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Do regimes matter? Epistemic communities and Mediterranean pollution control

Peter M. Haas

An important and persistent question facing analysts of international regimes is, Do regimes matter?¹ Much attention has been paid to regime creation and regime maintenance, but few authors have studied the substantive nature of regimes or their direct effects on national behavior. Regimes are not simply static summaries of rules and norms; they may also serve as important vehicles for international learning that produce convergent state policies. This role for regimes has been seriously underestimated in the theoretical and empirical literature, which has tended to focus on two correlates of regimes—political order and economic growth—rather than on the transformative processes that regimes may initiate or foster. The literature has also paid little attention to the fact that some regimes stem from communities of shared knowledge and not simply from domestic or transnational interest groups.

Through the examination of the Mediterranean Action Plan (Med Plan), a regime for marine pollution control in the Mediterranean Sea, I seek to demonstrate that this regime played a key role in altering the balance of power within Mediterranean governments by empowering a group of experts, who then contributed to the development of convergent state policies in compliance with the regime. In turn, countries in which these new actors

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1. See Oran Young, "International Regimes: Toward a New Theory of Institutions," *World Politics* 39 (October 1986), pp. 115–17; Robert O. Keohane, "The Study of International Regimes and the Classical Tradition in International Relations," paper presented at the 1986 annual meeting of the American Political Science Association, p. 14; and Stephan Haggard and Beth A. Simmons, "Theories of International Regimes," *International Organization* 41 (Summer 1987), pp. 491–517.

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acquired channels to decision making became the strongest proponents of the regime.²

The Med Plan is widely hailed as a success. Commentators from a variety of viewpoints cite it as the crowning achievement of the United Nations Environment Programme's (UNEP's) Regional Seas Programme and an exemplary case of interstate cooperation.³ Its success is distinctive because of the number of compelling factors militating against it. The extensive pollution of the Mediterranean is the result of intense coastal population pressures, combined with largely unregulated industrial, municipal, and agricultural emission practices. Constructing sufficient sewage treatment facilities region-wide to handle the wastes generated by up to 200 million summertime tourists and residents would require a regional investment of \$10 to \$15 billion over a ten-year period. Eighty-five percent of the pollution of the sea comes from land-based sources: agricultural run-offs, industrial wastes, direct emissions from cities lacking sufficient sewerage facilities, and other wastes transmitted by rivers. Eighty to ninety percent of the coastal municipal sewage is discharged into the sea completely untreated.⁴ Thus, effective protection required the coordinated efforts of all the coastal states. Common pollution control standards had to be adopted for pollutants from tankers, offshore dumping, and a variety of land-based sources. Contending uses of the sea also had to be balanced: for instance, fishermen and tourists require much cleaner waters than do tanker and industrial interests.

Pollution of the Mediterranean Sea was widely regarded as a collective goods problem, since one country's pollutants could wash up on its neighbor's beaches. The Riviera, for example, is polluted by discharges from Spain, France, Italy, and Monaco. If France were the only country to build sewage treatment plants and to require coastal industries to reduce their emissions, the quality of the coast would only be partially improved, and French industry would be hampered by additional production costs that would not be met by Spanish and Italian competitors and would thus reduce

2. For a detailed analysis of the negotiation of the Med Plan, compliance with it, and a more thorough testing of alternative theoretical explanations of its success, see Peter M. Haas, *Effluents and Influence: The Politics of Mediterranean Pollution Control* (New York: Columbia University Press, forthcoming). For other recent studies on environmental regimes, see Lynton Caldwell, *International Environmental Policy* (Durham, N.C.: Duke University Press, 1984); and Nigel Haigh, *EEC Environmental Policy and Britain* (London: Environmental Data Services, 1984). Although Haigh does not formally refer to regimes, he analyzes British compliance with the corpus of the European Economic Community (EEC) environmental directives that may reasonably be construed to constitute a regime. His conclusions about compliance, however, are equivocal.

3. See Peter Hulm, "The Regional Seas Programme: What Fate for UNEP's Crown Jewels?" *Ambio* 12 (January 1983); and George P. Smith II, "The U.N. and the Environment," in The Heritage Foundation, *A World Without a U.N.* (Washington, D.C.: The Heritage Foundation, 1984), pp. 44-45. The Med Plan serves as the model for ten other regional arrangements for controlling marine pollution.

4. UNEP/ECE/UNIDO/FAO/UNESCO/WHO/IAEA, *Pollutants from Land-Based Sources in the Mediterranean*, UNEP Regional Seas Reports and Studies, no. 32 (Geneva: UNEP, 1984).

the comparative advantage of French industries. Other Mediterranean basins, such as the Adriatic and Aegean Seas and the eastern basin, posed similar problems. Pollutants were not exchanged throughout the entire Mediterranean, but the entire Mediterranean region faced a number of smaller collective goods problems that impeded coordinated national action to control pollution. The political antipathies and economic disparities in the region militated against effective and equitable cooperation, and the global recessions of 1973–75 and 1980–84 made the expensive compliance with the regime even more problematic.

Negotiating the regime was difficult. Countries disagreed about which pollutants to control. Developed countries wanted to control all sources of pollution, whereas many of the less developed countries (LDCs) saw this as a thinly veiled attempt to control their industrialization practices and thus opted for the control of only municipal and tanker wastes. Algerian President Houari Boumediene, who initially was actively hostile toward environmental protection, announced in the early 1970s, “If improving the environment means less bread for the Algerians, then I am against it.”⁵ The Algerian delegate to the 1972 United Nations Conference on the Human Environment also firmly stated that Algeria “will not sacrifice development at the altar of the environment.”⁶ Later, Boumediene continued to “assure [the developed countries] that many of us would be very happy to help you solve your pollution problems by processing [raw materials] in our own countries.”⁷ Algeria blamed France for much of the Algerian coastal pollution but was loath to negotiate with the exploitative North. However, in 1983, Algeria ratified the very treaty against which such bombast had been directed.

Even though the Med Plan was successfully negotiated, its maintenance poses an anomaly in terms of conventional understanding of how regimes operate. The most intriguing puzzle regarding the Med Plan’s effectiveness is why states comply, given the fact that so many were initially opposed to it. As Oran Young and Robert Keohane have noted, the most compelling argument for a regime’s importance in promoting international order is the fact that compliance is achieved even when the regime’s norms and principles run counter to the short-term interests of the participants (or the hegemon).⁸ The highly technical dimension of the Med Plan makes it a “most expected case” for an explanation that emphasizes consensual scientific knowledge.

5. NOVA, “Mediterranean Prospect,” WGBH Transcripts, Boston, Mass., 1980, p. 13.

6. *El-Djeich* (Algiers), no. 107, April 1972, p. 28.

7. *Times of London*, 4 September 1974, p. A9.

8. See Young, “International Regimes”; and Keohane, “Study of International Regimes.” Arthur Stein has suggested that compliance can be explained in terms of common aversions; however, the intensity with which many policymakers from LDCs expressed initial opposition to negotiating with the exploitative North during the early years of the New International Economic Order (NIEO) negotiations far exceeded that of any common aversions to a polluted sea. See Arthur A. Stein, “Coordination and Collaboration: Regimes in an Anarchic World,” in Stephen D. Krasner, ed., *International Regimes* (Ithaca, N.Y.: Cornell University Press, 1983), pp. 115–40.

However, the diversity of political interests in the region and the widespread political antipathy to international environmental protection initially inhibited the easy influence of scientists on their governments.

The Med Plan's successful creation was promoted by a community of ecologists and marine scientists. They served in UNEP's secretariat and were often granted formal decision-making authority in national administrations. In addition to their involvement in the policymaking process, they were given responsibility for enforcing and supervising pollution control measures. The members of this group became partisans for adopting the regime, complying with it, and strengthening it to deal with more pollutants from more sources. Following the involvement of these new actors, state interests came to increasingly reflect their environmental view, as seen in diplomats' statements and government policies, and state behavior came to reflect their interests as well, as was evident from state investment patterns and diplomatic actions. Compliance, as measured by the adoption of new policies which are consonant with the regime's norms and which ease its enforcement, has been strongest in countries in which the experts were able to consolidate their power most firmly.

As the case of the Med Plan shows, regimes may be transformative, leading to the empowerment of new groups of actors who can change state interests and practices. According to the explanation suggested here, if a group with a common perspective is able to acquire and sustain control over a substantive policy domain, the associated regime will become stronger and countries will comply with it. Such groups are most likely to be consulted after a crisis, especially when decision makers are uninformed about the technical dimensions of the problem at hand or are uncertain about the costs and benefits of international cooperation. New national policies, often in compliance with the regime, would then reflect the interests of the group consulted and empowered, and the duration of the new policies would depend upon the group's ability to consolidate and retain its bureaucratic power. The substantive nature of the regime would reflect the group's cause-and-effect beliefs. Because of the usual institutional rigidities and the overall administrative inertia at reviewing past decisions, such power would be likely to persist until a subsequent crisis incited other decision makers to consult with a new group or until the current group was weakened by internal disagreements or as a result of bureaucratic infighting with another group. It would follow logically, then, that the loss of consensus within the group or the loss of the group's access to high-level decision making would lead to a breakdown in compliance.

In the following sections, I describe the regime, analyze in greater detail the role of the new actors and the process by which national compliance occurred, and contrast this analysis with more conventional analyses of regimes and policy change. The data are derived from over ninety interviews

with government officials and from United Nations archives, government publications, and more general secondary sources.

The Mediterranean Action Plan

The Med Plan is a collectively negotiated, ongoing set of arrangements for the progressive control of Mediterranean marine pollution. It was developed under the auspices of UNEP, which provided \$18.5 million and administrative support during the program's first eight years and continues to oversee it. With Albania's attendance at the 1985 meeting of the Contracting Parties, all eighteen littoral states now participate.⁹

Within the formal framework of the 1975 Mediterranean Action Plan, the regime consists of legal, assessment, management, and administrative components. Following the adoption of the 1976 Convention for the Protection of the Mediterranean Sea Against Pollution (the "Barcelona Convention"), four protocols were negotiated to govern dumping from ships and aircraft (1976), to enhance cooperation in cases of oil spill emergencies (1976), to control pollution from land-based sources (1980), and to establish specially protected areas (1982). The Barcelona Convention and these protocols have been ratified or acceded to by all of the Mediterranean coastal states, with the exception of Albania, and are now in force. In addition, a center to develop integrated planning approaches for future coastal development was established in Sophia-Antipolis, France, and a center to coordinate seven specific projects aimed at harmonizing environmental and development objectives was established in Split, Yugoslavia. Thirteen joint research and seven monitoring projects to evaluate the quality of the Mediterranean have been carried out since 1977. Administrative arrangements include a headquarters unit in Athens, with a small professional staff and a 1987 budget of \$4.1 million.

In Stephen Krasner's by now familiar definition, the Med Plan is a regime, consisting of

... sets of implicit or explicit principles, norms, rules, and decision-making procedures around which actors' expectations converge in a given area of international relations. Principles are beliefs of fact, causation, and rectitude. Norms are standards of behavior defined in terms of rights and obligations. Rules are specific prescriptions or proscriptions for action. Decision-making procedures are prevailing practices for making and implementing collective choice.¹⁰

The principles are that Mediterranean currents and wind patterns transmit pollutants across national borders and that these pollutants interfere with

9. The eighteen participating countries are listed in Table 1.

10. Stephen D. Krasner, "Structural Causes and Regime Consequences," in Krasner, *International Regimes*, p. 2.

other uses of the sea (such as recreation, tourism, fishing, and navigation), thereby necessitating coordinated national pollution control policies. Norms are made abundantly clear in Paragraph 1 of Article 4 of the Barcelona Convention:

The Contracting Parties shall individually or jointly take all appropriate measures in accordance with the provision of this Convention and those protocols in force to which they are party, to prevent, abate and combat pollution of the Mediterranean Sea Area and to protect and enhance the marine environment in that area.¹¹

The rules and decision-making procedures consist of annual intergovernmental meetings at which the secretariat's administration of the joint monitoring projects is reviewed and the Contracting Parties' attempts to develop and enforce national legislation for pollution control are held up to nominal public scrutiny. A weak provision for arbitration exists but has never been invoked.

Until 1976, there was a very loose framework for evaluation. After 1976, the rules became stronger as the parties adopted protocols covering a more comprehensive range of sources and types of pollutants. The rules have grown in scope from banning marine dumping to controlling a wide variety of land-based sources of pollution, including agricultural sprays and industrial and municipal wastes. They also govern pollutants transmitted to the Mediterranean through rivers and the atmosphere. In addition to its early focus on dumping and oil spills, the Med Plan now "eliminates" the emissions of nine groups of toxic substances, "limits" the emissions of thirteen groups of less hazardous substances, and requires states to develop specific guidelines for control of these substances. The specific substances are identified in the technical annexes to the land-based sources protocol. Interim ambient quality-control standards for water in recreational areas and shellfish grounds were adopted in September 1985. An inventory of products containing the regulated substances is to be completed by the mid-1990s, along with specific ambient and emission standards. An additional annex to control pollution transmitted through the atmosphere is due to be completed in 1989. Effective control of oil pollution will require the construction of facilities to receive oily ballast material in most major Mediterranean ports, at a cost of over \$150 million.

Following the evolution of a stronger regime, the quality of the Mediterranean has improved. Beaches have been protected from organic wastes, such as municipal garbage. Environmental quality data on inorganic pollu-

11. UNEP, Convention for the Protection of the Mediterranean Sea Against Pollution and Its Related Protocols, 1982, p. 8.

tants, such as industrial wastes, remain anecdotal at best.¹² In 1976, about 33 percent of Mediterranean beaches were unsafe for swimming. Ten years later, only 20 percent were deemed unsafe by World Health Organization (WHO) and UNEP standards.¹³ This improvement is largely due to the construction of sewage treatment plants inspired by the Med Plan. These plants have been built or are under construction in Tel Aviv, Aleppo, Athens, Naples, Genoa, Istanbul, Marseilles, Nice, Toulon, Alexandria, Tripoli, and Algiers.¹⁴ In addition, ballast reception facilities are under construction or planned in ports in Greece, Yugoslavia, Egypt, Tunisia, and Turkey.¹⁵ Between 1982 and 1984, Spain lowered the number of contaminated beaches from thirty-six to eight.¹⁶ Between 1972 and 1982, France achieved a 93 percent reduction in chemical oxygen demand, a 90 percent reduction in suspended solids, a 95 percent reduction in hydrocarbons, a 92 percent reduction in phenols, and a 92 percent reduction in mercury emissions from some plants in the Berre Lagoon, a containment tank for wastes from the industrial zone of Fos. This was at a cost of \$96 million.¹⁷ Toxic emissions into the Rhone were reduced by 44 percent during the 1970s, and mercury emissions dropped sevenfold.¹⁸ As the monitoring and research components of the regime collect and analyze more data and make the data available, a more sensitive evaluation of the regime's effectiveness in controlling pollution may be possible.

Although it is extremely difficult to confirm, regional scientists concur that the quality of the Mediterranean is better than it would have been without the Med Plan, and preliminary studies suggest that the pollution level has at least stabilized and is now about the same as it was in the early 1970s. In light of the rapid coastal population growth and industrialization during the past two decades,¹⁹ maintaining the Mediterranean at a constant level of pollution is quite an accomplishment.

12. The state-of-the-art estimates of levels of Mediterranean pollution are presented in UNEP's "Review of the State of the Marine Environment: Mediterranean Regional Report," GESAMP WG 26, SG 26/C/1, 19 December 1986. At present, environmental quality data are aggregated for regions of the Mediterranean Sea so as not to embarrass individual coastal states.

13. *The New York Times*, 21 October 1986, p. C3.

14. *Ibid.*; and Paul Evan Ress, "Mediterranean Sea Becoming Cleaner," *Environmental Conservation* 13 (Autumn 1986), pp. 267-68.

15. UNEP, *The Siren: News from UNEP's Oceans and Coastal Areas Programme*, no. 34, September 1987, p. 25.

16. See *El Pais* (Spain), 8 November 1984; and Comisión Interministerial del Medio Ambiente (CIMA), *Medio ambiente en España* (Madrid: CIMA, 1984), p. 179.

17. See Secrétariat Permanent pour les Problèmes de Pollution Industrielle de la Région de Fos-l'Etang de Berre, "Lutte contre la pollution des eaux—Etat des rejets industriels," no date; and *Presse Environnement*, no. 379, 23 May 1980, p. 1.

18. *Le Monde*, 18 June 1980, p. 40.

19. Annual industrial growth from 1973 to 1984 ranged from 10.3 percent in Egypt to 1.4 percent in France, according to World Bank, *World Development Report* (New York: Oxford University Press, 1986), pp. 182-83. Tourist receipts in the Mediterranean area grew every year during this period. See International Union of Official Travel Organizations, *International Travel Statistics*, various years; and World Tourism Organization, *World Tourism Statistics*, various years.

The ecological epistemic community and the Med Plan

The success of the Med Plan is attributable to the involvement of ecologists and marine scientists who set the international agenda and directed their own states toward support of international efforts and toward the introduction of strong pollution control measures at home.

In the Mediterranean in the early 1970s, government leaders became increasingly concerned about the extent of pollution of the Mediterranean Sea. Jacques Cousteau alerted the world to the potential "death" of the sea, but government officials did not know whether such predictions were valid (they turned out not to be), nor did they know the extent of the problem, the sources and types of pollutants, or the means of preventing or controlling pollution. Therefore, they turned to the region's marine scientists for information and to UNEP for the development of environmental policies and the drafting of a treaty to protect the Mediterranean Sea.

UNEP officials, some secretariat members from other specialized agencies (notably WHO and the Food and Agriculture Organization [FAO]), and like-minded governmental officials in the region comprised an "epistemic community."²⁰ Together, they acted as an informally coordinated lobbying group. They also shared a common ecological outlook. In this ecological epistemic community, the members had similar beliefs about the need to preserve the quality of the physical environment and similar views on the origins and severity of pollutants, the policies necessary to control pollution, and the research needed to determine the physical linkages between sources of pollution and the health of the sea by evaluating all economic activities and possible uses of the sea within a broader ecosystemic framework. This epistemic community consisted of high-ranking UNEP officials and mid-level government officials from various countries (including France, Israel, Greece, Egypt, and Yugoslavia) and from a variety of disciplines and backgrounds (such as engineering, physics, oceanography, microbiology, urban planning,

20. The term has been used in the literature on sociology of knowledge and has been adapted for use in international relations to refer to a specific community of experts sharing a belief in a common set of cause-and-effect relationships as well as common values to which policies governing these relationships will be applied. For a good survey of the sociology of knowledge usage, see Burkart Holzner and John Marx, *Knowledge Application: The Knowledge System in Society* (Boston: Allyn & Bacon, 1979), chaps. 4 and 5, especially pp. 107–11, in which the authors present a lengthy discussion of epistemic communities, including the large community of scientists who share a faith in the scientific method. The beliefs of the ecologists which I discuss here are much more specific, since in addition to sharing a belief in the scientific method as the way to verify their understanding, they also share beliefs in specific causal models. A very similar notion is that of "thought collective," discussed by Ludwig Fleck in *Genesis and Development of a Scientific Fact* (Chicago: University of Chicago Press, 1979). See John Gerard Ruggie, "International Responses to Technology: Concepts and Trends," *International Organization* 29 (Summer 1975), pp. 569–70, in which Ruggie takes an approach similar to Foucault's use of "episteme" but associates epistemic communities with broader widespread social beliefs rather than with the more limited set of shared beliefs held by experts. See also Ernst B. Haas, "Why Collaborate? Issue Linkage and International Regimes," *World Politics* 32 (April 1980), pp. 357–405.

and diplomacy). Their political values entailed a belief that all governments should actively cooperate and intervene domestically to protect the environment, including the universal adoption of more comprehensive, rational forms of economic planning to internalize environmental considerations into virtually all forms of policymaking.

UNEP officials also forged transnational alliances with regional marine scientists, who shared an interest in controlling specific pollutants but lacked the overall holistic, causal framework that ecologists accepted. Effectively acting in harmony with UNEP, these scientists had the combined impact of persuading their governments to support the UNEP measures to control as many sources and types of pollution as possible, to move for stronger measures for their control, and to comply with Med Plan policies. Later, as environmental ministries were established in the Mediterranean countries, these scientists were invited to join their staffs, as were people who were firmly in the epistemic community.

Ecological principles were embraced by members of the epistemic community as their core set of beliefs about cause-and-effect relationships. Ecology as a discipline asserts the unity of narrower scientific disciplines and conceptions of the world:

The holistic viewpoint, as a philosophy of science, is both a confession of faith and a goal to be pursued; and as such it has great significance. In describing nature as one integrated system it reveals the scientists' faith in a universe of cause-and-effect relationships, the whole of which is capable of being made intelligible to the normal mind. At the same time it points to the essential unity of science with respect to its problems and its ultimate goal.²¹

Coming into popularity following World War II, ecology is fundamentally a framework in which other disciplines may be assimilated:

This new science, which is an integration of the traditional disciplines of geology, oceanography, ecology, meteorology, chemistry, and other sciences, has a variety of names—earth systems science, global change, and biogeochemistry. Its subject is nothing less than the composition, behavior and interactions of the planet's nonliving realms or phases—the atmosphere, geosphere, and hydrosphere—and its living realm, the biosphere, which encompasses parts of each of the others.²²

As such, it facilitated the formation of coalitions among scientists, because most contending views about what are important research questions and the

21. Amos Hawley, *Human Ecology* (New York: Ronald Press, 1950), pp. 9–10.

22. World Resources Institute, *World Resources 1987* (New York: Basic Books, 1987), p. 163. For intellectual histories of ecology, see Donald Worster, *Nature's Economy: A History of Ecological Ideas* (Cambridge: Cambridge University Press, 1977); and Edward J. Kormondy and J. Frank McCormick, eds., *Handbook of Contemporary Developments in World Ecology* (Westport, Conn.: Greenwood Press, 1981).

appropriate levels and methods of analysis may be integrated within such a broad framework.

By promoting the adoption of a very broad definition of "pollution" which emanated from an ecological perspective, UNEP and members of the ecological epistemic community were able to encompass more parochial interests under its umbrella. The definition reads:

"Pollution" means the introduction by man, directly or indirectly, of substances or energy into the marine environment resulting in such deleterious effects as harm to living resources, hazards to human health, hindrance to marine activities including fishing, impairment of quality for use of sea-water and reduction of amenities.²³

Such a broad formulation of concerns blurred the distinctions between otherwise incompatible views, and this enabled UNEP and other members of its epistemic community to tie in with the broadest possible constituency by incorporating the concerns of many groups within those of UNEP. Many of the individual marine scientists and officials of specific organizations had different views about the nature of the problem of Mediterranean pollution and the appropriate remedies, reflecting their various backgrounds and expertise in disciplines such as marine biology, marine chemistry, marine geology, oceanography, microbiology, public health, and civil engineering. For instance, marine biologists and FAO officials were concerned with the positive and negative effects of organic pollutants on fishery yields. These pollutants largely come from municipal wastes. On the other hand, public health officials and WHO representatives, whose focus is on human health and communicable diseases, were concerned with the adverse effects of inorganic industrial wastes as well as the untreated municipal wastes that concerned marine biologists. These perspectives gave rise to mutually exclusive policy proposals, as FAO officials suggested that some organic wastes were useful nutrients for relatively hungry fish in the Mediterranean, whereas public health officials advocated the closure of beaches exposed to such wastes. Within UNEP's broad definition, research and policies could be developed to satisfy each group individually while avoiding a direct confrontation between them.

UNEP cemented the alliances by funding scientific research that was not supported by domestic sources, providing sophisticated monitoring equipment and training in its use, and publicizing the research findings. UNEP's discretionary control over the Med Plan budget allowed it to continue to distribute funds among the various members of the alliance during budgetary squeezes from 1979 to 1982. The provision of sophisticated equipment allowed scientists to conduct new studies and generate data revealing the

23. UNEP, Convention for the Protection of the Mediterranean Sea Against Pollution, Article 2, Paragraph (a). For narrower definitions of pollution which arise from other disciplinary approaches, see M. Tomczak, Jr., "Defining Marine Pollution: A Comparison of Definitions Used by International Conventions," *Marine Policy* 8 (October 1984), pp. 311-22.

widespread presence of organic and inorganic pollutants. The scientists were invited to attend biannual conferences convened by UNEP for the purpose of exchanging information, discussing techniques, and forming professional bonds with their colleagues throughout the Mediterranean. UNEP stressed the ambiguity of individual scientists' roles and loyalties by inviting them in their individual capacity as scientists rather than as formal representatives of their governments. Methodologies and findings were also exchanged in English language journals such as *Ambio* and *Marine Pollution Bulletin* and in over thirty-six manuals released by UNEP and FAO in French, English, and Spanish.

The external support from UNEP enhanced the scientists' domestic prestige and strengthened their domestic political base. Although their work was only loosely coordinated by UNEP, the knowledge gained through collaborative efforts established or reinforced their authority in the issue-area of marine pollution control. When consulted by their governments, the scientists provided congruent policy advice about domestic pollution control measures and encouraged them to support the norms and principles outlined in the Med Plan. Through shaping their own governments' policies in convergent manners, they reinforced the regime's support internationally. They also led their governments to take more constructive approaches at international meetings on the Med Plan. Ultimately, a stronger regime resulted than was initially anticipated, since the states adopted and ratified new protocols controlling an even wider range of pollutants (new rules) and acted in compliance with the regime's injunctions.

Politics were also important in the negotiation of the Med Plan protocols. A number of compromises satisfied the demands of different groups. The protocols included pollutants of concern to both developed and developing countries, and the LDCs received monitoring equipment from UNEP. Arab-Israeli conflicts were downplayed as a result of the deliberately low profile stance adopted by Israeli delegates and the decision of UNEP not to invite the Palestine Liberation Organization to attend. The definition of the Mediterranean's geographic scope consciously excluded the Soviet bloc by setting the eastern limit at the southern end of the Dardanelles rather than at the northern end, which would open up Bulgarian participation. Scientific laboratories for the monitoring component of the Med Plan were chosen by UNEP on a geographic basis in order to reward countries for their participation at negotiating meetings.

The epistemic community's influence on the Med Plan

In 1972, there had been very few measures for pollution control in the Mediterranean states. After the regime's successful negotiation, however, member countries began to introduce measures to accomplish the Med Plan

objectives. From an early antipathy to dealing with environmental problems, many LDCs became much more constructive at international meetings. Accepting the need to control a growing number of hazardous substances, they ratified the international protocols within two years. As shown in Table 1, almost all of the Mediterranean governments had created environmental ministries or agencies by 1985, and many had developed measures to control oil spills and dumping. Algeria, Egypt, France, Greece, and Israel also adopted legislation to curtail pollution from land-based sources and to mandate environmental impact assessments before new development projects are approved.

The actual form of policies varies among countries. Different countries specify different emission standards, ban different substances, and point to different indicators for cleanliness. Many LDCs simply apply thresholds suggested in the WHO's *Technical Reports Series*. Yet the movement in all cases is in the same direction, in conformity with the Med Plan's enunciated norms and principles.

The countries that have been the most supportive of the Med Plan are those in which the epistemic community has been strongest. Phrased slightly differently, the variance in compliance with the Med Plan is largely explained by the amount of involvement of the epistemic community in domestic policymaking. With increasing involvement of the epistemic community, countries became more supportive of the Med Plan, became more constructive participants at international meetings, and introduced more comprehensive pollution control policies at home, often supported by increased domestic funding for pollution control. The epistemic community influenced both foreign and domestic environmental policies.

Pressures for compliance generally came from environmental ministries. As shown in Table 1, these ministries were either coordinative or regulatory. While coordinative ministries were merely responsible for encouraging other governmental bodies to consider environmental factors in their activities, regulatory ministries had direct responsibility for formulating and enforcing environmental policy.

In the early 1970s, most of the countries established coordinative environmental ministries, in keeping with the holistic environmental ethos galvanized by preparations for the 1972 United Nations Conference on the Human Environment. These ministries were staffed by members of the ecological epistemic community and by the marine scientists who were allied with UNEP, since they were the only ones with a strong reputation for expertise in pollution control. These groups had little affinity with other ministries in their own governments and felt more closely tied to their functional counterparts around the region. As members of UNEP's transnational alliance, they were all involved in the Med Plan negotiations, and they encouraged their own governments to support these negotiations and to comply with Med Plan arrangements.

With only small staffs, slim budgets, and little statutory authority, the coordinative environmental ministries were seldom able to compel other ministries to control pollution within their functional domains. However, once they were transformed into regulatory ministries, as occurred in seven countries (see Table 1), they usually had sufficient bureaucratic clout to usurp control over the environmental domain and convert their interests into new national policies. Thus, through the capture of various regulatory environmental ministries, the epistemic community consolidated its control over environmental policy and became successful in encouraging governments toward convergent actions such as controlling a broader range of pollutants, increasing their support for the Med Plan, elevating environmental concerns on their national agendas, and pushing for increased investment in pollution control. Countries in which the epistemic community did not consolidate its hold through regulatory environmental ministries have been less supportive of the Med Plan and have undertaken fewer and weaker measures for pollution control.

The ecological epistemic community has been able to use the administrative base provided by environmental ministries to effectively promote its own preferred vision of pollution control, which is broader in scope and more clearly delineated than the vague, formal missions assigned to the ministries in various countries. In this respect, it has been a story of putting the foxes in charge of the chicken coop. For instance, in Israel and Greece, the foreign ministries ceded responsibility for Med Plan negotiations to the Israeli environmental protection service²⁴ and to the Greek national council for physical planning and the environment (NCPPE), respectively, which were both staffed by members of the epistemic community. The NCPPE was instructed by its foreign affairs ministry to be "pro-environment," in essence making the Greek delegation an active environmental lobbyist and giving the scientific constituency within the government a free hand to formulate and pursue policy. With the NCPPE as a springboard, the staff introduced new domestic environmental legislation to Parliament and continually served as an "honest broker" to mediate conflicts at intergovernmental meetings.

In France, ecologists have usually been appointed as major officials of the environmental ministry, although their beliefs have not always been shared by the head of the ministry, whose appointment varies with the administration in power. In Algeria, the members of the environmental ministry and the supporting body of research marine scientists have not been members of the epistemic community, although they have shared its concerns about controlling specific pollutants.

The importance of scientific access to government decision making is underscored by the Italian experience. With a large and experienced sci-

24. Irving Schiffman, "The Environmental Impact Assessment Comes to Israel," *Environmental Impact Assessment Review* 5 (June 1985), p. 184.

TABLE 1. Introduction of environmental authorities and pollution control measures by member countries of the Med Plan, 1970-86

Country ^a	Created national environmental authorities		Introduced marine pollution control legislation		Became more supportive of the regime at international meetings
	Coordinative	Regulatory	General (oil spills, dumping)	More effective (land-based sources, environmental impact assessment)	
Albania	None	—	—	—	Did not attend until 1985
Algeria	1974	1979, 1983	1983	1983	1979
Cyprus	—	—	—	—	Seldom attended
Egypt	1980	1982	1982, 1983	1983	1982
France	1970	1974	1964; many after	1976-77	1975-76
Greece	1976	1980	1975, 1977	1981, 1986	1975
Israel	1973	1976	1971, 1983	1982	1975
Italy	1973, 1983 ^b	1986	1976, 1982	None	1977

Lebanon	Between 1973 and 1983	—	—	—	Low profile
Libya	1981	None	1976	None	Seldom attended
Malta	1971	—	—	—	Low profile
Monaco	—	—	—	—	Low profile
Morocco	1974	None	None	None	Low profile
Spain	1972	1978	1977, 1982	None	Low profile
Syria	1971	—	—	—	Seldom attended
Tunisia	1975	None	1975	None	1979
Turkey	1979	None	1983	None	Low profile
Yugoslavia	1974, 1982 ^c	None	1965, 1976	None	1975

^aLittle or no data are available for Albania, Cyprus, Lebanon, Malta, Monaco, and Syria.

^bItaly created the position of minister of the environment without portfolio (without budget and staff) in 1973, but this minister was soon absorbed into the ministry of cultural property. A minister of ecology without portfolio was created in 1983, and a full ministry of the environment was finally established in 1986.

^cYugoslavia created a federal council for the environment in 1974, and this was replaced by a lower-level coordinating committee for the environment, physical planning, habitat, and public utilities in 1982.

Sources: Sachiko Kuwabara, *The Legal Regime of the Protection of the Mediterranean Sea Against Pollution from Land-Based Sources* (Dublin: Tycooly International Publishing, 1984); Organization for Economic Cooperation and Development (OECD), *Environmental Policies in Yugoslavia* (Paris: OECD, 1986); OECD, *Environmental Policies in Greece* (Paris: OECD, 1983); Comisión Interministerial del Medio Ambiente (CIMA), *Medio ambiente en España* (Madrid: CIMA, 1984); and Mark Baker, Libby Basset, and Athleen Ellington, *The World Environment Handbook* (New York: World Environment Center, 1985).

entific community, replete with individuals who deeply believed in UNEP's message, but without an active environmental ministry for them to channel their concerns, domestic policy did not change for several years. Although the position of minister of ecology without portfolio was created in 1983, a full ministry of the environment was only established in 1986, at which time a budget of \$6.7 million was allocated and sixty staff members were appointed.²⁵ This staff now has the capacity to enforce the 1977 Merli Law, whose deadline for compliance had been frequently extended owing to the government's inability to enforce it and to the industries' reluctance to incur the high costs necessary for modifying production processes to reduce or eliminate emission of the hazardous substances covered under the law. Following a period of static environmental expenditures, Italy allocated \$846 million for new water purification plants, \$559 million for river decontamination, and \$184 million for new waste disposal plants for 1986.²⁶

In most cases, the environmental ministries' authority over pollution control in Mediterranean countries was not challenged by industrial groups or by commerce ministries. Multinational corporations potentially affected by the Med Plan arrangements were slow to recognize its implications and only weakly entered the process after most of the agreements had been concluded. In 1981, the Centre Européen des Silicones, representing the European silicon industry, asked UNEP to remove organosilicons from the list of substances for which permits must be obtained from national authorities before they can be emitted into the Mediterranean, but their request was denied. The persistent uncertainty about the actual extent of regional pollution deferred challenges to the authority of the environmental ministries. There was prevailing sentiment that something had to be done, and the ministries were the only groups with anything to offer. Initially established as coordinative ministries, their creation was seldom challenged, since they did not appear to pose a real threat to other administrative bodies. Subsequent administrative reforms turning them into regulatory ministries received less attention, although in many countries, such as Algeria, Greece, and Egypt, true enforcement responsibility is split between the commerce ministry and the environmental ministry.

A more detailed analysis of the process by which Algeria and Egypt came to support the Med Plan indicates the key role played by the epistemic community. At first, both of these countries were strongly opposed to introducing measures that would inhibit industrial growth and were highly suspicious of French motivations. However, following the involvement of the epistemic community, these positions were reversed. This is particularly striking given the fact that, as small countries, both would have been able to free-ride on arrangements once they were supported by France.

25. "The Environment in Europe," *Bulletin of the Institute for European Environmental Policy*, no. 37, November 1986, p. 3.

26. *International Environment Reporter*, 11 February 1987, p. 56.

Algerian leaders had always been intransigent in asserting the primacy of industrial development over environmental protection. In the early 1970s, they opposed any pollution control measures that might impede or retard economic development, and they did not send a delegation to the 1976 Barcelona Conference. Following the inclusion of marine scientists in the Algerian administration after 1975, government preferences began to change, elevating pollution control to a more equal footing with economic development. Algeria acceded to the Barcelona Convention in 1981, ratified the protocol for control of pollution from land-based sources in 1983, and also adopted national environmental legislation in 1983. Algeria's law no. 83-3 of 1983 provides a broad framework for the development of a domestic environmental policy, although it fails to specify water quality standards. The fact that the 1983 legislation includes the control of industrial wastes is an indication of the change in Algerian position from refusing to accept constraints on economic development to imposing them.

These Algerian policy changes in the early 1980s followed the entrenchment of marine scientists in the government and their provision of domestically produced analyses of marine pollution. The Algerian scientific community originally obtained access to the government through its national committee for the environment, established in 1974, and its subsequent institutionalization within the hydrologic ministry, which became the secretary of state for forests and development. In 1983, a national agency for environmental protection was formed.

Policy advice also came from scientists in the Centre de Recherches Océanographiques et des Pêches (CROP) in Algiers. CROP began monitoring pollution in 1975, in response to fears of a decrease in fishery production due to pollution. UNEP gave CROP scientists a gas chromatograph and an atomic absorption spectrophotometer to monitor industrial and agricultural wastes and also provided them with training in their use. With this new equipment, the Algerian assessment of levels of oil and other industrial wastes was consonant with that of other countries around the Mediterranean Basin. CROP's first reports, published in 1979 and 1980, described the industrial and public health dimensions of coastal pollution²⁷ and generated

27. The coastal population in Algeria became alarmed by localized fish kills, discoloration of the water, and tar balls on beaches. Zinc killed shellfish at Ghazouet in 1975, and pollutants from pulp and paper production killed fish at Mostaghanem in 1976. Fish were also killed by pollutants from phosphate fertilizers at Annaba and from petrochemical products at Arzew and Skikda. See Ali Bakalem, "Pollution et sources de pollution marine d'origine industrielle sur la côte ouest algérienne: Etude préliminaire," in ICSEM/IOC/UNEP, *Fifth Workshop on Marine Pollution of the Mediterranean* (Cagliari, Italy: ICSEM, 1980), pp. 195–200; A. Bakalem, "Aménagement du littoral ouest: Problèmes de pollution marine—Etude préliminaire de la zone Arzew-Mers-el-Hadjad," *Cahiers géographiques de l'ouest*, no. 5–6, 1980, pp. 115–49; A. Bakalem, "Les sources de pollution sur la côte ouest algérienne: Note préliminaire," *Bulletin de la Société d'Histoire Naturelle de l'Afrique du Nord*, vol. 69, part 3–4, 1981, pp. 131–37; and A. Bakalem and J.-C. Romano, "Pollution et peuplements benthiques dans la région algéroise," in ICSEM/IOC/UNEP, *Sixth Workshop on Marine Pollution of the Mediterranean* (Cannes, France: ICSEM, 1982).

concern within the government and among elites. The evidence of increasing marine pollution was finally accepted by the early 1980s, and policies began to change.

The Algerian position also became much more constructive at Med Plan meetings after 1979. Delegates from CROP and the hydrologic ministry began to accompany foreign ministry officials to these meetings. Although foreign ministry officials retained control over decision making, they invited greater policy input from the scientific community, and scientists gained a stronger voice within the government. The CROP scientists did not appear to share UNEP's holistic viewpoint, but they did hope to study and control a broader range of marine pollutants than was currently controlled. Therefore, they urged government officials to adopt more comprehensive policies and to encourage their foreign affairs colleagues at Med Plan meetings to do the same.

The gradual involvement of the epistemic community also transformed Egyptian policy. Scientists were initially isolated from the government, having access only to the Egyptian academy of scientific research and technology. During early Med Plan negotiations, delegates from the foreign ministry focused on encouraging the transfer of technology on concessionary terms, but they did nothing substantive with regard to specific sources or types of pollutants to control. The delegates' attitude toward pollution control was one of ambivalence or even indifference.

However, scientists were consulted in the early 1980s, as the government convened commissions to decide whether Egypt should adopt the protocol for control of land-based sources of pollution and to determine what the domestic effects of ratification would be. Administrative reforms from 1980 to 1982 created a new environmental affairs agency and committees in the academy for scientific research and technology, which were charged with developing environmental policy and determining whether Egypt should ratify the various Med Plan treaties. Chaired and lobbied by individuals who were closely tied to UNEP, the committees not surprisingly advocated immediate compliance with the Med Plan norms, which the foreign ministry accepted. Egypt ratified the protocols to control pollution from land-based sources and to establish specially protected areas.

Already sensitive to the variety of pollution problems facing Egypt, marine scientists who were now invited into the policy arena began to encourage legislation to control the whole gamut of pollutants and sources of pollution. In 1982, the government introduced Egypt's law no. 48 to protect the Nile, followed by a number of ministerial directives aimed at controlling a variety of forms of pollution. In January 1983, President Mubarak announced that water quality control and sewage treatment were primary national concerns and called for an investment of \$4.6 billion to develop water resources and control water pollution. The environmental affairs agency has advocated the widespread use of environmental impact assessments, expanded investment

in sewerage and sewage treatment, and development of specific emission and ambient standards for coastal waters used for different purposes (recreation, navigation, and so forth). A \$1-billion sewage treatment plant in Alexandria is slated for completion by mid-1989, and plans are being made to convert the sludge to fertilizer by 1994. Work is also under way for much-needed sewerage construction in Cairo. In the early 1980s, the ministry of industry spent \$24.6 million on controlling industrial wastes as part of a \$153-million industrial production project supported by the U.S. Agency for International Development (USAID).²⁸

France provides the limiting case for the extent of an epistemic community's influence. Although the epistemic community consolidated its power in the French environmental ministry and was able to redirect domestic planning policy, it was relatively weak in influencing foreign environmental policy because the Quai d'Orsay would not cede authority to it.

Since its creation in 1972, the French environmental ministry has been able to retain and consolidate its power within subsequent administrations. The environmental ministry's budget has increased from \$20.8 million in 1972 to \$61.5 million in 1981 and \$89 million in 1986, and from 0.36 percent of the 1972 federal budget to 0.49 percent of the 1981 budget.²⁹ During the 1970s, total public investment in the environment grew by over 250 percent, with an increase from around \$722 million in 1970 to over \$3.32 billion in 1980. It grew from 13 percent of gross fixed capital formation in 1970 to 14.7 percent in 1973 to 18 percent in 1980.³⁰ This is a significant mobilization of public resources during a recessionary period, since it exceeded the rates of growth for total public investment (139 percent) as well as for federal budgetary allocations to agriculture (121 percent), veterans' benefits (193 percent), and commerce and industry (236 percent) for the decade.³¹

The environmental ministry was less powerful than the foreign affairs ministry, however, and was unable to prevail with regard to French Med Plan positions. Internationally, the foreign affairs ministry had broader geopolitical ambitions in the Mediterranean to which the Med Plan was subordinated, and it therefore kept the scientists on a tight rein. The Quai d'Orsay supported overall compliance with international environmental law and was willing to defer to the environmental ministry's abiding interest in integrated environmental planning, about which it had no interest; but French delegates from the foreign affairs ministry were reluctant to accept the provisions in the protocol for control of land-based sources of pollution which

28. All data are drawn from interviews conducted by the author with USAID officials in Alexandria, Egypt, in January 1983.

29. See *Le Monde*, 24 February 1982, p. 30; and 8 October 1986, pp. 35–36.

30. Ministère de l'Environnement, Direction de la Prévention des Pollutions, *Données économiques de l'environnement* (Paris: Documentation Française, 1982), p. 15.

31. Calculated from data provided in Robert Delorme and Christine André, *L'Etat et l'économie: Un essai d'explication de l'évolution des dépenses publiques en France (1870–1980)*, suppl. 5 (Paris: Editions du Seuil, 1983).

covered river-borne and airborne transmission of pollutants and which banned the emission of radioactive substances, even though the environmental ministry supported them. At the Conference of Plenipotentiaries for the Land-Based Sources Protocol, scientific delegates had to telephone the Quai in Paris to authorize compromises.

Domestically, the epistemic community had a much stronger impact in France, since it was able to utilize its bureaucratic leverage. Because French scientists already had extensive domestic resources and ongoing research activities, they had much less direct interest in the Med Plan than did their colleagues from other Mediterranean countries, who could obtain needed equipment and prestige by participating. Thus, UNEP's deliberate strategy of transnational alliance building would not work well in France, and UNEP officials did not try hard to mobilize French scientists, in part because they did not want to appear to the LDCs to be closely linked to the regionally dominant French. However, although less involved than their Mediterranean colleagues in the direct policymaking associated with the Med Plan, the marine scientists in the French environmental ministry did share the beliefs of their Mediterranean colleagues about the causes of marine pollution and the need to control them, so they advocated policies similar to those advocated elsewhere by marine scientists.

In the clearest indication of policy derived from the Med Plan, on 16 June 1980 the French minister for the environment and quality of life announced that a new ten-year, \$380-million program for the construction of sewage treatment facilities along the Riviera was a direct response to the recently concluded protocol on land-based sources of pollution.³² A state-of-the-art sewage treatment plant in Marseilles opened in December 1987.

Following the adoption of the Med Plan in 1976, French investment in environmental protection grew. Investment from 1976 to 1980 was higher than that from 1971 to 1975, and investment on a per capita basis for the Mediterranean region exceeded the national average.³³ More than 6,000 new sewage treatment plants were put into service during the 1970s, and the amount of French population served by sewage treatment plants grew from 40 percent in 1975 to 60 percent in 1983.³⁴ From 1978 to 1983, total public and private investment in sewage treatment grew from 1.71 to 2.32 percent of the gross fixed capital formation and from 0.368 to 0.46 percent of the gross domestic product (GDP). Total nationwide environmental expenditures during this period grew from 1.54 to 1.7 percent of the GDP. The environment's share of total public investment grew from 14 percent in 1967 to 17.9

32. See *International Environment Reporter*, 2 November 1981, p. 643; and Ministère de l'Environnement et du Cadre de Vie, *L'Etat de l'environnement* (Paris: Ministère de l'Environnement, 1982), p. 41.

33. Ministère de l'Environnement, *Données économiques*, p. 16.

34. See *Actualité environnement*, no. 18, 9 June 1982, p. 1; and OECD, *The State and the Environment, 1985* (Paris: OECD, 1985), p. 54.

percent in 1981.³⁵ After adopting twenty-seven major pieces of environmental legislation between 1960 and 1981, the environmental ministry in 1981 turned to their enforcement.³⁶

Countries in which the epistemic community was unable to consolidate its power have been much less active in controlling pollution. In some states, such as Libya, Syria, and Morocco, there simply was not a domestic scientific establishment. In others, no strong domestic institution was put into place to provide the epistemic community with a channel to influence national policy. For example, Libya, Morocco, and Tunisia have only titular offices for the environment.

Epistemic communities and governmental learning

In response to new information about Mediterranean pollution, the states in which the epistemic community was most active have not only developed more sophisticated environmental policies to control more pollutants but have also sought to develop economic plans that anticipate possible environmental degradation through the preparation of environmental impact assessments. To the extent that governmental planning agencies actually follow such procedures, one may say that double-loop learning about the relative role of the environment in overall economic development occurred. In the absence of these procedures, single-loop learning is evident in efforts to incrementally manage more types and sources of pollutants.³⁷

Learning occurred in two domains, through a different process in each. In the domain of foreign policy, governments committed themselves to a new environmental regime for the Mediterranean. Learning seems to have occurred by persuasion, as marine scientists and members of the ecological epistemic community informed foreign ministry officials of the need to control specific pollutants. Consensual knowledge proved compelling to the uninitiated. In 1977, all of the countries chose to control land-based sources of pollution as a consequence of a report of the sources of the region's pollution.³⁸ Tunisian and Moroccan delegates were convinced of the need to extend coverage to organophosphate pesticides, despite their heavy eco-

35. Secrétariat d'Etat auprès du Premier Ministre, Commissariat Général du Plan, *Rapport du groupe de travail "Environnement,"* January 1983, p. 30.

36. *Ibid.*

37. For a description of single- and double-loop learning, see Chris Argyris and Donald Schon, *Organizational Learning: A Theory of Action Perspective* (Reading, Mass.: Addison-Wesley, 1978). Single-loop learning relates to the pursuit of new instrumental policies while the ends remain constant or unquestioned. Double-loop learning entails the recognition of new ends and the adoption of new means to accomplish them. Joseph Nye calls these "simple" and "complex" learning. See Joseph S. Nye, Jr., "Nuclear Learning," *International Organization* 41 (Summer 1987), p. 380.

38. UNEP/ECE/UNIDO/FAO/UNESCO/WHO/IAEA, *Pollutants from Land-Based Sources in the Mediterranean.*

conomic reliance on phosphate exports; and as a result of thorough documentation submitted by the secretariat, most of the LDCs were convinced of the need to control more industrial heavy metals than were covered under existing international law. The case of France, however, demonstrates the limits of persuasion. With its regional foreign policy prestige at stake, the Quai d'Orsay was only willing to accept policy advice from the French environmental ministry in areas about which the Quai was indifferent.

In the domain of domestic policy, by which the states complied with the Med Plan, learning occurred through bureaucratic preemption of policy-making by the environmental ministries. The epistemic community usurped decision-making authority and promoted pollution control policies consistent with its own perspective. As observed earlier, no learning occurred in countries in which the epistemic community was unable to appropriate control.

Throughout, changes in government policy did not directly follow from objective reports of coastal pollution or from the existence of consensual knowledge. In Algeria, for instance, governmental concern about changes in environmental quality were expressed only after the domestic marine scientists were identified as authoritative experts and had become entrenched in the government. When foreign observers had reported the same phenomena in the early 1970s, the Algerian foreign ministry officials had been deaf to outside advice.³⁹ They had also ignored extensive domestic evidence of coastal pollution from Algerian industry.⁴⁰

Learning did not result solely from the persuasive force of shared understanding. Persuasion did account for a small amount of the regime's broadened scope to include more sources and forms of pollution, but national compliance came from the power acquired by a new group of actors. Consensual knowledge is the common bond within this group, but it did not serve as a process of regime change. Instead, it served largely as a power resource for members of the epistemic community. With no basis for challenging their authority, they were able to use consensual knowledge to bolster their policymaking advice. The regime not only provided new evidence but, more important, it also empowered a group that was able to articulate what the evidence portended for Mediterranean governments and to suggest policies to alleviate anticipated problems.

In response to the advice provided by the epistemic community and its allied domestic marine scientists, as well as through their consolidation of domestic bureaucratic power, state interests were transformed. Algeria moved from a position of staunchly opposing the control of industrial pollutants to one of compliance with the Med Plan, as did Egypt. The governments learned

39. FAO internal memo, "Report on Travel to Algeria and Tunisia to Advise Algerian Authorities on Marine Pollution Problems and to Visit the UNDP/SF Fishery Survey and Development Project TUN 33." FAO FIRM/TRAM/672, May 1972, pp. 3-4; and FAO, "Fisheries Travel Report and Aide Memoire," no. 672, May 1972, p. 4. A UNDP consultant observed that "harbors are evil smelling places, in some places with gas and oil bubbling to the surface."

40. See footnote 27.

to accept the fact that ecosystemic transfer of pollution imposed limitations on the undifferentiated pursuit of their short-term objectives, which required more comprehensive management in order to minimize possible trade-offs between them. Long-term objectives, such as economic development and the enhancement of autonomy, remained unchanged. The governments thus became willing to accept the need to control new sources of pollution, even at reasonably high short-term costs.

Alternative explanations

The process of regime compliance described above contradicts three common explanations for the development of convergent state policies: foreign pressure (coercion), public opinion, and the rational anticipation of future benefits by a unitary government. Thus, the analysis offered in this case varies from the conventional (often tacit) analyses suggested by hegemonic stability theorists, the comparative analyses of domestic politics, and the more recent functional-institutionalist approaches of Robert Keohane and Robert Axelrod.

Neither the regime nor compliance was "imposed." The persistence of the regime does not lie with hegemonic support through bargaining,⁴¹ toleration of defections,⁴² or staunch enforcement of the regime's rules.⁴³ France was the hegemonic power in the region, with 42 percent of the Mediterranean gross national product (GNP) in 1978, with 20 percent of the region's marine research centers (second to Italy's 22 percent, but far in excess of the LDCs' capacities),⁴⁴ and with a high proportion of regional trade. Yet Algerian support for the Med Plan came when France's principal tool of leverage over Algeria was at its lowest: Algerian dependence upon trade with France had dropped from 27.6 percent in 1973 to 17.3 percent in 1980.⁴⁵ Contrary to conventional hegemonic stability arguments, Algerian compliance was actually strongest when French hegemony was weakest.

Compliance did not stem from popular mass politics in the Mediterranean countries either. Domestically, issues of marine quality were not highly politicized, and they remained within the purview of a small group of elites

41. See Arthur A. Stein, "The Hegemon's Dilemma: Great Britain, the United States, and the International Economic Order," *International Organization* 38 (Spring 1984), pp. 355–86.

42. See Robert O. Keohane, *After Hegemony* (Princeton, N.J.: Princeton University Press, 1984); and Charles Kindleberger, *The World in Depression, 1929–1939* (Berkeley: University of California Press, 1973).

43. See Robert Gilpin, *War and Change in International Relations* (Cambridge: Cambridge University Press, 1982); and Stephen D. Krasner, *Structural Conflict* (Berkeley: University of California Press, 1985).

44. UNEP, *Directory of Mediterranean Research Centres* (Geneva: UNEP, 1977).

45. International Monetary Fund, *Direction of Trade Statistics Yearbook*, 1978 and 1985. Reliance on trade with France fell from 32 to 23 percent of Algerian imports and from 22 to 13.4 percent of Algerian exports during the same period. Algeria accounted for under 1 percent of France's trade.

and technocrats in the environmental ministries. Citizen response was generally too weak and too delayed to influence the decision to control marine pollution. Although public acceptance and support of "environmental values," at least in Western Europe, were on the rise,⁴⁶ such support did not extend to marine issues. Public support for "environmental" issues in France from 1973 to 1975 overwhelmingly focused on the preservation of furry animals and the development of energy resources.⁴⁷ The Green movement in France, although receiving as much as 3.88 percent of the national vote in 1981 presidential elections, has been organized around issues of distrust of modern technocratic society rather than issues related to marine pollution.⁴⁸ Similarly, in Greece, environmental deterioration emerged as a popular issue in 1980, yet this was a response to Athenian air pollution.⁴⁹ Governmental concern with the environment preceded popular concern by several years. Very few citizens expressed systematic concerns about the Mediterranean, although in the mid-1970s an environmental organization successfully opposed construction of factories in enclosed gulfs, until it went bankrupt in 1982. In Israel, environmental protection appeared on the Knesset's agenda before it appeared in the popular press.⁵⁰

Nor did compliance stem from the rational anticipation of future benefits or from guarantees that other partners would not ride freely.⁵¹ The Med Plan does provide many of the functional goods that Keohane and Axelrod identify as being absent in international society (such as information about the environment and other actors' choices, a stable forum for interactions that reduce transaction costs, and a set of iterated sequences in which actors may hope to receive reciprocated concessions in the future), but their provision is insufficient to explain the full force of compliance with the regime. For example, the Algerian leaders' initial antipathy to cooperation was so severe that it does not seem credible that they were only grandstanding in order to obtain subsequent concessions. Algeria could have ridden freely in 1980 after observing France's decision to unilaterally enforce pollution control regulations; instead, within two years, Algeria chose to follow the French example. Viewed through "rational choice" lenses, a crude cost-benefit

46. See Ronald Inglehart, *The Silent Revolution* (Princeton, N.J.: Princeton University Press, 1977); and Lester Milbrath, *Environmentalists: Vanguard for a New Society* (Albany, N.Y.: SUNY Press, 1984).

47. *French Periodicals Index, 1973-1974, 1975* (Westwood, Mass.: F. W. Faxon, 1976).

48. Claude Journe, "Les idées politiques du mouvement écologique," *Revue française de science politique* 29 (April 1979), pp. 230-54.

49. Panayote Dimitras, Survey of Athenian Surveys, mimeographed, Athens, Eurodim, 1982.

50. Y. Yishai, "Environment and Development: The Case of Israel," *International Journal of Environmental Studies* 14 (November 1979), p. 208. Only four small environmental groups existed in the country.

51. See Keohane, *After Hegemony*, chap. 6; and Robert O. Keohane and Robert Axelrod, "Achieving Cooperation Under Anarchy: Strategies and Institutions," in Kenneth A. Oye, ed., *Cooperation Under Anarchy* (Princeton, N.J.: Princeton University Press, 1986), pp. 226-51. Robert Jervis uses this approach to explain the persistence of the Concert of Europe as well. See Robert Jervis, "Security Regimes," in Krasner, *International Regimes*, pp. 173-94.

analysis might suggest that defection would have been more profitable than cooperation for Algeria. By avoiding the expenditures related to pollution control, Algerian industry would have gained a comparative advantage that benefited Algeria as a whole, and the state would also have forgone investment expenditures in coastal factories (such as Sonatrech refineries) and municipal sewage treatment facilities. For Algeria and Egypt as well, the costs of controlling pollution may have outweighed the economic benefits of improved coastal water quality (for instance, benefits of increased fishery yields, decreased medical costs, and increased income from tourism) and the marginal benefits of technology transfer and training provided by UNEP. UNEP would most likely have continued to provide this support and support in the functional areas identified by Keohane and Axelrod, even in the absence of constructive Algerian and Egyptian diplomacy and domestic policy changes. Nonetheless, these two countries chose to comply fully with the Med Plan in the sphere of developing more comprehensive national policies (see Table 1).

Conclusion

The most notable aspect of the Med Plan is the domestic compliance with it. In the literature on international relations, few studies have focused on the reasons for which states actually comply with regimes. As argued above, coercion, public opinion, and anticipation of benefits do not fully explain the extent of compliance. The Med Plan's success was due to the regime's introduction of new actors who influenced national behavior and contributed to the development of coordinated and convergent policymaking in the Mediterranean states. In the face of uncertainty, a publicly recognized group with an unchallenged claim to understanding the technical nature of the regime's substantive issue-area was able to interpret for traditional decision makers facts or events in new ways and thereby lead to new forms of behavior.⁵²

Common principles and norms gave rise to a common set of rules for pollution control. The principles also empowered new domestic groups of marine scientists, who led their governments to comply more strongly with the regime and to negotiate more constructively internationally. In turn, the regime's scope was broadened and stronger rules were negotiated—rules with which most states have complied.

52. Note that this proposition skirts an epistemological dispute regarding the relativity and accessibility of the natural world. Does the intermediation of different cognitive frameworks and cultures preclude the possibility of achieving a single acceptable image of the natural world? Does such incommensurability imply the lack of existence of a single accessible objective reality? For a good review of the various competing philosophical perspectives on these issues, see Martin Hollis and Steven Lukes, ed., *Rationality and Relativism* (Cambridge, Mass.: MIT Press, 1982).

As this analysis of the process of compliance with the Med Plan shows, regimes can play a transformative role in international affairs. Within the analytic framework explicitly or tacitly accepted by most proponents of international regime theory, regimes are valued as stable forms to order international behavior and mitigate conflict in an anarchic world. But this conventional approach does not go far enough. Regimes may also contribute to the empowerment of new groups. By relating shared norms and principles to the codified social conventions of a specific group, light is shed on the origins of a regime's substantive nature, often overlooked in most regime analyses. With the presence and durability of new groups, regimes may not be static arrangements. They may be evolving arrangements that contribute to greater understanding, recognition of common interests, and convergence on a new set of policies.

Epistemic communities may introduce new policy alternatives to their governments, and depending on the extent to which these communities are successful in obtaining and retaining bureaucratic power domestically, they can often lead their governments to pursue them. In the case of the Mediterranean, where the new policies were more integrative and reflected an acceptance of the interplay between a number of different environmental forces, the pursuit of these policies constituted governmental learning. Governments learned about the complexity of the pollution problem and accepted the need for more comprehensive and coordinated policies to accomplish state and regional goals. Thus, both power and knowledge can be viewed as explanatory variables for state behavior.

Is this process of regime creation and interest recalculation generalizable? Other contemporary environmental regimes suggest that it may well be. The 1987 Montreal ozone protocol to protect the stratospheric ozone layer was completed after a similar ecological epistemic community became influential in the UNEP secretariat and well-represented in the U.S. delegation to the Montreal meetings.⁵³ Collective policies for the control of European acid rain were adopted in the 1979 Economic Commission for Europe (ECE) Convention on Long-Range Transboundary Air Pollution after atmospheric scientists were consulted about the origins of regional acid deposition. The two principal sources of acid deposits, the Federal Republic of Germany and the United Kingdom, both became more supportive of multilateral controls and imposed domestic controls. Scientists' access to policymakers was facilitated in Germany by widespread dismay over the possible loss of the

53. In this case, the epistemic community had to actively defend itself from groups within the U.S. administration who opposed stringent controls on chlorofluorocarbons. The epistemic community only prevailed four months before the final adoption of the treaty, after four months of internal policy review by the domestic policy council. See David Doniger, "Politics of the Ozone Layer," *Issues in Science and Technology* 4 (Spring 1988), pp. 86-92; and Peter M. Haas, "Ozone Alone, No Chlorofluorocarbons: Epistemic Communities and the Protection of Stratospheric Ozone," paper presented at the 1988 annual meeting of the American Political Science Association. The most recent measures introducing the Montreal ozone protocol into U.S. policy are discussed in *Federal Register* 53 (12 August 1988), pp. 30566-619.

culturally valued Black Forest. In Britain, the influence of the scientists has been vitiated by the countering interests of public utilities and industries, and Britain has thus been less supportive of the overall initiative than have other countries.⁵⁴

The failure to adopt a U.S.–Canada acid rain regime may well hinge on the failure of an epistemic community to gain access to high-level U.S. policymaking bodies.⁵⁵ In the case of the Med Plan, ozone protocol, and the European acid rain policies, new actors were consulted because of uncertainties about the environmental problems. In this case, however, it is already manifestly clear that the United States as a whole stands to gain by making Canada bear the externalities of U.S. energy generation, and the distribution of costs and benefits from possible global climate change is sufficiently well estimated so as to inhibit the U.S. government from delegating authority to ecologically inclined atmospheric scientists.⁵⁶

54. See Peter H. Sand, "Air Pollution in Europe," *Environment* 29 (December 1987), pp. 16–29; Armin Rosencranz, "The Acid Rain Controversy in Europe and North America: A Political Analysis," *Ambio* 15 (January 1986), pp. 47–51; and Economic Commission for Europe, *National Strategies and Policies for Air Pollution Abatement* (New York: United Nations, 1987).

55. Ecologists lack access to decision-making channels in the U.S. government. Proposals for a bilateral treaty by Environmental Protection Agency Administrator William Ruckelshaus in 1983 were ignored by the White House. See Walter A. Rosenbaum, *Environmental Politics and Policy* (Washington, D.C.: CQ Press, 1985), pp. 307–8.

56. See Walter Orr Roberts and Edward J. Friedman, *Living with the Changed World Climate* (New York: Aspen Institute for Humanistic Studies, 1982).