact on Coastal Water
Quality? -- Building a Consensus for Action**

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HOW CAN AGRICULTURE REDUCE ITS IMPACT ON COASTAL WATER QUALITY? -- BUILDING A CONSENSUS FOR ACTION

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INTRODUCTION

Coastal resources support a multitude of economic activities that depend on good water quality. In 1990 coastal and marine fisheries, alone, were worth an estimated \$12 billion, including \$5 billion directly contributed by coastal wetlands (USEPA, 1991a). Coastal tourism, recreation, aquaculture and other resource-based industries generate additional economic output. Coastal resources are under increasing pressure from population growth; almost half the United States population (110 million people) now live in coastal counties (Council on Environmental Quality, 1992). An estimated 50% of coastal wetlands have been destroyed and more are likely to decline in the near future (USEPA, 1991a). New methods are needed for managing coastal resources and water quality in the face of population growth and the needs of agriculture, recreation, conservation, fishing, manufacturing and mining (Davies, 1989).

Nonpoint source pollution (NPS) is a significant factor in degradation of coastal water quality. Nationally, agriculture has been identified as the nation's leading contributor of NPS (USEPA, 1991a). Yet, agriculture is a tremendously important economic sector; cash receipts from United States farm marketings in 1990 totalled \$170 billion (Carter and Goldman, 1992). Many people also consider agriculture desirable for maintaining open space in rapidly urbanizing coastal areas.

Agricultural producers are increasingly regulated by pollution control programs. For example the Clean Water Act, the Federal Insecticide, Fungicide and Rodenticide Act, and various state programs seek to reduce agricultural contributions to pollution. Coastal nonpoint source pollution from agriculture will soon be managed under the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA). (USEPA, 1991a)

Environmental policy changes often place much of the cost on a few to provide benefits for all (Libby, 1991). Agriculture is increasingly asked to shoulder such burdens and tensions run high on environmental issues. San Diego County agricultural producers describe public hearings as "tellings," where their concerns are not addressed. Nationally, environmental interests and government agencies perceive agriculture as slow to control pollution and agricultural producers fear broad brush regulatory programs will unnecessarily burden those less likely to produce runoff (Hilgren, 1991).

New coastal NPS management programs are required by CZARA to be economically achievable, enforceable and provide opportunities for public participation in all aspects of the program (USEPA, 1991a). If industry is a partner in the planning process, an adversarial relationship and resultant problems can be avoided (Bickings, 1991). Also, environmental representatives must participate as full partners, if the community is to accept decisions.

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The National Oceanic and Atmospheric Administration (NOAA) and U.S. Environmental Protection Agency (USEPA) must also coordinate closely with existing state and local water quality plans and programs (USEPA, 1991b). In California they must develop partnerships with the Coastal Commission, State Water Resources Control Board and Regional Water Quality Control Boards (pers. comm. Jovita Pajarillo, USEPA Region IX).

Achieving these goals in NPS management programs will require building coalitions between regulators and the public and among regulatory agencies. This is best accomplished by fostering communication and cooperation based on understanding technical and economic considerations and the values underlying different perspectives. Effective coalition building also requires establishing respect, trust and fairness for all points of view.

METHODS

OBJECTIVES

The authors were funded by the United States Department of Agriculture (USDA) Extension Service to develop a national model for empowering agricultural producers, environmental interests and government agencies to work cooperatively in evaluating, selecting and implementing measures to reduce agricultural impacts on coastal water quality. The issue of agriculture and coastal nonpoint source pollution was selected as the project focus, because policy had not been determined and because developing this policy would require education, communication and cooperation among those with a stake in the issue.

RATIONALE AND GENERAL APPROACH

Cooperative Extension public policy education was selected as the umbrella process for this project (Wallace, Reedy, et al, 1991). It is a stepwise approach for: defining a problem, including issues, concerns and technical information; involving those with a stake in the selected issue; improving their ability to communicate; assisting them in identifying alternatives for resolving the issue, evaluating the consequences of those alternatives and selecting top priority alternatives for action; and evaluating the effectiveness of the process, resulting policy and future actions. It is well suited to a developing policy area in which options remain open.

Mediation techniques (Community Mediation Program, 1991) helped establish respect, trust, fairness and a spirit of cooperation among stakeholders for finding common ground. Methods of the National Issues Forum (Kinghorn, 1991) helped in planning background research and establishing a deliberative style for discussions. All three processes helped participants to make choices by expressing, exchanging and clarifying the values they employ in making decisions on difficult issues (Johnson, 1993). Figure 1 outlines how the processes were combined in this project.

San Diego County, California was an excellent location for this pilot project. It has several coastal estuaries. Its diverse agricultural industry produced over \$1 billion wholesale value in 1991 (County of San Diego, 1992). The authors had expertise in coastal and agricultural science and issues and in public policy education. They were familiar with governmental, agricultural and environmental representatives who held a stake in the issue (stakeholders).

**FIGURE 1. AGRICULTURE AND COASTAL WATER QUALITY
PUBLIC POLICY EDUCATION PROCESS**

DEFINE PROBLEM

Identify Issue
Identify Stakeholder Groups
Assemble Preliminary Background Information

INVOLVE STAKEHOLDERS

Obtain Leaders' Commitment
Invite Others to Participate

IMPROVE STAKEHOLDERS' ABILITY TO COMMUNICATE

Develop Background Information on Issue, Including
Technical, Regulatory and Stakeholder Concerns
Prepare Educational Materials
Educate Stakeholders, Using Background Information

ASSIST STAKEHOLDERS IN SELECTING ALTERNATIVES

Convene Stakeholders
Present Background Information Summary
Use a Neutral Discussion Leader
Provide Equal Opportunity for All to Speak
Establish a Deliberative Discussion Style
Stakeholders Identify Alternatives for Resolving the Issue
Stakeholders Evaluate Consequences of the Alternatives
Stakeholders Select Top Priority Alternatives for Action

EVALUATE EFFECTIVENESS

Administer Questionnaires
Talk with Participants
Assess Implementation of Selected Alternatives
Assess Adoption of Techniques by Participants and Others

DEVELOPMENT OF PARTICIPATION

Stakeholder participation was initiated in meetings with county Farm Bureau and Regional Water Quality Control Board leadership. Then, about 25 agricultural producers, representing various commodities, the USDA Soil Conservation Service, two Resource Conservation Districts and the county Department of Agriculture, Weights and Measures (DAWM) were introduced to the project in a kickoff meeting at Farm Bureau. The DAWM was also a major cooperator in the project. Other participants were invited by individual contacts. They included a mussel grower, several local estuary organizations, the Tijuana River National

Estuarine Research Reserve, Environmental Health Coalition, Audubon Society, San Diego State University, University of California at San Diego, USEPA, the California State Water Resources Control Board and Coastal Commission, and the county Departments of Parks and Recreation and of Environmental Health Services. Overall, 81 stakeholders participated.

RESEARCH METHODS

Background information for the project was developed primarily through legal and opinion research conducted under the authors' guidance by two assistants, who were an attorney and a graduate student. It also included pesticide use data provided by the county DAWM, data contained in federal, state and local regulatory documents, and publications provided by research scientists. The information was needed to improve understanding of the issue as a basis for coalition building and decision making.

The objective of the legal research program was to produce a clear explanation of the confusing regulatory framework for the agriculture and coastal NPS issue. Pertinent laws, regulatory programs, terminology and government agencies were identified with the assistance of agency staff whose responsibilities were related to the issue. Summaries were prepared and agency staff reviewed them for accuracy. A University of San Diego School of Law professor also advised on the legal research program. The DAWM Environmental Specialist developed an educational format for the summaries.

The objective of the opinion research program was to produce a clear explanation of stakeholders' perspectives on the issue. The research was qualitative and descriptive in nature. Forty-nine agricultural, environmental and governmental representatives and university faculty were interviewed on their knowledge, concerns, responsibilities and anticipated actions regarding agriculture, coastal NPS and pertinent regulations. Agricultural producers were also asked general information such as commodities produced and acreage farmed. Participants reviewed their interview writeups for accuracy and educational summaries were prepared.

EDUCATIONAL PROGRAM METHODS

Preliminary legal and opinion research results were disseminated to all stakeholders, who were invited to two forums. At the forums project assistants summarized the legal and opinion research results and the authors facilitated a decision making process. Participants cooperated to identify, evaluate and select alternatives for addressing the issue of agriculture and coastal nonpoint source pollution.

In Forum I the 20 participants took five minutes to write down general alternatives for addressing the issue, then each in turn presented an alternative. Ideas were recorded on large pieces of paper at the front of the room. Participants were asked to present only ideas that had not yet been recorded. Rules were similar to brainstorming rules in that all had an equal voice and ideas could not be criticized. Suggested alternatives and the consequences of choosing them were discussed in a deliberative fashion, again with an equal voice for all, and grouped by similarity. Each participant then voted for five choices. The mechanics of this process were similar to those of "nominal group technique" (Sharpe, 1984). Results were tallied and mailed to all 81 project participants.

Environmental and agricultural representation was relatively low at Forum I. The authors and agricultural industry leaders actively encouraged more of them to participate in Forum II. Forum II included many people who had not participated in Forum I, so the top alternatives

from Forum I were discussed again. This allowed new participants to voice their concerns and ratify the agreement on priorities. The 40 Forum II participants then proposed, discussed and selected means to implement the top alternatives.

EVALUATION METHODS

Project evaluation included surveys, discussions with participants, and analysis of activities stimulated by the project. Participants were surveyed regarding their knowledge and attitudes related to agriculture and coastal NPS at the beginning of the first Forum and again by mail at the end of the project. The final survey also asked how much they had increased their abilities for addressing the issue, their interest in taking advantage of the voluntary period for NPS management, their reactions to project methods, interest in continuing with the project, how they would adapt the process for other environmental issues and suggestions for extending project results. Discussions asked participants similar questions and provided opportunities for followup on comments.

DISSEMINATION OF PROJECT INFORMATION

Local radio interviews, news releases and Extension newsletter articles informed the public about the project. A presentation to a committee representing Farm Bureaus in three neighboring counties extended project information in the Southern California region. Involvement of staff from state agencies and the regional USEPA office and discussions with state Farm Bureau educated stakeholders at the state level. Preliminary results were presented to the Western Regional Extension Workshop on Water Quality and Public Policy. The project was also discussed in a presentation to the National Public Policy Education Conference and in a report to the National Sea Grant College Program. A mailing list was developed for local, state and national dissemination of project materials and reports.

RESULTS

RESEARCH RESULTS

Legal research was summarized in an educational publication (Flynn and Tierney, 1992) that included a glossary, agency list and sections of federal, state and local regulatory programs pertinent to agriculture and coastal NPS. Programs summarized included overviews of federal and state programs and individual summaries of the federal Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, the federal Coastal Nonpoint Pollution Control Program -- Program Development and Approval Guidance, the state Porter-Cologne Act, Inland Surface Waters Plan, Enclosed Bays and Estuaries Plan, Fish and Game Code, Water Code, regional San Diego Basin Plan and Local Coastal Programs. A disclaimer stressed the publication's educational nature.

Opinion research was also summarized and published (Rager, Johnson and Mellano, 1992). It determined that the 21 agricultural producers interviewed were concerned that NPS regulations could increase costs. Flexibility, technical assistance and time to come into compliance were key issues in producers' ability to comply with regulations, while remaining competitive. For example, flexibility would be needed in light of differences in slope of land used for production, soil type and fiscal resources. Some were already using practices to minimize pollution. For example, drip irrigation, which reduces runoff and fertilizer, pesticide and water use, was a common practice. Many utilized Integrated Pest Management (IPM) to reduce pesticide use.

Growers found overlapping regulatory programs and jurisdictions confusing, even though they had a generally high educational level, including many bachelor's, master's and doctoral degrees.

The 13 environmental representatives interviewed were concerned that regulatory and enforcement programs would be inadequate, costly and lack site specificity. Most felt agriculture had a significant impact on NPS, but that the exact nature of the impact depended on the area, watershed and practices used. Some said agriculture has implemented practices to control NPS, such as drip irrigation and organic farming. They commented that producers might experience higher initial costs for NPS management, but would benefit in the long run through better and fiscally improved farming practices. Environmental representatives believed NPS regulations would benefit the environment, including wetlands. Many plan to be actively involved by working with agencies and developing educational programs. One commented on the importance of finding a way to benefit the environment and maintain economically viable agriculture.

The 15 government agency representatives interviewed stressed the importance of the voluntary compliance period and the flexibility of the planned best management practices (BMPs) approach. Each agency is responsible for enforcing different regulations. Possible enforcement methods included group permits, financial incentives and trading allowances for levels of point and nonpoint source pollution. Most felt agriculture had little knowledge of NPS, but believed many producers already used BMPs that reduce it. They stressed the importance of BMP education for all agricultural producers. Agencies plan to conduct studies, provide funding, and provide information through public meetings and mailings.

EDUCATIONAL PROGRAM RESULTS

Stakeholders at the Forums identified the following priorities for action on the agriculture and coastal nonpoint source pollution issue:

- technical, educational and economic assistance for reducing agricultural NPS;
- developing NPS programs on a watershed basis;
- establishing liaison with other NPS and stormwater management planning groups; and
- forming a steering committee to take the lead in implementing recommendations.

The steering committee included a balanced representation of all three stakeholder groups. It met three times and formed subcommittees to begin implementing Forum recommendations. It developed liaison with the joint city and county stormwater management committee, the San Elijo Lagoon Watershed Management Plan steering committee, the Tijuana River Estuarine Sanctuary Management Authority and other watershed and water quality management groups. The authors obtained USEPA Near Coastal Waters Program funding to assist in implementing other stakeholder recommendations through a research and education program and the subcommittees began working on it.

EVALUATION RESULTS

Twenty participants responded to the pre-Forum survey and 31 responded to the final mail survey. Agreement with statements in the questionnaire was indicated on a scale from 1 (low) to 5 (high). Comparing responses to questions asked on both surveys yielded inconclusive results. Responses to the final survey are discussed below with moderate indicating a mean of about 3 and strong indicating a mean of about 4.

Interestingly, environmental groups felt more strongly than agencies or agricultural producers that urban populations should pay the cost of NPS management. They expressed the least support for having agricultural producers bear the brunt of these costs.

Respondents to the final survey reported a moderate to strong increase in communication among the three groups and in their understanding of regulatory requirements and agricultural practices affecting NPS. Agency representatives gained the most new ideas and methods for addressing the issue of agriculture and NPS. One commented that she had used the methods in the local stormwater management program.

Overall, they were strongly interested in taking advantage of the voluntary period to cooperate, communicate and implement practices to reduce NPS. Some commented that the legal summaries helped them understand the regulations.

Respondents strongly approved project methods. Some suggested including small group discussions. They strongly supported continuing the project and using this type of process to address other environmental issues.

In discussions agency staff said they were concerned about limited resources for the large, new responsibility of managing NPS. They stressed the importance of educational organizations, such as Cooperative Extension, Resource Conservation Districts and the Soil Conservation Service in helping agriculture and other groups learn to control NPS.

Demand was strong for project educational materials. Participation in the steering committee and a generally high level of enthusiasm demonstrated commitment by all three stakeholder groups to continue working together on this issue.

EXTENSION OF PROJECT IMPACTS

Farm Bureaus from three neighboring counties formed a joint NPS management committee and contacted local regulatory agencies to begin working cooperatively. Participants in regional and national Extension meetings requested copies of project materials and reports for use in other areas of the United States. They formed the nucleus of the mailing list for nationally disseminating results. The USEPA Near Coastal Waters Program helped to extend project impacts by funding a research and education program to implement recommendations.

DISCUSSION

RESPONSE TO A NATIONAL NEED

This project was conceived in response to local and national concerns about the need to reduce pollution of coastal waters and about the increasing costs of environmental management. The focus of agriculture and coastal nonpoint source pollution was selected because resources were available, contacts with stakeholder groups were established, and the regulatory program was not finalized. The authors believed a balanced, cooperative approach to managing NPS would provide a longer range solution than if one group dominated decision making.

Background research developed a factual, educational framework for the issue and demonstrated ways to increase understanding about environmental issues and management. Opinion research involved all stakeholders in an early phase of the project and demonstrated

that their concerns would be recorded and utilized in the decision making process. Demand for the opinion summaries demonstrated interest in understanding each others' perspectives. Legal research involved regulatory agencies in communicating about their programs and helping to clarify the confusing regulatory structure. Demand for the legal summaries demonstrated the importance of clarifying the regulatory framework for the issue.

CONTEXT FOR SUCCESS

During the project an open atmosphere was maintained that stressed tolerance for different points of view. Discussions allowed participants to express how they perceived the issue, why they thought as they did, and ways that it could be resolved. The guiding principle was that if respect were shown for all interests and if a factual basis were provided, participants would produce a workable agreement. Recruiting more participants for Forum II and allowing time again to discuss Forum I results demonstrated that the project was based on the principle of inclusion, rather than exclusion.

An important element in establishing a deliberative, rather than adversarial, environment was to explain that agriculture was one of several groups targeted by the new NPS program. It was also stressed that the project's purpose was not to single out agriculture, but to encourage the three stakeholder groups to work together constructively on managing the agricultural component of NPS.

TRUST AND TEAMWORK

A key factor in the success of this project was the ability of the Cooperative Extension project leaders (the authors) to develop trust among the stakeholders that the project would be conducted in a fair and unbiased fashion. This was accomplished by establishing a neutral position on the issue and by stressing that all could gain by working cooperatively.

The team approach, using Extension staff with complementary expertise (coastal and agricultural), helped to establish the project leaders' credibility among all stakeholders. It also modeled cooperative behavior between persons with different perspectives on the issue. This promoted cooperative effort and helped participants discover common ground with groups they perceived as holding interests opposed to their own. Common ground was based on understanding facts and values that underlay concerns and influenced decision making.

NEW COALITIONS AND COMMITMENTS TO ACTION

Many local stakeholders had perceived the process of environmental management as the development of unrealistic regulatory programs with little public input, followed by adversarial and costly public hearings, enforcement actions and litigation. Thus, project participants were wary at first. They became enthusiastic as the background research proceeded and were very complimentary following the Forums. A significant change in attitudes about their ability to work together occurred as Forum discussions brought out strong agreement on major points.

Representatives of all three stakeholder groups demonstrated their commitment to continue the process through participation in the steering committee to implement Forum recommendations. Thus, establishing respect and trust and utilizing communication, education and cooperative effort early in the development of local NPS management programs produced breakthroughs in understanding, willingness to work together, and cooperative action on a common problem.

COST EFFECTIVE AND COOPERATIVE ENVIRONMENTAL MANAGEMENT

Adoption of project methods by neighboring counties, by local participants for other issues, and requests for materials from other areas of the state and nation indicate that this process meets a national need for cost effective and cooperative approaches to environmental management.

CONCLUSIONS

Cooperative Extension public policy education, mediation and National Issues Forum processes improved understanding, developed trust, reduced conflict and enabled stakeholders to work together in resolving the issue of agriculture and coastal nonpoint source pollution. The methods used in this project offer a way to serve national needs for reducing the cost of controlling NPS, while improving coastal water quality.

The agriculture and coastal water quality public policy education pilot project produced strong immediate local and regional impact. Methods and materials developed during the project can be adapted for other areas and environmental issues.

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