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Chapter 4

Events, Politics, and Environmental Change[1]

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Many social scientists now emphasize the study of politics in human-environment research (Blaikie 1999; Watts 2003; Robbins 2004). Aligning themselves under the general rubric of "political ecology," these researchers are largely pre-occupied with the influence that such factors as government policy, unequal access to natural resources, institutional structure, and competing environmental discourses can have on environmental outcomes. For many political ecologists, the environment is understood primarily or even exclusively as a political matter: constructed, controlled, and contested by political actors (Watts 2003). The primacy of politics in explaining human-environment interactions is so self-evident to many political ecologists that search for evidence for other causal factors is viewed as besides the point.

Vayda and I entered this discussion several years ago, offering a methodological critique of some of the burgeoning literature in political ecology (Vayda and Walters 1999). Our main point then was *not* to argue against considering political factors as possible influences on the environment; it is obvious that politics are often important. Rather, we argued against *always* making politics a priority in understanding environmental change. Such a priori bias, we argued, will discourage researchers from paying careful attention to actual environmental changes of interest and to evidence that might demonstrate such environmental changes to be caused by influences that are not necessarily political (Vayda and Walters 1999). We further noted that political influences, where they do occur, are likely to be more ambiguous in reality than common theoretical models and assumptions in political ecology allow.[2]

In that same paper, Vayda and I proposed an alternative approach to study human-environment interactions. We called this approach, "event ecology," and

I employ it here as the analytical methodology for evaluating causal links between events and for integrating relevant bio-physical and socio-economic information (Vayda 1996; Vayda and Walters 1999; Walters and Vayda n.d.). With event ecology, research is guided by open-ended questions about why specific environmental changes or "events" of interest have occurred. It then seeks to explain such changes by making causal connections to prior events, in so doing constructing causal chains outward in space and backward in time. Avoiding as much as possible a priori assumptions about which events are likely to do the explaining, socio-economic and bio-physical information are sought as evidence where the researcher anticipates their having relevance to answering specific questions of interest. Counterfactual reasoning is then applied to evaluate the plausibility of specific causal relationships (Hawthorn 1991; Tetlock and Belkin 1996).

This paper will present results of a study where event ecology was applied. In so doing, it will engage directly the claims made by political ecologists about the importance of political factors in human environment research by illustrating how event ecology was effectively used to analyze *both* political and non-political human influences on mangrove forests in the Philippines. Findings here will show that political influences were sometimes, but not always important for explaining anthropogenic changes to mangrove forests. Furthermore, findings will illustrate that political influences, where found, were not always consistent or predictable in their consequences.

Study Area and Research Methods

Empirical findings presented here are based on field research into the causes and consequences of mangrove tree cutting and planting in the Philippines. Study sites and research methods are described elsewhere (Walters 2000, 2003). Briefly, field work was conducted in 1997 in North and South Bais Bay (9N/123E) and on Banacon Island (10N/124E), Philippines. Banacon is a small island, located five km off the northwest corner of Bohol Province and about thirty km east of Cebu City. It includes over five hundred ha of mangrove forest, much of which is planted, and fifteen ha of dryland on the eastern tip where about 550 households are crowded. Ninety percent of these households today derive their principal income from fishing and related activities.

North and South Bais Bay are located on the eastern side of Negros Island and together occupy an area of 5400 ha. The bays are bounded on the east by Tanon Strait, and on the west by a one to four km wide band of flat alluvial plain which rises into steep hills and mountains. The growing of sugar cane on large *haciendas* in the lowlands and small farms in the uplands, and the production of sugar by local industrial mills has dominated the local political economy of Bais for over a century (Walters 2003; Walters et al. 1999). The marine environment of North and South Bais Bay supports a diverse and productive fishery, the economic backbone of a dozen villages which ring the two bays (Luchavez and Abrenica 1997). Extensive mangroves have also been cleared and the lands developed into brackish water fish ponds (Walters 2003). The coastal perimeter of Bais Bay today is fringed by narrow bands of mangrove forest, much of which was planted. Larger natural stands of forest are also found at the mouths of two rivers and extending as a peninsula across the seaward front of South Bais Bay.

A mixture of ethnographic and ecological methods was used in the study. I interviewed 215 coastal residents in the study areas, 158 of whom had planted mangroves. In the interviews, people were asked about the history of mangrove changes, their use of mangrove resources and motivations to plant mangroves, etc. Thirty-two key informants (government officials, mangrove scientists, etc.) were also interviewed to understand relevant changes in policy and to seek "expert" opinion on such topics as the causes of mangrove deforestation and reforestation. A variety of secondary sources of information were consulted, including maps, property surveys, unpublished government statistics, policy and legal documents, published and unpublished technical reports, and historical records.

I integrated information from interviews and secondary sources with data collected from bio-ecological assessments of mangrove forests and their environments. In general, I made efforts to confirm empirical claims made about mangroves by interviewees by visiting specific sites with them. I also measured the spatial dimensions and planted tree densities of 123 mangrove plantations in nine different villages. To study more systematically the influence of human actions on mangrove forest composition, structure and regeneration, I made replicated measures across a range of sites and forest types using a standardized, 10m x 10m census plot. A total of nineteen plots in natural mangrove forest and thirty-three in plantations ranging from five to sixty years of age were surveyed in this manner. Data on nearly six thousand trees and two thousand seedlings was recorded. As well, to corroborate the literature and local claims being made about the influence of environmental factors, I systematically sampled water salinity, soil depth & particle size, tidal inundation, and shell infestation rates across different sites.

Government Policies as Causes of Environmental Change

The influence of government policies on mangroves in the Philippines has been little studied. Mangrove wood makes superb quality fuelwood and, for decades, forests were intensively harvested by commercial operators who gained exclusive access to sites with government forest product concessions (Brown and Fischer 1918; Wernstedt and Spencer 1965:89-90). Even more significant has been the widespread cutting and clearing of mangroves to make space for brackish-water aquaculture ponds, a practice at times promoted under a series of national policies and programs (Villaluz 1979; Sidall et al. 1985; Primavera 1995).

I found evidence that such policies had, in fact, influenced mangroves in Bais Bay and Banacon Island. For example, large tracts of mangrove forest in both areas had been leased between the 1940s and 1979 under forest product concessions for commercial firewood harvest (Walters 2003). In both cases, mangroves were being cut and the wood sold to bakeries and other industries in the respective regions. Evidence from ecological surveys and oral accounts revealed dramatic impacts of concession harvesting on forest structure and composition (Walters 2005a, 2005b). Yet, the ecological effects of the forest concessions also clearly varied between the two sites. In particular, the class of mangrove trees most valued, *Rhizophora* spp., had been virtually extirpated from areas held under the concession on Banacon, but remained abundant under the concession in Bais. The explanation for this difference was significant, albeit straightforward. Over a two to three decade period, the firewood concessionaire in Bais had paid his employees to re-plant *Rhizophora* trees following cutting as a regular part of the site's management. In contrast, the concessionaire on Banacon appears to have not practiced re-planting at all and, as a result, left behind a site significantly more denuded of tree cover.

A second example of policy influences pertains to a program implemented under the national Integrated Social Forestry policy that allocated over three hundred household-based leases to mangrove areas in Bais Bay between 1986 and 1997. The intent of the program was to encourage local people to plant and manage mangroves through the provision of enhanced tenure security (most mangroves are on public lands). Many planted areas in Bais today do, in fact, coincide with such leases, suggesting that the program has motivated widespread local planting. But research revealed that only a small number of planters who held leases actually began planting mangroves in response to receiving a lease. Instead, most planting within lease areas was found to pre-date lease allocation. Furthermore, some previously existing mangroves and mangrove plantations had actually been cut to clear space for homes or fish ponds following lease allocation. For these households, the added tenure security not only failed to encourage planting, but it actually emboldened the cutting of existing mangroves!

Political-Economic Causes of Environmental Change

A great deal of political ecology is focused, not on policy analysis per se, but rather on structural/political-economic analysis of such factors as unequal access to environmental resources and decision making. Given the highly skewed distribution of economic wealth and political power in the Philippines (Balisican 1992; Riedinger 1995) and the dire condition of much of the nation's environment (Myers 1988), it should be no surprise that this brand of political ecology has gained some popularity among Philippine researchers (e.g., Broad and Cavanaugh 1993; Montes and Lim 1996). However, the relationship between inequality and mangrove change was found to be complex and ambiguous.

The cutting of mangroves in certain sites in Bais Bay to make space for residential housing illustrates how events which create inequality can lead to environmental degradation. Specifically, the vast majority of lands in lowland Bais are owned today by a small number of families, the result of a historical sequence of events: settlement, land acquisition & accumulation, and the subsequent development of *hacienda* agricultural estates (Walters 2003; cf. Billig 1993). A great number of poor and middle-income families in Bais are technically landless as a result, and some of their settlement has concentrated along the coast in places where *hacienderos* have never established formal claims or have voluntarily ceded small parcels to permit residence by hacienda laborers and their families. Being useless for agriculture, inter-tidal mangrove lands were initially overlooked by the haciendas and national legislation subsequently attempted to prevent their privatization. Most mangroves are thus technically in the public domain and, as such, perceived by landless persons as potential settlement sites. Extensive mangroves in some areas have been cut and cleared for this purpose. In fact, so accepted was the use of mangrove lands for settlement that the local government has intervened on several occasions to finance the reclamation of large tracts of mangrove adjacent to the town proper to provide residential housing sites for landless residents (Walters 2003).

But events that resulted in unequal access to mangrove resources have also had positive environmental effects. For example, considerable evidence suggests that stewardship of mangroves under the commercial firewood concession in Bais was effective because cutting was regulated and re-planting done vigorously and on a large scale. By contrast, the site experienced its most severe degradation in the years between when the concession was canceled in 1979 and when the local government initiated aggressive management of the area as an ecological reserve in 1992.[3] During the interim, people from villages throughout north and south Bais Bay and possibly from even further away cut mangroves freely without replanting, and some began staking claims and clearing sites for fish pond development (Walters 2003).

Compared to Bais, stewardship of the Banacon Island firewood concession was relatively poor and environmental impacts comparatively more severe. Locals were excluded from cutting in most areas, but cutting by the concessionaire for commercial sale undoubtably far surpassed what the relatively small population of local residents would have cut had they unrestricted access. And as was noted in the previous section, no attempt was made by the concessionaire on Banacon to reforest the site following cutting. Yet, the presence of the concession on Banacon had an important, unintended environmental consequence for the mangroves there that has proven to be positive in the long term.

Specifically, the exclusion of local residents from cutting mangroves within the concession boundaries on Banacon was a key event motivating local people to plant mangroves. The reason was that planted mangroves (as well as other trees) in the Philippines are customarily owned by the person who plants them, even where such trees are located on lands not owned by the planter (Walters 2004). Residents were thus able to address the problem of local wood scarcity created by the imposition of the concession by planting their own mangroves within the concession boundaries. Once introduced and shown to be effective, mangrove planting spread in the community and planted mangroves began to replace areas previously degraded from cutting under the concession (Walters 2004). Such planting has continued to proliferate since the cancellation of the concession in 1979 and has become a normal cultural practice that is, in itself, creating its own political-economic dilemmas. For example, while planting has been widespread in the community, ownership of many planted stands is gradually concentrating in the hands of a small number of local elites (Walters 1998, 2004).

In Bais Bay, mangrove planting has long been practiced by persons with varied incomes and interests. Many fishermen plant, but entrepreneurs and wealthy land and fish pond owners have been among the most ambitious planters and protectors of mangrove forests. In general, there was no consistent relationship found between income status and mangrove forest use. Individuals from varied income brackets contributed substantially to mangrove destruction at some times and in some places, and contributed to restoration or protection in others.

Non-Political Causes of Environmental Change

Evidence thus far presented shows that policy and political-economic influences were important for understanding certain changes to the mangroves in Bais Bay and Banacon Island. In this section, illustrations will show that recourse to political causes was often insufficient and at times altogether unnecessary for explaining environmental changes of interest. By contrast, non-political influences, including some that can be classed as micro-economic, environmental or cultural/cognitive in nature, were found to be critically important.

Discussions of mangrove cutting, in particular, have thus far focused on the impacts of commercial concessions. But mangrove wood has also long served as a source of domestic cooking fuel and fish trap/weir construction wood for coastal residents in Bais and Banacon. In fact, the effects of commercial cutting of mangroves are overshadowed in many areas (both inside and outside former concession boundaries) by the effects of cutting for domestic consumption (Walters 2005a, 2005b). Cutting intensity and selectivity for domestic consumption has reflected a genuine preference for using mangrove wood over other sources because it is considered by most to be better quality, both for fuel and fish trap/weir construction, and because it was historically often available to collect freely from natural areas. Spatial patterns of cutting reflected such political factors as restrictions imposed by commercial concessionaires, as already noted. But as well, non-political factors like the geographic proximity to settlements and ease of physical access were found to be critical for understanding patterns of cutting and associated forest degradation. In short, mangroves near settlements and easy to access by small boat typically evidenced the most severe cutting impacts (Walters 2005b; see also Wernstedt and Spencer 1967).

Local planting of mangroves is also widely practiced by local residents in both Bais and Banacon and has profoundly important consequences for the distribution and composition of forests in both areas (Walters 2000, 2003). Patterns of planting vary considerably, both between and within the two study areas. In Bais Bay, in particular, plantations are highly patchy in distribution: abundant at some sites, rare in others, and totally absent in still others. Part of this patchiness reflects local knowledge of storm weather patterns and their potential impacts: people often plant adjacent to fish ponds and seaside homes to protect against storm winds and waves (Table 4.1). Such planting emerged as an adaptation to local environmental conditions and spread primarily through the mechanism of imitation (i.e., the "neighborhood effect") from household to household or fish pond owner to fish pond owner (Vayda et al. 2004).

Table 4.1. Motivations to plant mangroves in Bais Bay and Banacon Island

Motivation to Plant Mangroves	Percentage of Respondents (n = 190)
Storm Protection	47.4
Fish Trap/Weir Construction Posts	43.6
Told to Plant by Officials *	13.5
Firewood Source	11.5
Tenure Security *	9.6
Capital Investment/Savings	9.6

Motivations that can be seen as political are noted with *. Figures represent the percentage of planter respondents indicating said motivation.

Mangrove planting was found to have obvious political consequences, such as conflict over land, in some cases.[4] Furthermore, it is clear that some planting can be explained at least in part as having been politically motivated or influenced. For example, landlessness has forced many people to settle along the coastline, increasing their vulnerability to storm damage and thus influencing their motivation to plant mangroves for this purpose. However, most cases of mangrove planting were not well explained either by individual motivations that were clearly "political" in nature (Table 4.1), or by larger political factors. Specifically, the majority of planters are fishermen and most fishermen *prefer* to live close to the shore so that they can land and store their boats and gear close by. For them, shoreline property is a valued asset, even if it comes with certain environmental risks.

Having documented the importance of mangroves as storm buffers, it was perplexing then to observe that many seaside homes and fish pond dykes remained unprotected by such forests. Seeking to explain this, I subsequently learned that many households and fish pond owners had planted mangroves, but these had died. Further interviews combined with survey work along the shore revealed that environmental events, especially shell infestations and wave impacts, were a common cause of planted mangrove mortality and precluded the successful establishment of mangrove plantations in numerous sites in North and South Bais Bay (Walters 2000, 2004). These findings, in fact, corroborate well the experience of mangrove planting projects elsewhere in the country (Calixto Yao, Pedro Balagas, Hilconida Calumpong and Jurgenne Primavera, personal communication).

Another common motivation to plant mangroves is the desire to establish a ready supply of construction wood, especially for use in construction of fish traps/weirs, called *bunsod* (Table 4.1). As already described, planting on Banacon Island was motivated in that context in large part by political influences: a response to wood scarcity created by an exclusive firewood concession. However, planting has continued and even accelerated there since the cancellation of the concession. The result is impressive: about one-third of households have planted 400 ha cumulative in area.

The situation is more complex in Bais Bay. There is evidence that some planting was similarly motivated in response to local wood scarcities created, in part, by elite control of mangrove areas, including the firewood concession. As well, areas available to plant are scarce, in part due to environmental constraints as already discussed, but also because fish ponds and other plantations occupy many of the potentially suitable planting sites. In this sense, political influences can explain the *presence* of planting in some areas and its *absence* in others. As is the case for planting for storm protection, however, much of past and most of current planting for construction wood in Bais can be explained without regard to political influences. Specifically, planting is a micro-economic response by fishermen who view the practice as a relatively easy and efficient alternative to acquiring fish trap posts from natural sources or buying them from other fishermen or local markets (Walters 2004). As long as fish trapping remains common, such planting is likely to continue.

Finally, the discussion of planting has thus far focused mostly on explaining changes to forest cover and distribution. Yet, planting is also environmentally significant because it changes the species composition of mangrove forests. In short, plantations tend to be dominated by *Rhizophora* spp. as compared to natural forests, which typically include a mix of *Rhizophora* spp., *Avicennia* spp., *Sonneratia* spp. and others (Walters 2000). These differences reflect the fact that planters tend to plant only *Rhizophora* spp., and they do so for two reasons. First, *Rhizophora* is widely regarded as the best tree type for construction wood because stems tend to grow straight and the wood is especially hard and durable. However, most people planting for storm protection also plant *Rhizophora* and do so, not out of species preference per se, but because the reproductive biology of *Rhizophora*, especially *R. stylosa* and *R. mucronata*, make them especially easy to plant as compared with other mangrove tree species (Vayda and Walters 1999; Walters 2004).

Discussion and Conclusion

Political ecologists have made considerable contributions to recent empirical and theoretical debates in human environment studies. Yet, questions of analytical methodology have been neglected by them. The work of British geographer Piers Blaikie is especially noteworthy because of its general influence on the development of political ecology, but also because it stands out as one of the few attempts to propose an analytical framework for linking such disparate phenomenon as soil erosion to government policies or international commodity markets. Event ecology bears resemblance to Blaikie's proposal to build "chains of explanation" across different scales so as to link the actions of local people with non-local, political-economic influences (Blaikie and Brookfield 1987; Blaikie 1989). Unfortunately, Blaikie's framework has proven difficult to apply empirically (Batterbury and Bebbington 1999). Blaikie, himself, has since acknowledged that his approach provides little guidance for establishing actual causal connections between social and environmental phenomenon, especially where such interactions are occurring over historical time and at different scales (Blaikie 1999:140). By contrast, event ecology directly addresses these central analytical challenges and, as such, perhaps offers a solution to the dilemma facing Blaikie and other political ecologists who have followed in his foot steps (Walters and Vayda n.d.).

The findings presented in this paper show that event ecology is effective for demonstrating causality between local environmental changes and both political and non-political human influences. Given the number and diversity of mangroves users in the study areas, it was no surprise to learn that human influences are varied and complex. Political influences—notably government policies, commercial market pressures, and resource access inequalities—were found to be important in many cases for explaining anthropogenic changes in mangroves. But important environmental changes were also shown to reflect other influences, among these: environmental impacts on planted tree survival; local knowledge of means to ameliorate storm impacts through mangrove planting; micro-economic preferences for different types of wood and different means of obtaining such wood; neighborhood and proximity effects in knowledge transfer and patterns of wood harvesting; and variation in the reproductive biology of different mangrove tree species.

Given these findings, event ecology as a research methodology can be seen as notable in three important respects. First, event ecology seeks explanation of environmental change in terms of causal connections between specific, concrete events and, as such, contrasts with analytical approaches that emphasize the development and testing of general theory or the application of regression models (Walters and Vayda n.d.). It thus shifts explanatory weight away from general, often vaguely defined *conditions* and socio-political *structures* (e.g., wealth, inequality, bureaucracy, capitalism) toward the articulation of more precise causal chains and mechanisms operating in particular places at particular times. Thus for example, the presence of highly skewed wealth distribution in Bais is not simply posited as a cause of mangrove degradation because the two coincide. Instead, the researcher must empirically demonstrate the specific causal connections between the specific environmental changes of interest and antecedent events which may have arisen because of such inequality.

Second, event ecology reduces theoretical bias and a priori assumptions in research investigations. The discovery of so varied a range of human influences on mangrove forests would not have been likely had I gone into the field with strong biases reflecting any one or two particular theoretical models. In explanations of environmental change or people-environment interactions, this point has been made by Vayda and Walters 1999 and McGuire 1997 with respect to not privileging politics and political factors and similarly by Vayda, Walters and Setyawati (2004) with respect to not privileging cultural or local-knowledge factors. This is not to say that my research would have benefited or could have been possible had I gone into the field a veritable theoretical *tabla rasa*. To the contrary, having familiarity with any and all different theoretical perspectives, including political ecology perspectives, did prove useful for interpreting empirical findings (Walters and Vayda n.d.; cf. Vayda 1996). Nonetheless, the study findings show that even something as apparently straightforward as mangrove tree planting or tree cutting may involve a complex series of causal events and situational factors that is not likely to be captured by one or two variables or theoretical models alone.

Finally, not only was event ecology effective for showing the influence of politics, but it revealed that political influences were often ambiguous where they did occur. For one, identical government policies or programs were shown to have varied and, at times, unexpected environmental outcomes, as the comparison of firewood concessions and household plantations illustrated. In both cases, I likely would have failed to learn of this variation were it not for the fact that I began with careful observations of different mangrove sites, and sought to explain environmental differences between them.

To further illustrate this point, consider that much literature in political ecology suggests that inequality and elite control of environmental resources fosters their destruction (e.g., Peluso 1992; Broad and Cavanagh 1993; Montes and Lim 1996; Watts 2003). Yet, research findings here show that the relationship between inequality and mangrove stewardship is ambiguous (cf. Baland and Platteau 1999). On the one hand, the fact that landless residents in Bais are sometimes forced to settle in mangrove areas for lack of any realistic alternative illustrates that events which create inequality can cause environmental degradation. On the other hand, intensive forest cutting for a range of wood uses has been done by rich and poor, alike. Ambitious persons have had the will and wealthier individuals the means to inflict destruction of mangroves on a relatively greater scale than others, and they have certainly done so in many cases. But the most impressive examples of mangrove planting and conservation were typically also done by political and economic elites. In fact, those who excelled most in forest cutting at some periods or in some places often were the same individuals who excelled most in forest planting and protection at other times and places (personal observation). This may seem ironic, but should not be surprising given the more general finding that mangrove stewardship through planting and protection is done typically for pragmatic reasons—protecting property, assuring long term access to wood supplies, etc.—and pragmatic priorities often change with changing circumstances. This paper has argued that event ecology may assist human environment researchers to better study such contingent interactions between people and the environment.

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Notes

1. An earlier version of this paper was presented at an invited session, “New Directions in Political Ecology,” at the Annual Meeting of the American Association of Anthropologists, San Francisco, November 18-23, 2000.

2 . Our critique of political ecology represents one part of our wider, general critique of theory-driven research in human-environment studies (see also Vayda 1995, 1996, this volume; Vayda et al. 2004; Walters et al. 2005; Walters and Vayda n.d.).

3. The site, called *Talabong*, was designated a local wildlife and fish sanctuary in 1985, but effective enforcement of cutting regulations was not instituted there until a change in local government administration in 1991 brought into power a pro-conservation mayor (Walters 2003).

4. For example, some fish pond owners and home owners have planted mangroves in areas previously used for fishing, shell and firewood collecting, and boat passage. Such planting has in cases triggered violent conflict between users (Walters 1998).