

SUSTAINABLE COMMUNITIES REVIEW



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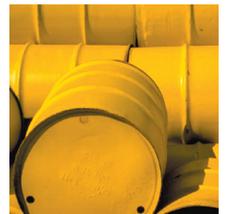
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The Struggle for Sustainability:
Past Practice, Future Possibilities
Diana Ortega-Villaseñor



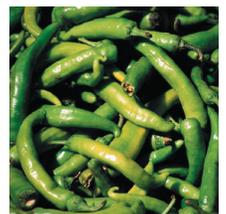
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Merges traditional concerns for the environment with the social and cultural aspects of community life. The Review seeks to broaden the traditional focus of sustainable development to include other dimensions of community life that promote sustainability, such as empowerment, education, enterprise, and environment. The Review features cutting edge thinking in a reader-friendly style. We welcome articles, commentaries, and news about ways to engage all citizens in sustaining quality community life and healthy environments to be submitted for consideration for publication. Back issues of the Review can be accessed at <http://www.cps.unt.edu/scr/>. The publisher, the University of North Texas, and the sponsors assume no responsibility for any statements of fact or opinion expressed in the published papers or advertisements.

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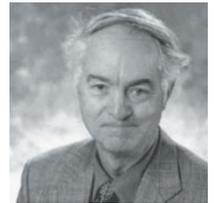
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From the Editor

Stanley R. Ingman

Sustainable Communities Review Editor



As we approach this issue, the global community struggles to deal with three crises on this planet: 1) global poverty, 2) ecological decline and 3) systemic and individual corruption. The papers and book reviews in this issue touch upon these three crises implicitly and explicitly.

Atkinson, Faris and Canter review the startling decline of the Steller sea lion. Early in the 1970's there were 250,000 and in 1970, their population had declined to 38,000. The process we have for protecting various specific species on this planet represents perhaps the best of and the worst of humanity's attempt to slow down ecological decline. We seem unable to focus on general environmental protection. By reducing our focus to one species we can secure the best of science to inform our policy and attract public interest for some species. This focus on a single specie survival has held back questionable economic development as it also generates public opposition on many occasions. Researchers like Atkinson, Faris and Canter in their reports show well the "interconnectedness" of all species to ecological well being, however, the media does not provide the details and thus, often citizens do not become more "biologically literate" and general population support for environmental reform may actually decline. The media spin masters will need to be challenged when they present simplistic models like for example, "who needs elephants or sea lions?"

Diana Ortega addresses the public's general understanding of how our education about the interrelationship of economy, culture, and nature is lacking. She suggests the concept of sustainable development can assist us in our attempt to more fully understand how to maintain a better balance between ecological protection and economic justice.

Immigration from low-income nations to high income nations is partly a result of the ever increasing income gap between low and high income nations. With a concern for the limits of ecological systems in USA, John Cairns' paper argues that we should limit migration across our national borders because of the negative impact on the "carrying capacity." First, policy to reduce pressure on the threat to ecological system unrelated to particular nation states seems to be of paramount importance. Second, the USA and Europe have the best chance of integrating population growth with sound environmental policies. As Jeremy Rifkin argues in *The European Dream*, (2004), mankind's best hope for sustainable development may come from the Europeans. The lower consumption rates and high saving rates among Europeans as opposed to the citizens of USA, give Europeans some hope to lead the way forward. With the global economic inequities increasing, simplistic policies to restrict population movement across the globe will not succeed in the final analysis.

Dr. Kimuna's analysis of "hazardous waste transfer to Africa" puts into sharp relief the "ecological footprint" issue. As a society the USA can transfer its waste to low-income nations where corruption is high or transparency is extremely weak, and high-income societies can escape the local impact of their own consumption. The pressure to practice "sustainable business practices" is weakened, and people of low-income societies are forced to experience economic inequities along with increased environmental health risks. It is reasonable to assume that societies with weak regulatory structures cannot easily defend themselves from the global merchants of hazardous waste.

The article on domestic violence, by Mark H. Sandel, directs us to return to the micro level of community and family life. The migration of men first, and later families across borders in search of work is a major social environmental hazard of our global order. Mexican men moving north, leaving mothers and sometime grandparents to care for children on their own is the Texas story in the migration debate. Pragmatically, while migration leads to social disorder, the remittances from high-income societies by foreign workers to low-income societies plays a major role in sustaining life in Mexico, Haiti, India, Bangladesh and Central America. While the culture of sexism and violence explains, in part, domestic violence rates, the economic mal-distribution on this planet increases the probability of domestic violence rates rising. Thus, for various reasons economic migration carries an ecological and social cost, as well as some benefits. Policies that allow migrants to travel back and forth may assist family stability as well as allow in time economic cross-border gaps to shrink.

Our final article by Bradley and Katzir attempts to address how local communi-

ties and family sustainability can be increased, and migration from places like rural Mexico to urban areas in Mexico and to the USA can be decreased. They discuss how with modern techniques of simplified hydroponics and micro-farming, men and women can maintain a family life without leaving the countryside. In the small villages surrounding Lake Chapala, south of Guadalajara, farm laborers receive \$6-10 per day. If the food bill can be lowered by home production of vegetables and other produce, the viability of family life for the poorest families may be able to be maintained.

The books reviewed in this issue underscore the challenge civil society faces to produce a more ethical globalization process. As Clark in *Worlds Apart* notes our commitment to simple-minded market idolatry will continue to lead us toward more ecological decline. Chris Wright in *A Community Manifesto* points to four weak points in modern economic models: The global money economy, large-scale agribusiness, modern command and control systems, and the cult of the individual. His particular solution points to the barter economy or social economy model (LETS exchange networks) has one small way to provide a buff against the anti-social dimensions of laissez faire capitalism. Paehlke in *Democracy Dilemma* asks that we link environmental reform policy to issues of social equity as we address the process of globalization. Callicott and Freyfogle as editors of *Health of Land* collect papers that address another strong belief or ideology, namely our simple notion of "controlling nature." This belief still seems to allow us to think that technology and market mechanisms will easily solve most social and environmental challenges across the world. Allen in *Uneasy Alchemy* outlines how Louisiana has become a poster child for ecological and social injustice in the United States. Gonzalez (Zapotec Science) in reviewing farming practices in Mexico asks whether factory farming practices may damage the land of Mexico. Two of our volumes (Hicks and McNutt, Clark) look to the internet to mobilize citizens to address the challenges present above and push for more sustainable behavior and policies. If we are to make more moves toward international environmental laws, we will need to develop a full range of tools to educate citizens and policy makers. The story about Cathy Steward-Ganz in the *North Texas Magazine* in Fall 2003 is a local example of a teacher in Grapevine, Texas, moving the environmental education forward in one local school (www.unt.edu/northtexas/archives/f03/taste.html)

Initiatives in the Americas

In the last year, in our projects in Mazamitla, Chapala and Colima, Mexico, we also tried in many small ways to move sustainable development forward in

Mexico. Our colleague, Raanan Katzir, M.A., Sustainable Agricultural Extension Specialist from Israel conducted workshops in Tecoman, Colima, Jocotepec, Chapala and Mazamitla for two weeks. Over 130 individuals discussed such issues as drip irrigation, organic pest control and solarization in arid areas to control herbs and pests.

The big event of this year was the June Conference in Mazamitla entitled: "Poverty, the Face of the Modern Day Slave." One hundred fifty people attended the conference. The Mexican Secretary of Environment, Alberto Cardenas, provided the keynote address. Various other speakers dealt with the rates and causes of poverty in Mexico and elsewhere, and what might be some solutions.

In 2005, the Second International Conference will be held in Mazamitla (May 26-28, 2005). Syl Flores, working in Mazamitla for the past four years, has witnessed some significant steps taken by local leaders and citizens including: 1) movement of solid waste to a modern new site outside of town, 2) creation of a kitchen next to a school in San Martin to feed hungry children, and 3) the operation of a tortilla production factory and stand in Huevera by eight women. In the last six months we saw the establishment of a "First Contact Hospital" in Mazamitla (a \$1 million investment), and a small cooperative textiles factory in Flor de Campo, near Mazamitla (\$40,000 loan from SEDESOL) is scheduled to open in 2005. Trout farm ponds are also planned for the coming year.

In October of 2004, we had some significant meetings in Denton with colleagues from Universidad de Colima, University of Regina, Emporia State University and University of North Texas to discuss the exchange of students from Canada, Mexico and USA across three societies to promote sustainable communities education. Six higher education institutions will be initially involved. Once again it is encouraging to learn how many universities have sustainable campus programs, students exchange programs and off-campus development-oriented programs in other nations.

After reviewing our activities of last year and the content of our articles in this issue, I am more convinced that we have three fronts to address as we all cooperate to improve the chance of planetary survival. As I argued in Mazamitla in June, "service learning" for students and citizens (www.easi.org) is a small step toward more ethical behavior and less corruption on this planet. Students in high schools and universities involved in ecological protection and community development as part of their education will be slightly less likely to be blind to economic and environmental challenges. Education on the environmental struggles we face as we provide economic stability to more and more families

is one crucial step that all campuses can adopt to educate new citizens of our respective societies. Regardless of whether our planetary communities are organized under democratic socialism or principles of capitalism, we have not solved the problem of economic equity. Around the world some two-thirds of our citizens still live in poverty. Corruption and unethical behavior make it more difficult to address economic inequity and ecological decline.

Sea Lions, Fish and Jobs: A Case Study of the Interactions of Policy, Economics and Science

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Vitus Jonassen Bering is credited with the European discovery of the north west coast of North America in 1741. Among the 76 crew on his vessel, the *St. Peter*, was a German naturalist and physician, Georg Steller (Steller, 1743). During their journey of discovery, and especially while shipwrecked during the winter of 1741 and 1742 on the Aleutian Island now known as Bering Island, Steller wrote a manuscript that was published ten years later as *De Bestiis Marinis* (The Marine Beasts). This book

described numerous animals that he encountered, including the now extinct “sea cow” (the only known manatee that lived in cold climates), and a large, aggressive, roaring sea lion. The sea lion, now named the Steller sea lion (*Eumetopias jubatus* translation: Eu=true or fine, metopias=broad forehead, jubatus=mane, or “true broad forehead and fine mane” as Steller described the large males) is the centerpiece of this case study.

Steller sea lions are large marine mammals. Males can reach over 550 kilograms (1,200

pounds); females over 250 kilograms (550 pounds) (Harmon, 2001). Females mature at 4 to 5 years, males at 7 years, but they are unable to begin defending territory and harems until 9 to 13 years of age (Pritcher and Calkins, 1981). Steller sea lions arrive at rookeries located from the Kamchatka peninsula in Siberian Russia, through the Aleutian Islands, and to the U.S. and Canadian coast in May, giving birth to pups within a few days. Breeding begins about 10 days after birthing, and the cycle continues, as it has for tens of thousands of years. These mammals consume many species of fish, (Imler and Sarber, 1947; Wilke and Kenyon, 1952, Thorsteinson and Lensink, 1962; Fiscus and Baines, 1966; Pritcher, 1981), and by the time they are adults can dive to approximately 250 meters (820 feet) (Merrick and Loughlin, 1997). Walleye pollock, Pacific salmon, sand lance, flatfish, cod, herring, capeline, cephalopds, bivalves and gastropods have been found in their stomachs or scat. It appears that pollock contributes substantially to its diet, as about 55% of stomach analyses contain some amount of this fish.

Decline of the Steller Sea Lion

The reason the Steller sea lion is at the heart of this case study is due to a startling decline in population. The population size observed in the early 1970's was approximately 250,000 and by 1990 it had declined to 38,000: an 80% loss. In 1990, the National Marine Fisheries Service (NMFS) listed the Steller sea lion as threatened under the Endangered Species Act of 1973, and began implementing a series of reviews to determine management approaches. Steller sea

lions that lived west of 144oW longitude (west of Cape Suckling, Alaska) continued to exhibit a declining population, while the population east of that longitude appeared to stabilize. In 1995, with Steller sea lions west of Cape Suckling experiencing an even greater decline, NMFS divided the species into two stocks (eastern and western) along the 144oW longitude line and re-classified the western population of Steller sea lions as endangered under the Endangered Species Act. Today, the eastern population appears to be increasing slightly, but the western population is still declining. Figure 1 shows the estimated population sizes over time of these stocks. These data indicate that in 1960, the eastern population had about 7,000 non-pup individuals and the western population had about 175,000 non-pup individuals. By 1991, the eastern population appeared relatively stable, growing slightly to about 8,600 non-pup individuals, but the western population was down to just under 30,000 non-pup individuals. The latest data (Sease, 2002) indicate that the eastern population is still stable or growing slightly (10,000 non-pups in 2002), and the western population may have reached the bottom in 2000 at about 18,000, rising to just over 19,000 in 2002.

North Pacific Fisheries

Simultaneously with the sea lions' decline were changes in commercial fisheries in the north Pacific. The north Pacific fisheries have a long and rich history since George Steller first described the area in 1741. By 1785, the first salmon fishery was established on Kodiak Island (Paine, et al., 2003), and by the mid- to late- 19th century, thriving hali-

but and cod fisheries were underway (Bean, 1887). In the 1930's and 1940's, Japanese trawl fisheries began taking walleye pollock and yellowfin sole (Rigby, et al., 1995). After World War II, multinational fisheries began using gillnets, tangle nets, longlines and trawls to "prosecute the fisheries", the phrase used to describe the concerted effort to catch a particular species of fish. As the fisheries

Management Act. The Act required NMFS to promote domestic fishing by limiting the foreign catch in U.S. territorial waters to the portion of "optimum yield" that was not harvested by domestic vessels. The term optimum yield is defined as the amount of fish that will achieve the "maximum sustainable yield", as reduced by any relevant economic, social, or ecological factor. Maximum sus-

The term optimum yield is defined as the amount of fish that will achieve the "maximum sustainable yield", as reduced by any relevant economic, social, or ecological factor.

became increasingly industrialized, larger trawlers, motherships and support vessels appeared. Over time fishing efforts have shifted among species due to changes in species distribution and stock abundance patterns or as product demand by consumers made certain fish more or less valuable. As can be expected in any valuable commodity market, conflicts occurred. Domestic fishers and fish processors began competing with foreign fishers, necessitating increased regulations to protect the extremely valuable north Pacific fisheries from overfishing. NMFS manages the groundfish fisheries through a series of regulations that define the "where, when, how and how much" of fishing that occurs in U.S. territorial waters.

In the mid 1970's, under continuing conflicts between U.S. and foreign fishers, Senator Warren Magnuson of Washington sponsored legislation that is now known as the Magnuson-Stevens* Fishery Conservation and

tainable yield is defined as the largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological and environmental conditions. In the case of an overfished fishery, optimum yield has been defined as that amount of fish that will provide for rebuilding of the stock to a level that will support the maximum sustainable yield.

The Magnuson-Stevens Act resulted in multiple joint ventures between domestic "catcher" vessels and foreign "processor" vessels in the 1980's, but by the 1990's, with pressure from domestic processors, the north Pacific fisheries in U.S. waters were fully Americanized. Today, the fisheries are completely prosecuted by domestic fishers, seeking walleye pollock (approximately 2/3's of the total catch), Atka mackerel, sablefish, rockfish, and flatfish. Over 1,200 catcher vessels, nearly 100 catcher-processor vessels, and 69 inshore processors or motherships comprise

* Congress passed the original Magnuson Act in 1976 (www.nmfs.noaa.gov/sfa/magact). It establishes the role of regional fishery management councils, national standards for management, and outlines the contents of fishery management plans. The Act has been amended several times, most recently by the Sustainable Fisheries Act passed in 1996. Senator Ted Stevens of Alaska's name was added by the 1996 revision in recognition of his work to conserve marine resources.

the infrastructure (Paine, et al., 2003). The domestic groundfish fishery off Alaska is an important segment of the U.S. fishing industry. With a total catch of 2.1 million metric tons (mt), a retained catch of 2.0 million mt, and an ex-vessel value of \$566 million in 2002, it accounted for 49% of the weight and 18% of the value of total U.S. domestic landings (NMFS 2003). The value of the 2002 catch after primary processing was approximately \$1.5 billion (NMFS 2003). The value of that fish, by the time it reaches consumers at the dinner table and generates jobs at grocers, restaurants and related enterprises, rises dramatically.

Causes and Metrics of Steller Sea Lion Decline

It is almost natural to equate the rise in commercial fishing with the decline in the Steller sea lion population. A common perception is that the commercial fishing industry is catching too much of the Steller sea lion's prey, and thereby impacting the bottom of the Steller sea lion's food web. If too little food is available for the sea lion, it seems reasonable to predict that the population would decline. This perception was reinforced by the fact that in a Biological Opinion prepared under Section 7 of the Endangered Species Act, NMFS found that aspects of the federal groundfish fisheries for pollock, Pacific cod, and Atka mackerel, jeopardized the continued existence of Steller sea lions due to competition for prey and modification of their prey field (NMFS, 2000). In the 2000 Biological Opinion, NMFS mandated numerous restrictions on the fishing industry to remove jeopardy. Those restrictions had large eco-

nomical consequences on the fishing industry, and subsequent political pressure escalated to Congress. Senator Stevens responded to the constituent pressure by attaching \$60 million for fishing industry relief and Steller sea lion research to the December 2000, omnibus appropriations bill.

Closer examination of the many potential forces causing the Steller sea lion population decline suggests considering the problem from a broader food-web perspective (Paine, 1980). Population effects at the food-web scale can be caused by "bottom-up pressures", "top-down pressures", or "contaminant pressures". If the decline of a population is due to the availability of nutrition, it is considered a bottom-up control (i.e., the impact is coming from lower in the food web). If the decline is due to predators, it is considered a top-down control (i.e., the impact is coming from higher in the food web). Contaminants may cause pressures across the food web by affecting the prey of the species of concern, by affecting the species of concern directly, or by affecting predators of the species of concern. At least eight plausible hypotheses have subsequently been postulated to explain the declining Steller sea lion population that fall into the bottom-up, top-down or contaminant pressure category (Paine, et al., 2003). The eight hypotheses are summarized in Table 1, which indicates a brief name of the hypothesis, the mechanism of population decline and category of control.

The fact that there are two distinct populations of Steller sea lions (the relatively stable eastern population, and the heavily declined western population), allows a "weight of

evidence” approach in determining the cause or causes of the decline by asking how various sea lion metrics would be affected under each hypothesis. For example, Steller sea lion pup growth rates represents one such metric. If bottom-up control was the primary cause of the Steller sea lion population decline, one would expect that less nutrition would be available to mothers, and subsequently their pups would have lower growth rates than pups whose mothers are not experiencing nutritional limits. Likewise, if top-down control was the primary cause of population decline, one would expect that more nutrition would be available to the mothers due to less competition from other sea lions, and subsequently pups would have higher growth rates than pups whose mother who are experiencing nutritional limits. Because the western population is declining and the eastern population is stable, comparing pup birth mass between the two populations should help a weight of evidence analysis. As it turned out, a small sample of pup growth rates measured during the 1990’s showed that growth rates were higher in the western population as compared to the eastern population (Brandon and Davis, 1999; Merrick et al., 1995, Rea et al., 1998), suggesting top-down pressure, rather than bottom-up pressure.

While very few studies have been conclusive, and quite limited data exist, Paine, et al. (2003) recommended 10 metrics, including pup growth rates, that may suggest which controlling mechanism are affecting the western Steller sea lion decline. Table 2 lists the metrics and indicates the direction of change that would be expected in the western population when compared to the east-

ern population of sea lions under bottom-up, top-down or direct pressure. Table 3 presents the weight of evidence for each of the eight plausible hypotheses. These findings suggest that it is more likely top-down pressures are causing the decline in western Steller sea lion populations, but this should only be considered a preliminary finding because so few data points are available (less than 20 adult females and less than 100 pups). In fact, data are so limited that scientists continue to be extremely reluctant to claim that fisheries have no impact on the Steller sea lion, or that they know what is causing the decline, or that some combination of bottom-up, top-down or contaminant pressures are causing “death by a million cuts”.

The Environmental Impact Statement

Many factors, including paucity of information, the possibility of indirect and cumulative effects that the 10 metrics mentioned above cannot measure, pressure from legal challenges, a mandate to have a sustainable fisheries with the least economic impact to communities, NMFS’s goal to manage ecosystems under the precautionary principle, and the 2000 Biological Opinion that found jeopardy, prompted modifications to the north Pacific groundfish fisheries to better protect the Steller sea lion. A process known in the Endangered Species Act as developing “reasonable and prudent alternatives” in order to eliminate jeopardy was undertaken. Several alternative fisheries management proposals were considered, including how, when and where the pollock, Pacific cod and Atka mackerel fisheries could be prosecuted. Changes in management measures varied the

degree and direction of impacts the fisheries would have on marine mammals, seabirds, prohibited species, target fish species, and marine habitat. The changes would also have impacts on fishers, processors, and coastal communities.

Decisions about these changes were immediately recognized as a major federal action that could have significant impacts to the human environment. The National Environmental Policy Act of 1970 requires that federal decision makers consider potential impacts, both economic and ecological, of major federal actions with potentially significant impacts in an Environmental Impact Statement (EIS). An EIS must also consider reasonable alternatives that would achieve the purpose and need that the federal agency is responding to. Here, NMFS was responding to the need to protect Steller sea lions while meeting the purposes imposed by the Magnuson-Steven Act, namely: (1) managing the groundfish fisheries for optimum yield; (2) allocating harvest among user groups; (3) preventing overfishing; and (4) conserving marine resources. While developing "reasonable alternatives", a myriad of configurations and reconfigurations of the groundfish fisheries were considered. As expected, these considerations resulted in a heightened intensity of involvement by fishers, Alaska coastal communities, and the North Pacific Fishery Management Council. Ultimately, five alternatives were analyzed to understand the impacts that would be associated with differing ways of protecting the Steller sea lion. In short, the five alternatives were: (1) no action (or more accurately, no change in fisheries from the 2000 configuration, which was assumed to violate the Endangered Spe-

cies Act); (2) low and slow (allowable catch substantially reduced, and spread out over time); (3) restricted and closed (the configuration put forth in the 2000 Biological Opinion); (4) area and fishery specific restrictions; and (5) substantial limits on fisheries in areas designated as critical habitat for the Steller sea lion.

Paralleling the preparation of the Environmental Impact Statement, was preparation of another biological opinion to determine whether the reconfigured fisheries avoided jeopardy to Steller sea lions or adverse modification of their critical habitat. That Draft Biological Opinion (NMFS, 2001a) was released for public comment concurrently with the public comment period on the Draft Environmental Impact Statement. A rather unique feature of the process used during preparation of the analysis was inclusion of a special stakeholder committee appointed by the North Pacific Fishery Management Council. The stakeholder committee, known originally as the Reasonable and Prudent Alternative Committee, included members from the fishing community, the conservation community, NMFS, the North Pacific Fishery Management Council's Scientific and Statistical Committee, and the Alaska Department of Fish and Game. Their charge was to formulate an alternative in compliance with the Endangered Species Act and other federal laws and Executive Orders that was not as economically costly as the reasonable and prudent alternative specified in the 2000 Biological Opinion. Over the course of numerous meetings and working sessions, a new set of management measures that allowed a sustainable fishery, removed jeopardy to the Steller sea lion, and minimized impacts to

fishing communities were developed, analyzed in the environmental impact statement, and ultimately chosen as the preferred alternative (alternative 4 from the above list).

The inclusion of this stakeholder process to formulate alternatives for an environmental impact analysis of a major federal action represents a national achievement contributing to our basic national charter for protection of the environment. The process was open and transparent throughout. The resulting environmental impact statement helped inform the decision makers of environmental and economic consequences associated with revisions of fishery management measures, and articulated the reasons why the fisheries management configuration developed as “alternative 4” was chosen.

Concluding Remarks

Continuing to have fisheries in the north Pacific that generate jobs, profits and tremendous amounts of protein for humans, yet doing so in a sustainable manner is clearly challenging. Evidence suggests that individual health of Steller sea lions in the declining western population are at least as healthy as individuals in the stable or increasing eastern population. The western population decline has slowed, but has not yet shown recovery despite substantial restrictions that have been imposed on when, where and how the fisheries can be prosecuted. This raises questions about the presumed connection between commercial fishing and Steller sea lions. Likewise, the weight of evidence discussed by Paine et al. (2003) points to top-down pressures as a likely substantial contributor

to the Steller’s decline. In fact, a recent study (Springer et al., 2004) has suggested that if the nearly 4,000 killer whales (*Orcinus orca*) that live in the north Pacific, shifted their dietary intake with less than a 1% increase in sea lion consumption, the entire Steller sea lion decline could be explained. The study suggests that since the great whale population was so decimated by industrial whaling by the 1970’s, killer whales had to shift their diets from whales to other sources, and Steller sea lions were a likely target.

None-the-less, the impact to Steller sea lions from commercial fishing is still suspect. The different configurations of fisheries that were studied (i.e. the 5 alternatives) resulted in a wide range of impacts across many of the resources examined (NMFS, 2001b). For example, some configurations would cause adverse impact to benthic habitats, while other configurations would cause beneficial impacts to benthic habitats because some areas would be closed to bottom trawling. The most impressive range of impacts, however, was on the socioeconomic environment. For example, the most restrictive configuration of fisheries (alternative 2) was estimated to reduce the harvest of fish up to 55% (587,000 tons less fish harvested), resulting in \$147 million less ex-vessel value, and costing 4,700 jobs. Not surprisingly, some communities in the north Pacific would have been impacted much more strongly than others if alternative 2 were implemented: the small communities that exist along the Aleutian Islands would have borne the brunt of these economic impacts with the loss of up to 2,200 jobs, while the Alaska southeast region would have lost less than 100 jobs (NMFS 2001b).

Unfortunately, data establishing whether fisheries alone caused the decline in Steller sea lion populations are inadequate either for fully justifying or for overturning fishery management measures. As such, fishery regulations continue absent conclusive information. The strain regulations impose while attempting to protect environmental resources continue to surface in occasional disputes between resource managers and stakeholders. These disputes involving sea lion protec-

tion, fish harvest and jobs maintain a level of pressure on Congress to fund management and research programs until there is conclusive evidence that confirms one or more of the hypotheses for Steller sea lion decline, or until a sustained recovery of the Steller sea lion population occurs. Until that body of evidence is established, stakeholders will insist that policy, economics and science be balanced on a paper-thin edge.

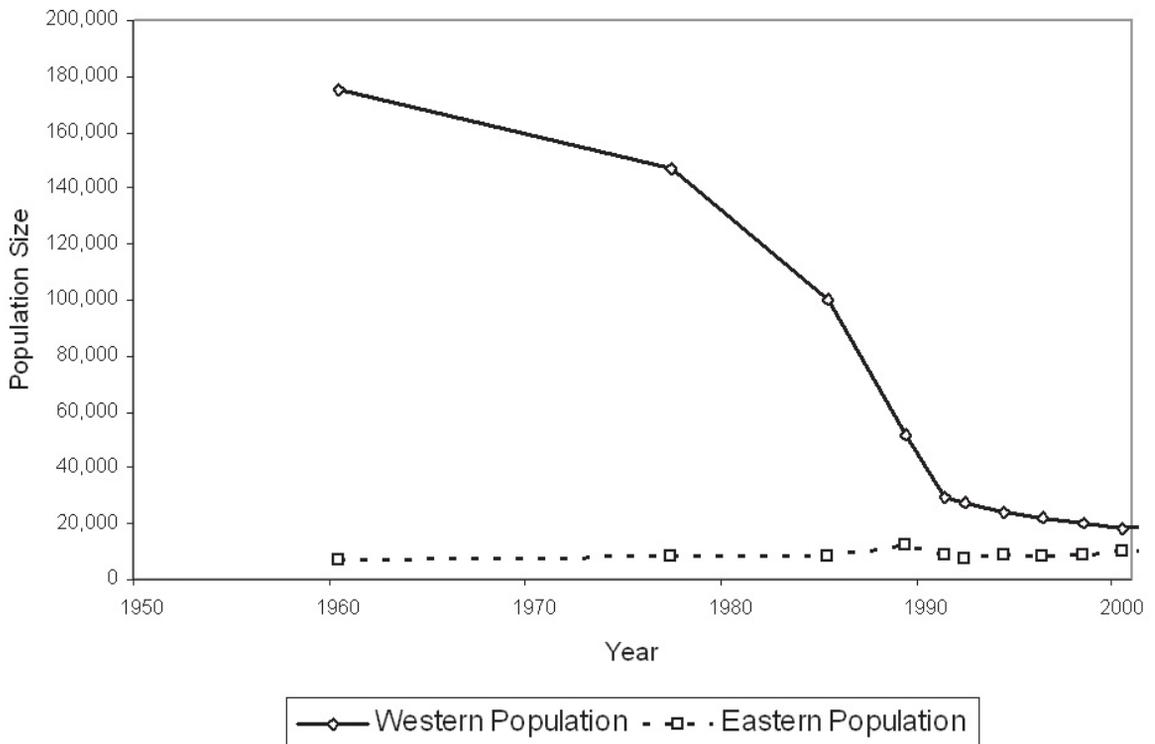


Figure 1. Steller sea lion population trends in the western and eastern populations (dividing line is 144° West longitude, approximately at Cape Suckling, Alaska). (Sources: Loughlin et al., 1992; Sease, 2002)

Table 1. Hypothesized reasons for decline of Steller sea lion (after Paine, 2003)

Hypothesis	Mechanism of Population Limitation	Forcing Direction
1. Fisheries removal	Starvation and/or reproductive failure because of nutritional limitation.	Bottom-up
2. Climate change/ regime shift.	Starvation and/or reproductive failure because of nutritional limitation.	Bottom-up
3. Predation	Elevated mortality from attack by predators.	Top-down
4. Direct take	Elevated mortality from attack by predators.	Top-down
5. Subsistence harvest	Elevated mortality from shooting or other purposeful killing.	Top-down
6. Incidental take/ entanglement	Elevated mortality from entanglement in fishing gear due to injury or drowning.	Top-down
7. Disease	Elevated mortality or reproductive failure caused by parasites, viruses, bacteria or fungus.	Top-down
8. Contaminants	Elevated mortality or reproductive failure from poisonous or toxic substances, either natural or human produced.	Top-down, direct, or bottom-up

Table 2. Expected directional change in western (declining) Steller sea lion metrics when compared to eastern (stable) Steller sea lion metrics if bottom-up, top-down, or contaminant pressure is causing the decline. (After Paine, et al., 2003)

Metric		Bottom-up pressure	Top-down pressure	Contaminant pressure
<i>Pups</i>	Birth mass	Lower	Higher (unknown for diseases)	Unknown
	Pup growth rate	Lower	Higher (unknown for diseases)	Unknown
<i>Adult female</i>	Body condition	Lower	Higher (lower for disease)	Lower
	Foraging trip duration	Higher	Lower or no-change	Lower
	Dive depth	Higher	Lower or no-change	Lower
	Field metabolic rate	Higher	Lower or no-change	Lower
<i>General</i>	Foraging range	Higher	Lower	Lower
	Beach strandings	Higher	Lower (unknown for direct take, higher for disease)	Higher
	Other piscivores	Lower	No-change	Unknown
	Food availability	Lower	Higher	Higher

Table 3. Agreement between existing studies/data and expected directional change in Steller sea lion metrics for each hypothesis of population decline. (Sources: ¹Brandon and Davis; 1999, ²Merrick et al. 1995; ³Rea et al. 1988; ⁴Davis et al. 1996; ⁵Adams, 2000; ⁶Castellini, 2002; ⁷Brandon, 2000; ⁸Milette, 1999; ⁹Andrews et al., 2002; ¹⁰NMFS, 2001b; ¹¹Calkins et al. 1998; ¹²Dragoo, et al., 2000; Table was modified from Paine, et al., 2003 and Bowen et al., 2001)

Metric		Hypothesis (and forcing direction: top, bottom or direct)							
		Fisheries (Bottom)	Climate (Bottom)	Predation (Top)	Direct Take (Top)	Subsistence (Top)	Incidental (Top)	Disease (Top)	Contaminant (Top-Direct- Bottom)
<i>Pups</i>	Birth mass ¹			X	X	X	X		
	Pup growth rate ^{1,2,3}			X	X	X	X		
<i>Adult female</i>	Body condition ^{4,5,6}			X	X	X	X		
	Foraging trip duration ^{7,8}			X	X	X	X	X	X
	Dive depth ⁹			X	X	X	X	X	X
	Field metabolic rate ⁹			X	X	X	X	X	X
<i>General</i>	Foraging range ¹⁰			X	X	X	X	X	X
	Beach strandings ¹¹			X		X	X		
	Other piscivores ¹²			X	X	X	X	X	
	Food availability ¹⁰			X	X	X	X	X	X

References

- Adams, T.C. (2000) Foraging differences and early maternal investment in adult female Alaskan Steller sea lions (*Eumetopias jubatus*). Ph.D. dissertation, Texas A&M University, Galveston.
- Andrews, R.D., Calkins, D.G., Davis, R.W., Norcross, B.L., Peijnenberg, K. and Trites, A.W. (2002) Foraging behavior and energetics of adult female Steller sea lions. pp. 19-22 in *Steller Sea Lion Decline: Is It Food?* DeMaster, D. and Atkinson, S. (eds) AK-SG-02-02. University of Alaska Fairbanks, Alaska Sea Grant College Program, Fairbanks.
- Bean, T.H. (1887) The cod fishery of Alaska. pp 198-226 in *Fisheries and Fishery Industries of the U.S. Section 5 Vol. 2, History and Methods of the Fisheries*, Goode, G.B. (ed) U.S. Government Printing Office, Washington, D.C.
- Bowen, W.D., Harwood, J., Goodman, D. and Swartzman, G.L. (2001) Review of the November 2000 Biological Opinion and Incidental Take Statement with Respect to the Western Stock of the Steller Sea Lion, with Comments on the Draft August 2001 Biological Opinion. Final Report. North Pacific Fishery Management Council, Anchorage.
- Brandon, E.A.A. (2000) Maternal investment in Steller sea lions in Alaska. Ph.D. dissertation, Texas A&M University, Galveston.
- Brandon, E.A.A. and Davis, R.W. (1999) Appendix B.5: Neonatal growth and condition and female attendance patterns. pp. 20-22 in *Final Report on the Steller Sea Lion Physiology Workshop*, Seattle, February 8-10, 1999, Didier, A. (ed) Pacific States Marine Fisheries Commission, Glandstone, Oregon.
- Calkins, D.G., Becker, E.F. and Pitcher, K.W. (1998) Reduced body size of female Steller sea lions from a declining population in the Gulf of Alaska. *Marine Mammal Science* 14(2): 232-244.
- Castellini, M. (2002) University of Alaska, Fairbanks, personal communication in Paine, et. al. (2003).
- Davis, R.W., Brandon, E.A.A., Adams, T.C., Williams, T.M., Castellini, M.A., Loughlin, T.R., and Calkins, D.G. (1996) Indices of reproductive effort, body condition and pup growth for Steller sea lions (*Eumetopias jubatus*) in Alaska. pp. 53-61 in *Steller Sea Lion Recovery Investigations in Alaska, 1992-1994*, Pitcher K. (ed) Alaska Dept. of Fish & Game, Division of Wildlife Conservation, Wildlife Technical Bulletin, Anchorage.
- Dragoo E.E., Byrd, G.V.Jr., and Irons, D.B. (2000) Breeding status and population trends of seabirds in Alaska in 1999. U.S. Department of Interior, Fish and Wildlife Service, Washington, D.C.
- Fiscus C.H. and Baines, G.A. (1966) Food and feeding behavior of Steller and California sea lions. *Journal of Mammalogy* 42(2), 195-200.
- Harmon, H.L. (2001). Seasonal reproductive endocrinology and anatomy of Steller sea lions (*Eumetopias jubatus*). M.S. Thesis. University of Alaska, Fairbanks.
- Imler, R.H. and Sarber, H.R. (1947) Harbor seals and sea lions in Alaska, Special Scientific Report 28. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C.

Merrick, R.L., Brown, R., Calkins, D.G. and Loughlin, T.R. (1995) A comparison of Steller sea lion (*Eumetopias jubatus*), pup masses between rookeries with increasing and decreasing populations. *Fisheries Bulletin* 93(4):753-758.

Merrick, R.L. and Loughlin, T.R. (1997) Foraging behavior of adult female and young-of-the-year Steller sea lions in Alaskan waters. *Canadian Journal of Zoology* 75(5), 776-786.

Millette, L.L. (1999) Behavior of lactating Steller sea lions (*Eumetopias jubatus*) during the breeding season: A comparison between a declining and stable population in Alaska. M.S. thesis, University of British Columbia.

NMFS (2000) Endangered Species Act-Section 7 Consultation-Biological Opinion and Incidental Take Statement. November 30. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Juneau.

NMFS (2001a) Endangered Species Act-Section 7 Consultation-Biological Opinion and Incidental Take Statement. November 30. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Juneau.

NMFS (2001b) Steller Sea Lion Protection Measures Final Supplemental Environmental Impact Statement, November, U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Juneau.

NMFS (2003) Stock assessment and fishery evaluation report for the Groundfish fisheries of the Gulf of Alaska and Bering Sea/Aleutian Island Area: Economic status of the Groundfish fisheries off Alaska, 2002. National Marine Fisheries Service, National Oceanic and Atmospheric Administration, 7600 Sand Point Way N.E., Seattle, Washington 98115-6349.

Paine, R. T. (1980) Food webs: linkage, interaction strength, and community infrastructure – 3rd Tansley lecture, *Journal of Animal Ecology* 49(3):667-685.

Paine, R.T., Bromley, D.W., Castellini, M.A., Crowder, L.B., Estes, J.A., Grebmeier, J.M., Gulland, F.M.D., Kruse, G.H., Mantua, N.J., Schumacher, J.D., Siniff, D.B., Walters, C.J., Roberts, S.J. and Caputo, N.A. (2003) Decline of the Steller sea lion in Alaskan waters: Untangling food webs and fishing nets, National Research Council, National Academy Press, Washington, D.C.

Pritcher, K.W. (1981) Prey of the Steller sea lion, *Eumetopias jubatus*, in the Gulf of Alaska. *Fishery Bulletin of the United States* 79(3), 467-472.

Pritcher, K.W. and Calkins, D.G. (1981) Reproductive biology of Steller sea lions in the Gulf of Alaska. *Journal of Mammalogy* 62(3), 599-605.

Rea, L.D., Castellini, M.A., Fadely, B.S. and Loughlin, T.R. (1998) Health status of you Alaska Steller sea lion pups (*Eumetopias jubatus*) as indicated by blood chemistry and hematology. *Comparative Biochemistry and Physiology – Part A: Molecular and Integrative Physiology* 120(4): 617-623.

Rigby, P.W., Ackley, D.R., Funk, F., Geiger, H.J., Kruse, G.H., and Murphy, M.C. (1995) Management of marine fisheries resources of Alaska: A report to the Northern Forum. *Regional Information Report* 5J95-

04. Alaska Department of Fish & Game, Commercial Fisheries Management and Development Division, Juneau.

Sease, J. (2002) Steller sea lion survey results, June and July 2002, Memo to The Record, U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Alaska Fisheries Science Center, Seattle, Washington, 8 pgs.

Springer, A.M, Estes, J.A., van Vliet, G.B, Williams, T.M., Doak, D.F., Danner, E.M., Forney, K.A. and Pfister, B. (2004) Sequential megafaunal collapse in the North Pacific Ocean. An ongoing legacy of industrial whaling? *Proceedings of the National Academy of Sciences* 100(21): 12223-12228.

Steller, G.W. (1743) *Tagebuch* edited and translated by Frost, O.W. and Engel, M.A., 1988, "Journal of a Voyage Bering, 1741-1742", Stanford University Press, Stanford, California.

Thorsteinson, F.V. and Lensink, C.J. (1962) Biological observations of Steller sea lions taken during an experimental harvest. *Journal of Wildlife Management* 26(4), 353-359.

Wilke, F. and Kenyon, K.W. (1952) Notes on the food of fur seal, sea-lion, and harbor porpoise. *Journal of Wildlife Management* 16(3), 396-397.

The Struggle for Sustainability: Past Practice, Future Possibilities

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GENERAL CONTEXT

Change assaults us on many fronts. Social, economic, environmental, political, cultural and moral crises arise everywhere, and lead toward dehumanization and destruction of the natural environment. As Harman (1996) notes, nothing escapes this on-going process of transformation from the world order, to institutions and individuals, to the collective underlying values that guide our lives. The interrelationships of personal, institutional and societal transformations lead to questioning and reflection about the future. We understand that our past models of the world and our activities no longer work and that new models are emerging. (Ortega-Villaseñor, 1999 a). We are at a point where we cannot move back into familiar territory but are not yet able to act upon the new models.

In these circumstances we must review and reflect upon our situation in order to redefine our role. That requires recognizing that two conflicting tendencies coexist. One involves blindly accepting the inertia that leads towards total disintegration; the other

is an integrating tendency that recognizes the unity that underlies apparent diversity. The fragmented view of reality is the main cause of the unprecedented and multiple crises confronting us. (Ortega-Villasenor, 1999a) It pervades all aspects of human behavior and has determined our understanding of and our way of tackling problems, and our proposals to overcome them. Therefore, it is necessary to demonstrate its limitations and the extent to which it is responsible for the current state of world affairs.

OUR FRAGMENTED VIEW OF REALITY

The first expression of the fragmented view of reality to be emphasized is the belief that the approach to problem solving is through the use of technological devices, the updating or creation of rules and regulations, or the application of the latest administrative, organizational and managerial concepts (Harman, 1994). Formulas and methods that have proved to be effective in the past or elsewhere can be applied. It argues that we are moving in the right direction, but that our

effort has to be doubled (Goldsmith, 1995). It rests upon the belief that reality can be controlled and shaped based upon human interests, desires and convenience. On a political level, those with power and authority dictate what is best for others and presume to decide on behalf of the rest of humanity. Generally speaking, problems are treated in an isolated manner and the interrelationships among them are seldom considered. As a result corrective measures are implemented without regard to possible consequences; causes are rarely taken into account. Thus, attention is centered on exploring and introducing immediate and limited changes that leave aside fundamental issues related to the principles and premises of a sustainable future.

Economy, Culture and Dehumanization

The pursuit of economic growth as the central goal guiding the economic policy of nations has been the dominant force impacting the entire world for at least fifty years. Its emphasis on capital accumulation, on increasing productivity, and on gaining and maintaining a powerful position within the international political arena, made it an end in itself rather than a means to satisfy social needs. Instead of alleviating poverty it seems to foster it, widening the gap between the few rich and the many poor. It is not surprising then, that dehumanization is one of the general outcomes of the multiple crises mankind confronts at present, as Schumacher (1976) observed almost thirty years ago.

The development of production and the acquisition of wealth have thus become the highest goals of the modern world in

relation to which all other goals, no matter how much lip service may still be paid to them, have come to take second place. The highest goals require no justification; all secondary goals have finally to justify themselves in terms of the service their attainment renders to the attainment of the highest. (p. 246)

The 1998 Human Development Report, an independent publication commissioned by the United Nations Development Program, provides astonishing statistics that dramatically illustrate an all-embracing dehumanization. As of that date annual world military spending amounted to 780 billion (US) dollars, world narcotic drugs expenditures accrued to 400 billion, and alcoholic beverages (in Europe), to 105 billion. These expenditures were followed by cigarettes (in Europe), pets food (in Europe and the USA), perfumes (in Europe and the USA), ice cream (in Europe), cosmetics (in the USA) and business entertainment (in Japan) which altogether amounted to 1,330 billion dollars. Taken together these figures amounted to 2,615 billion dollars. The report contrasted this with estimates of the annual cost of meeting universal access to basic social services in all developing countries.

“The World has more than enough resources to accelerate progress in human development for all and to eradicate the worst forms of poverty from the planet. Advancing human development is not an exorbitant undertaking. For example, It has been estimated that the total additional yearly investment required to achieve universal access to basic social services would be roughly 40 billion dol-

lars, 0.1% of world income, barely more than a rounding error. That covers the bill for basic education, health, nutrition, reproductive health, family planning and safe water and sanitation for all." (p. 37).

In the years since 1998, and especially since September 11, 2001, there is little doubt that world military expenditures have increased markedly.

The Report offers other data that demonstrate the concentration of wealth and income in the world. "New estimates show that the world's 225 richest people have a combined wealth of over one trillion, equal to the annual income of the poorest 47% of the world's people (2.5 billion). (p. 30)... "1.3 billion people still live on less than a dollar each day, and almost 3 billion on less than two a day." (p 51)

In Mexico, my country, an article in the newspaper *Publico* (1998 March 15), demonstrates how the neo-liberal economic model, combined with an authoritarian government, has aggravated the uneven distribution of wealth in the country since the early eighties. As income per capita dropped, the distribution of wealth worsened. The poorest 10% of the population received 1% of the national income, the richest 10% received 40%. And after 1994 the number of those in poverty increased from 14 to 21 million of the country's inhabitants, while the 15 richest families increased their fortunes from 16,400 million of U S dollars to 27,000 million. Put another way, the income of the 24 richest families in Mexico is equivalent to that of 25 millions of poor Mexicans. (Martin, 1998, Sept. 19)

Since one of the goals pursued by the economic system is to increase productivity, its counterpart, consumption, has to be spurred as well. As Galbraith (1972) observes, "The individual serves the industrial system not by supplying it with savings and the resulting capital; he serves it by consuming its products. On no other matter, religious, political or moral, is he so elaborately, skillfully and expensively instructed." (p. 44)

Individuals are not only required to be indefatigable goods consumers, they are also required to be idea consumers. The anthropologist Bonfil-Batalla (1986) has argued that the outcome is passive social behavior. The ideal society is one in which all the cultural creativity (ideas, objects, values, feelings) rests in the hands of efficiency experts, and others only become consumers of a prefabricated culture. Humans lose their capacity to face challenges, produce, and what is more dangerous, the will to do so. Bonfil-Batalla believes that ultimately alienation reaches the will and transforms the decision to carry out tasks or build something into the desire to consume. Another critic of the consumer culture (Ramonet, 2000, May 2) agrees but attaches specific blame to the United States. His argument is that throughout the world the American example of latest management methods, legal systems, sales techniques, fashions, and myths are dominant and continue to expand their influence.

Perhaps the most extreme consequence of the process is related to the impairment of the experience of life, the loss of direction, the meaninglessness associated with this civilization. The bitter words of Kass (1973) describe our contemporary world in its brutal

harshness:

“We are witnessing the erosion, perhaps the final erosion of the idea of man as something splendid or divine, and its replacement with a view that sees man, no less than nature, as simply more raw material for manipulation and homogenization ... Though well equipped, we do not know who we are nor where we are going.” (p. 107)

Other writers have expressed concern about the impact on young people. For example, Priego (1996) looks at them through an examination of recent novels. He believes that they portray an extremely fragmented vision of reality, in which hopelessness, nihilism, disenchantment, uncertainty and profound apathy, prevail. Born into abundance they become spectators rather than protagonists. Another author (Ochoa, 1996) offers a similar indictment of the cultural impact on the young. With no ethics to guide them, they become apolitical, incredulous, ironical, cynical, distrustful, and pessimistic. They do not try to change anything in society, because there are no choices left to be made.

Economy, Culture, and Nature

In our current culture how we conceive nature undermines the basis of its maintenance. Dickson (1976: 89-90) contributes to our understanding of how this came to be by examining the Judaeo-Christian tradition which had always preached that man was the center of God’s universe –both literally and metaphorically– and that nature was there for his use. Medieval orthodoxy, he believes, drew a distinction between God and Nature that

was the preamble to the later philosophical separation between man and nature, which prepared man not only to observe nature, but to experiment with it in a scientific manner. Undoubtedly, these conceptions paved the way for nature to be subdued to the logic of capital accumulation. (Leff, 1986).

Schumacher (1976) commented on this point more than three decades ago:

We have indeed been living on the capital of living nature for some time, but at a fairly modest rate. It is only since World War II that we have succeeded in increasing this rate to alarming proportions. In comparison with what is going on now and what has been going on, progressively, during the last quarter of a century, all the industrial activities of mankind up to, and including, World War II are as nothing. (p. 14)

In *Our Ecological Footprint* Wackernagel & Rees (1996) summarize and update the outcomes of the subjugation of nature that Schumacher deplored.

The list of threats to the life-support systems in which we are embedded is overwhelming: deserts are encroaching on ecologically productive areas at a rate of 6 million hectares per year; deforestation claims over 17 million hectares per year; soil oxidation and erosion exceeds soil formation by 26 billion tons per year; fisheries are collapsing; the draw-down and pollution of ground water accelerates in many places of the world; as many as 17,000 species disappear every year; despite corrective action, stratospheric ozone continues to erode; industrial society has increased atmospheric carbon dioxide by 28 percent. All these trends

are the result of either over-exploitation (excessive consumption) or excessive waste generation. (p.34)

THE FUTURE OF THIRD WORLD COUNTRIES UNDER CURRENT POLICIES

In recent decades a persuasive publicity campaign has been systematically launched through the mass media to keep the globalization process moving forward. On one hand, developing countries have been lectured on the goodness of free markets, privatization and foreign investment. On the other, it has seduced billions of persons by exhibiting a lifestyle of limitless pleasures and comfort. The publicity tells us that benefits brought forth by globalization are beyond discussion; the world of conveniences, leisure, opportunities and abundance lies ahead; industrialization is the path to progress; the only way to reduce social and economic disparities is through further economic growth; foreign investment will rescue us from poverty and backwardness, and by following the right path, a "modern" Mexico, for example, will make a triumphant entrance into the exclusive First World Club. The development concept and the policies that stem from it are not to be questioned. They are articles of faith even in many universities, where future professionals are being educated without regard to the sea of poverty, injustice and contamination that surrounds them (Ortega-Villaseñor, 2000).

Denying the possibility of development

There are powerful arguments that make it

highly improbable that developing countries will ever become 'developed'. In the United Nations Human Development Report 2001, for example, a comparison of changes between 1960 and 1998 in the Gross Domestic Product per capita is made among 6 groups of nations. The groups were classified as High Income OECD Countries, Latin America and the Caribbean, East Asia and Pacific, South Asia, Sub-Saharan Africa, and Least Developed Countries. The conclusion is appalling: "Despite the reduction in the relative differences between many countries, absolute gaps in per capita income have increased. Even for East Asia and the Pacific, the fastest growing region, the absolute difference in income with high income OECD countries widened from about \$ 6,000 in 1960 to more than \$ 13,000 in 1998." The report adds that "Latin American and Caribbean countries have among the world's highest income inequality. In 13 of the 20 countries with data for the 1990s, the poorest 10 % had less than 1/20 of the income of the richest 10 %. This high income inequality places millions in extreme poverty and severely limits the effect of equally shared growth on poverty." (pp. 17-18).

Similarly, Wackernagel & Rees (1996: 89-90) point out that for everybody on Earth to enjoy the living standards of North Americans would require three Earths in order to satisfy aggregate material demand using prevailing technology. They conclude that not even the present world population let alone future population growth can achieve North America's material standard of living without destroying the ecosphere and precipitating their own collapse. They re-emphasize that point by noting that UN statistics show that

“20 percent of the world’s population that lives in wealthy countries consumes up to 80 percent of the world’s resources.” (p. 149). The consequences, they note, is that there is nothing left into which the rest of the world can grow without eroding global life support!

For millions of the poor throughout the world It becomes harder each day to escape from poverty because traditional work has ceased to be a means to improve the quality of life. Bergmann (1996) argues that the natural impact of technological development has been to reduce jobs; it is exactly the goal at which technological innovation has aimed since the beginning of industrial revolution. He believes that thanks to technology, wealth can now produce goods and beget more wealth—without labor. Other critics are in substantial agreement with that argument. For example, Carrillo-Armenta (2001, May 28) argues that capitalism is destroying work. He reckons that unemployment is not a marginal destiny, but one that affects us all. Similarly, Goroztiaga (2000) redefines poverty by pointing out that it no longer means lack of money or material possessions; rather, it is a situation of economic exclusion and of technological-educational apartheid that has made the majority of the world’s population superfluous, disposable and dangerous.

To sum up, these sources offer a picture that shows why mankind has lost its compass and rudder. International agencies are pressing governments of developing nations to align with neoliberal policies. At the same time transnational corporations are appropriating the natural resources of developing countries in order to fuel their endless expansion. People are being bombarded by thousands

of messages that predispose and train them to consume. Millions are subjected to hunger, diseases, war, violence and fear and large numbers migrate in an effort to escape these plagues. Although growing pressure is being exerted upon governments and corporations to halt pollution, natural resource depletion, and loss of biodiversity, results are scanty. Meanwhile, the gap between those who possess too much and those who possess too little is increasing, and environmental destruction continues apace.

IS THERE AN ALTERNATIVE?

In the first part of this paper we pointed to the coexistence of two contradictory trends: one leading to total societal fragmentation and decline, the other toward a unified world vision. To the extent to which the first leads to multiple crises, the vision of just and humane alternatives becomes more important as an alternative. One writer, (Harman 1996: 76) maintains that ...“the driving force for transformation comes from the individual level.” A possible explanation of why this is so is offered by Ortega-Villaseñor and her associates (1998). They argue that by disagreeing with the fragments of reality that the dominant culture offers, the individual experiences a profound uneasiness and disenchantment. But it also produces an inner urge to recover a sense of existence, to reconnect to the flow of life, to rebel against injustice, and to correct errors derived from its life style that moves the individual to look for answers, to modify practices, to associate with others, and to organize and act. In short, it moves to a concern for the assurance of sustainability.

The Concept of Sustainable Development

The definition of sustainable development proposed in the Brundtland Commission Report *Our Common Future* (World Commission on Economic Development, 1987), is that we must “meet this generation’s needs without compromising the capacity for future generations to meet their own needs.” The report marks a breakthrough by questioning current life styles and production systems because they cancel opportunities for forthcoming generations to satisfy their needs. In a UNESCO policy paper (Becker, et. al., 1997) the authors elaborate on the concept by pointing out that sustainable development may be conceived as a conceptual counterposition to ‘modernization’, the paradigm that has dominated the social sciences since 1945 and has structured the politics of development, even though since the 1970’s it has been increasingly questioned. They believe that in recent years sustainable development has become an internationally accepted concept for discussions of quality of life issues, the conservation of natural resources and a sense of commitment to future generations. As a specific example they point to sustainable development as a “controversial discursive field” through which the political and economic differences between the developed North and the less developed South can be articulated and issues of equity and ecology can be linked.

In the nineties, the United Nations convened government representatives of countries from throughout the world several times in order to face jointly the increasingly severe crises related to that linkage. These meetings made

possible encounters among the representatives that resulted in communication nets of global exchange through which topics related to the environment, poverty, unemployment, gender, human rights, etc., could be treated in conjunction. One consequence is that local and regional consensus has often emerged and has resulted in proposals presented at international summits (Goroziaga, 2000). An example is the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992 at which many proposals concentrated on control of the degradation of the environment.

However, political discourse has changed since the Rio Conference. “Globalization” is now regarded by many as a threat to sustainability and has aroused intense opposition illustrated by the demonstrations that began in Seattle in 1999. Nevertheless, the pre-eminence of globalization over sustainability can be seen in the outcome of the Second World Summit convened at the United Nations in New York in 1997. Representatives of 70 nations gathered to evaluate the status of the agreements made during the Rio World Summit. An article published in the newspaper *Siglo 21* (1997, June 28) describes the situation:

“The cooperative attitude displayed during the Rio Conference died yesterday when government representatives were incapable of working together to preserve the environment and achieve sustainable development ... Adela Ruiz –Third World Coalition Group leader– pointed out during this meeting that the Rio spirit has deteriorated markedly since the conference. Such cooperative spirit was not only to

the betterment of the environment, but about the international cooperation to improve the well being of mankind.”

(Los Gobiernos Fracasaron, 1997, June 28)

The action of individual nations can also be seen as a threat to sustainability. An example is the announcement by President George Bush that the United States would not honor the commitments to restrict carbon dioxide emissions into the atmosphere which were signed at the Kyoto Conference. In such cases the perception of national self-interest becomes more important than threats to the global environment.

The necessary transformation

In spite of the vagueness of the definition of sustainable development, the notion proposed in *Our Common Future* (1987) foresees a revolution in which the society-nature dichotomy and the relations among and in human societies are re-stated. Because of that sustainable development should be considered a concept in construction. It involves a process that must be undergone by individuals, societies and institutions in which fragmented awareness will eventually be integrated. (Ortega-Villaseñor 1999 b). Since the ongoing external societal process seems to be an extension of the internal process taking place in individuals, a new perception of reality is beginning to appear on the horizon that reflects our changing attitudes and values towards life. In a sense we have come to realize that dehumanization and environmental destruction are manifestations of human selfishness, greed, and ignorance and that we are involved in an ongoing cultural revolu-

tion leading ultimately to a culture of co-operation and enhancement of life.

The intensive processes of transformation involve fundamental principles and teleological concerns that constitute the foundation of the emerging paradigm. Perhaps the most fundamental principle is that the well-being of the human race is the target at which government policies and societies efforts must aim. It is imperative that they recognize the rights and aspirations of human beings to live a dignified existence. To accomplish that, several factors must be taken into account: the availability of essential goods, such as pollutant free air, water, and food; a secure housing habitat that promotes health, education, means of transport, recreation and other facilities, and the right to have employment to pay for these commodities and services. In building the world they desire to live in, the role of the individual is to use voice, hands, intelligence, ideas, abilities, initiatives, and creativity, and to compromise, decide, work, organize, be helpful to others and assume responsibility in satisfying individual, family and collective needs.

We must also recognize that the human world exists within the natural world. We are subordinated to a jurisdiction that surpasses the human world in time, energy and space. (Enkerlin et. al. 1997). We humans are not the Captain of space ship Earth, nor do we have under our command the rudder of the evolutionary process; we are, however, an integral part of the crew. (Crofoot, 1985). As we come to understand that we are a constituent part of the vast order of nature, we must fully accept our place within the whole, we must understand that our words

and deeds not only affect ourselves, but other human beings, other living creatures, and the environment (natural or built) as well. In turn, each of us is affected by other persons, by other living creatures and by our environment. Thus, as we have said, change must begin with reviewing personal thoughts, words and actions in order to build among all members of society a life style, production system and technology according to the underlying order from which life emanates.

The comprehension and assimilation of these basic principles and aims implies a philosophical and spiritual transformation that will impact all aspects of human behavior because they stand in opposition to the philosophical positions that have placed mankind at the center of the universe. It can be argued that we humans are being displaced –willingly or not– from a position we have erroneously occupied in order to gain a different status. What emerges is a new concept of humanism like that propounded by Szent Gyorgi: “To be acquainted with Nature has become an inseparable part of humanism. Any human being that has no idea as to where he or she is, or which is his or her place within Nature and his or her relationship with the other living creatures, is not a humanist.” (quoted in Enkerlin, et. al., 1997: 250)

From the perspective of sustainable development, policies, plans and programs should result from the needs, culture, history and social potential of the inhabitants of a particular region which makes knowledge of the region’s ecosystems an integral part of the process.

Since the quality of human life is inextricably associated with the ecosystem’s health, a priority is to drastically reduce the negative impact that human actions inflict upon the environment as we utilize its resources. To restate the central idea of sustainable development, we are the temporary trustees of the natural patrimony that we have received from our ancestors and will bequeath to forthcoming generations. Since the principles and aims are different, the means must change correspondingly. Thus the generation of economic wealth, scientific rationality, technology, utilization of goods, etc., must be subject to the emergent principles, and the performance of the means must be evaluated in terms of their contribution to the attainment of the new aims.

Although we have argued that these principles and aims are new and emergent, in fact they were beautifully stated by the Roman poet Lucretius 2000 years ago (quoted in Clark, 1995).

“The creatures made to embody Beauty, in its different kinds, might come to regard themselves as “independent’ beings, whose welfare must depend on grabbing what they could from others. Because they came to forget that they were all rays from a single Brightness, fragments of a grand mosaic, they grew to hate and fear each other. The moment of return is when we look at others, real others, and know that they are not ourselves, not ours, not even very like us, and thereby reacquaint ourselves with the life, the beauty, that fills everything in so many, very different ways”. (12).

References

Becker, Egon, Jahn T., Stuess I. & Wehling P., (1997). Sustainability: A Cross-Disciplinary Concept for Social Transformations. MOST (Management of Social Transformations), Policy Papers 6, UNESCO, Paris, France.

Bergmann, F., (1996). The Future of Work / 1: in Perspectives on Business and Global Change, World Business Academy, San Francisco, USA. 10-1: 7-22.

Bonfil-Batalla, G., (1986). La querrela por la cultura. Nexos, Mexico City, Mexico, 100: 7-13.

Carillo-Armenta, A., (2001, May 28). Tres mitos generales. Publico, Guadalajara, Mexico.

Clark, S. R. L., (1995). Objective Values, Final Causes: Stoics, Epicureans and Platonists. The Electronic Journal of Analytic Philosophy, 3, Spring.

Crofoot, M., (1985). A Psychology of Soil. Paper presented in the Congress "Is the Earth a Living Organism?", University of Massachusetts, unpublished manuscript.

Dickson, David., (1976). Alternative Technology, and the Politics of Technological Change. Fontana Collins, Glasgow, UK.

(1998, March 15). El modelo neoliberal ha polarizado a la sociedad mexicana. Publico. Guadalajara, Mexico.

Enkerlin, E., Cano, G., Garza, R. A. & Vogel, E., (1997). Ciencia ambiental y desarrollo sostenible. International Thomson Editores, Mexico City, Mexico.

Galbraith, J. K., (1972). The New Industrial State. Pelican Books Ltd., Middlesex, UK.

Goldsmith, James., (1995). La trampa. Plaza & Janes Editores, Mexico City, Mexico.

Goroziaga, Xavier., (2000). La construcción de las utopías, desde la cultura y la educación. Paper presented in the VIII Symposium on Education: held in Guadalajara, Mexico, February, unpublished manuscript

Harman, W.W., (1996). The Transformative Spirit of Service: in Perspectives on Business and Global Change. World Business Academy, San Francisco, USA, 10-1: 71-80.

Harman, W.W., (1994). A System in Decline or Transformation?: in Perspectives on Business and Global Change. World Business Academy, San Francisco, USA, 8-2: 99-121.

Human Development Report (1998). United Nations Development Program (UNDP)

Human Development Report (2001). United Nations Development Program (UNDP)

Kass, L., (1973). The New Biology: What Price Relieving Man's Estate? in Herman E. Daly (ed.), Towards a Steady State Economy, W. A. Freeman and Company, San Francisco, USA.

- Leff, E., (1986). *Ecología y capital: Hacia una perspectiva ambiental del desarrollo*. National Autonomous University of Mexico Press, Mexico City, Mexico.
- (1997 June 28). *Los gobiernos fracasaron en su intento de cuidar la tierra. [The Governments Failed in Their Effort to Take Care of the Earth]*. Siglo 21, Guadalajara, Mexico.
- Martin, R., (1998, Sep. 19). *Se Agravan las Desigualdades en el Mundo*. Publico, Guadalajara, Mexico.
- Ochoa, A., (1996). *Generación se escribe con X: el mismo desencanto, pero más sofisticado. Viceversa*, Mexico City, Mexico, 38: 34-43.
- Ortega-Villaseñor, D., (2000). *Reflexiones en torno al plan de desarrollo de la región ciénega*. Estudios de La Ciénega, University of Guadalajara Press, Guadalajara, Mexico, 1-2: 181-190.
- Ortega-Villaseñor, D., (1999a). *Taller Chapala: An Integrated Academic Approach to Sustainable Development*. Aquatic Ecosystem Health & Management, Elsevier Science Ltd. and AEHMS, London, UK, 2-2: 105-113.
- Ortega-Villaseñor, D., (1999b). *Ideas petrificadas como dogmas*. Renglones, ITESO University Press, Guadalajara, Mexico, 41-42: 72-82.
- Ortega-Villaseñor, D., Mejia, R. & Martin, W., (1998). *La universidad: Espacio para descubrir la unidad en la diversidad*. Renglones, ITESO University Press, Guadalajara, Mexico, 40: 52-62.
- Priego, E., (1996). *La literatura que definió a la norteamérica de los noventa. Viceversa*, Mexico City, Mexico, 38: 25-33.
- Ramonet, I., (2000, May 2). *United States Goes Global: The control of Pleasure*. Le Monde Diplomatique, Paris, France.
- Schumacher, E. F., (1976). *Small is Beautiful: A Study of Economics as if People Mattered*. Sphere Books Ltd., London, UK.
- Wackernagel, M. & Rees W. E., (1996). *Our Ecological Footprint: Reducing Human Impact on the Earth*. New Society Publishers, Gabriola Island, B. C., Canada.
- World Commission on Environment and Development, (1987). *Our Common Future*. Oxford University Press, Oxford, UK.

Immigration/Emigration and Carrying Capacity

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Human society is a subsystem of the interdependent web of life or the biospheric life support system. Because of its long existence, the biospheric system provides a model for sustainable use of the planet that humankind would do well to emulate. A prime component of this model is that resources are quantitatively finite and diverse spatially. Although the 20th century and the beginning of the 21st century have had a goal of maximizing individual well being, particularly in terms of short-term objectives, there seems to be no clear, concisely stated, accepted objective for humankind or for the biospheric life support system to achieve sustainable use of the planet. Sustainable use of the planet (sometimes referred to as sustainable development) is one such objective. Unfortunately, although the aspiration for indefinite use is clear, the means of achieving this end have not been well thought out or discussed. The purpose of this manuscript is to discuss some important components of the developing overall strategy, namely immigration, emigration, and carrying capacity. Sustainable use of the planet requires compassion not only for those humans now alive, but for their descendants as well as

descendants of other life forms. This objective will necessitate some hard decisions, many of which will be unpalatable because a finite planet has finite resources and lacks the capability for infinite growth of either the human population or individual affluence.

End of the Migration Era

Homo sapiens began as a small-group species, thinly spread initially over a limited part of the planet. Humans migrated to the Americas and Australia in relatively recent times, even native Americans arrived fairly recently. Technology and human ingenuity have made inhabiting areas of the planet comfortably possible that were previously not highly desirable. Advances in agriculture, including new strains of crops and irrigation, have made further rapid increases in the human population possible. It is interesting to note that the last 1 billion humans was added to the planet in the past 12 years. Furthermore, population is still increasing on a finite planet. Although some economists (e.g., Simon, 1981) do not believe in resource limitation and finite carrying capacity for hu-

mans, robust evidence indicates that humans are no different from other species, although technology and science make it appear as if the rules of nature have been suspended for the human species.

Migration has been a characteristic of human behavior for practically the entire existence of the species; even now there is great reluctance to admit this era is over. In Europe, where some countries have a declining birth rate that is sometimes below replacement level, immigration from other parts of the world still pushes the carrying capacity hard. Except for the epicenter(s) from which Homo sapiens emigrated to colonize the entire planet, everyone is either an immigrant or a descendant of an immigrant. Mass migrations are only possible when the resource base of an area is exceptional, the human population is well below the carrying capacity for the region, and people are living sustainably, which means not damaging the biospheric life support system. The major issue is no longer whether compassion requires the admission of immigrants from other countries, but rather whether the biospheric life support system can be maintain its integrity and resources are not markedly diminished, ideally even increased somewhat, for future generations.

Maximizing the Creation of Wealth

The goals of many countries focus on maximizing the creation of wealth as measured by the Gross Domestic Product (GDP) and to continually increase the GDP. Purportedly, one of the components of the GDP is to distribute "created wealth" as uniformly as pos-

sible, although the reality is often quite different from the aspiration. Two countries with the largest ecological footprints (e.g., Wackernegel and Rees, 1996) have an ecological footprint approximately sixty times greater than the one of the state of Kerala in India. Thus, while the creation of wealth, at least for the short term, has been dramatic, the disproportionate distribution of this wealth has increased in an even more dramatic fashion. Worse yet, these increases in material wealth have caused unprecedented losses of natural capital, such as old growth forests, top soils, groundwater aquifers, and the like.

Integrating Top-Down and Bottom-Up Strategies

Top-down Strategies

Unsustainable practices must be replaced by sustainable practices, which will be most effective if they emulate the economies of natural systems. This change, in turn, will require replacing a homocentric or ethnocentric mind set with an ecocentric mind set. This mind set will require major specific changes in the structure of financial institutions and views of what constitutes natural capitalism in the development and orientation of technologies and, most importantly, in the renewal and equitable allocation of the world's resources (i.e., natural capital). This strengthening of natural capital should ensure the constancy of the delivery of ecosystem services as well as their quality and quantity. These changes further require a mind set change from an unlimited to a limited resource base, which espouses pollution prevention and waste minimization (or, preferably, waste that can be beneficially

reincorporated into natural systems) as essential to sustainable use of the planet. Given the world's situation today, with a substantial proportion of humankind living near or below the subsistence level and the extraordinary damage to natural systems, little time is left for political rhetoric and posturing.

Clearly, it is impractical as a long-term strategy to have parts of the planet living unsustainably and parts living sustainably. This imbalance is particularly true in an era with weapons of mass destruction, including biological weaponry. The latter can be produced in relatively unsophisticated laboratories and might well be the weapon of choice for desperate people. In order to diminish the number of desperate people, there must be a realistic hope for the future and a willingness to change individual and societal behavior to make this vision a reality. Sharing a vision will require considerable discussion and communication about what this vision might be. Basically, sustainability requires leaving a habitable planet for future generations and protecting the integrity of the biospheric life support system with its natural capital and ecosystem services. Second, this vision will require a major shift in which industrialized economies decrease their dependency on "ghost acreage," such as ecosystems and resources outside their national boundaries that supply the difference between consumption and internal resources. A second type of "ghost resource" utilization occurs in the automobile culture that is primarily dependent on fossil fuels that were developed and deposited in ecosystems long since gone. Disengagement from a global trade system, in which raw materials are shipped to the highly developed countries in

In order to diminish the number of desperate people, there must be a realistic hope for the future and a willingness to change individual and societal behavior to make this vision a reality.

exchange for a limited quantity of these same resources to which value has been added by the manufacturing or industrial processes is essential. Third, a sharing of "green technologies" is essential. Although green technologies should be developed everywhere in the world, the more affluent countries should take the lead in developing and using these technologies, for example, substituting wind power or solar energy for fossil fuel power. Green technologies will reduce the ecological footprint of countries with sizable footprints and, at the same time, enable them to live more sustainably. Countries benefitting from developing green technologies will be in a position to develop local, regional, and national sustainability practices more rapidly.

Weston (1995) lists a number of conditions leading to the call for sustainable use of the planet: (1) increasing population densities; (2) increasing concentrations of populations in urban areas; (3) increasing rates of per capita resource use; (4) overharvesting of renewable resources; (5) exhausting non-renewable resources; (6) mismanaging natural capital; (7) degrading environmental quality; (8) losing species; (9) increasing risk to individual human health, safety, and security; (10) increasing disparity in living standards;

and (11) escalating terrorism, local warfare, and threats to natural security. Developing a viable and implementable top-down strategy for sustainable use of the planet will require discussion and a significant degree of consensus on these crucial issues and those related to them. The top-down strategy examines the problem of sustainable use of the planet at the ultimate systems level, Earth. Perhaps the day will arrive when sustainability might be viewed in a more universal sense, but, for the present time, current capabilities limit the view to a finite planet; a top-down strategy must include ways to live sustainably on the space available, with the resources available, and to do so for an indefinite period of time. Berry (1989) believes that humans have a limited ability to coordinate and comprehend

Presumably, for the third-world countries requiring assistance, provisions could be made for withholding aid if the conditions of population stabilization, reforestation, or whatever was needed for that particular area, were being carried out properly.

beyond some scale; presumably, given the record thus far, a global scale and probably even a continental scale are applicable. The second type of limit is inherent in the nature of humankind as creatures with a limited sense of "the good" and a willingness to do things to achieve it. These two considerations are arguably the most serious and intractable obstacles to the development of a top-down strategy, but it seems irrational not to develop such a strategy for sustainable use of the

planet. Presumably, social evolution might enable humankind to overcome these obstacles, although Berry is correct in viewing them as formidable. It is difficult to imagine what sort of organization could develop and implement the top-down strategy for sustainable use of the planet. Of course, the United Nations (UN) immediately comes to mind, but the organization will have to have much more power than it has today. Moreover, the organization could not exert any power until there was some a consensus on what should be done. Presumably, for the third-world countries requiring assistance, provisions could be made for withholding aid if the conditions of population stabilization, reforestation, or whatever was needed for that particular area, were being carried out properly.

For a country that refused to accept the conditions necessary for sustainability, the only recourse would seem to be letting nature take its course, which is neither compassionate nor ethical, at least in a homocentric sense, although it would be both compassionate and ethical in an ecocentric sense. In summary, there is no question that a top-down

strategy is essential to achieving sustainable use of the planet, and even to recognizing when the appropriate conditions have been met. The steps needed to meet this drastic emergency are not at all clear, are unlikely to be popular in almost every country in the world, and will require "tough love" that will offend many people. However, the future of humankind will be dramatically influenced by the decisions made in the 21st century.

Bottom-up Strategies

The key to a bottom-up strategy is the presence of an environmentally literate, stable, highly motivated population with a deep commitment to sustainable use of the planet.

A nation should not be encouraged to live unsustainably by maintaining conditions that result in mass emigration. The other side of the coin is that local regions attempting to achieve sustainable use of the planet cannot afford to be seriously hampered by an influx of immigrants in any significant numbers. Sustainable use of the planet will require a deep “sense of place” – being well informed about the local natural systems, how the local culture has made accommodations to develop a harmonious relationship with natural systems and, most importantly, that while resources are not unlimited in any location, adding to the population of any system will either result in environmental degradation and depletion of natural capital or a lower standard of living for the indigenous inhabitants. Even if local communities are willing to reduce their birth rate below replacement rate to permit immigration, it is still not clear how many immigrants could be accepted in what periods of time to maintain the close relationship with natural systems that is the sine qua non of sustainable use of the planet. Individuals who have emigrated from regions where there were numerous unsustainable practices are likely to bring these practices with them, either unconsciously or deliberately, because they are not willing to change their lifestyle

Language barriers are likely to exacerbate further the assimilation of immigrants into a society and ecoregion attempting to achieve sustainability.

or social practices to accommodate the sustainable practices of the community to which they have been admitted. This action is likely to bring howls of rage from those with strong ethnocentric viewpoints, but sustainable use of the planet requires an ecocentric viewpoint, which means staying within the

carrying capacity of the region. Language barriers are likely to exacerbate further the assimilation of immigrants into a society and ecoregion attempting to achieve sustainability. One way to somewhat reduce the problem of assimilation is to have a citizen-

ship examination determine the immigrant’s environmental literacy and the understanding of the prerequisites to developing a harmonious relationship with the local ecosystem. It is extremely important that the concept of carrying capacity and the closely related concept of ecological footprint size be well understood by the entire population and the effects that population growth will have on the quality of life with finite resources on a finite planet. Bateson (1975) has thoroughly developed the concept of interrelatedness or the “pattern that connects.” He asserts that humans are not outside the ecology upon which they depend, but are inevitably a part of it. In this regard, a bottom-up strategy must include estimating the extent to which population size and resource use will stay within the carrying capacity of the bioregion in which sustainability is sought. One of the key factors in the bottom-up strategy is determining the size and nature of the ecoregion in which sustainability is sought.

For island nations such as Malta, Bermuda, and even larger ones such as Japan, the land mass available is clearly defined, but the extent to which the nation depends on oceanic and terrestrial resources both near and far is an important calculation on a path to sustainability. For nations with large geographic areas, such as Russia, the United States, China, and Canada, the national boundaries could be considered an ecoregion although for bottom-up management, there will have to be sub-units because one could not treat the Gobi desert with the same management strategies, carrying capacity, and resource limitations that one would use for the most fertile areas of China.

In planning a bottom-up strategy it is well to remember Ehrlich's (2000) insightful remark that humans are essentially small-group animals trying to live, with increasingly rare exceptions, in gigantic groups. It is quite unlikely that humans can revert to small tribal units. However, large group communications have been facilitated by the Internet, etc. and, with increased longevity, memories are more likely to accumulate in the community. This statement grossly oversimplifies the complex issues Ehrlich (2000) has discussed in his superb book, but the main point is that, despite all the discouraging evidence, Ehrlich remains optimistic about what can be done.

Territoriality

The Brundtland Report (World Commission on Environment and Development, 1987) describes the primary goal of sustainability as meeting the needs of the present without compromising the ability of future generations to meet their own needs. Regrettably,

the word development is always used as a noun in the report and the word sustainable is always an adjective. The Brundtland Report further describes sustainable development as a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, institutional change, and the ability of the biosphere to absorb the effects of human activities are consistent with future as well as present needs. The italicized portion of the previous statement indicates the need to stay within the carrying capacity of both ecoregions and the entire planet. Although the report has a homocentric viewpoint, there are statements that natural capital should be preserved and that the biospheric life support system is essential to sustainable use of the planet. The concept of sustainable development implies growth to most people, particularly economic growth. This perception is regrettable because it places economic growth and growth of other sorts (e.g., human artifacts) as one of the primary goals in achieving sustainability. The Brundtland Report is essentially a top-down strategy report and has very little information about a bottom-up strategy. It is well and good to state aspirations to sustainability in lofty and general terms, but it is the bottom-up approach to implementing sustainability that brings the primary issues into clear, unmistakable focus.

Ultimately, as noted earlier, sustainability must be achieved in patches throughout the entire planet. The size and characteristics of each of these patches will vary widely, from deserts to rainforests, high altitude to low altitude, tropical to polar, and, therefore, the exact implementation of sustainability ini-

tatives will vary widely. Some regions will have a carrying capacity that is quite high in terms of humans per hectare, others so low that it may require a number of hectares to support each person. In short, from a bottom-up approach to achieve sustainability, the planet will be divided into a series of territories, each with particular issues and problems related to sustainable use. Once the issue is framed in a territorial context, one inevitably asks how long can immigration continue to that area without impairing or destroying the hopes for sustainability and, conversely, how long can a territory postpone taking the measures essential to sustainability by encouraging emigration as the primary means of staying within the territory's carrying capacity for humans. Closely related issues are: (1) is it possible to implement any viable bottom-up plans for sustainability when there are mass migrations of people on the planet? (2) If controlling mass migrations to the degree necessary to achieve sustainability is essential, what measures should be taken at the global, national, and local levels? (3) If some areas appear to have achieved sustainable use of the planet, they will doubtless appear very attractive to those in areas that have not. What is to prevent people from leaving the less attractive areas to colonize the more attractive ones, thus reducing their desirability of attractive areas by pushing them beyond the carrying capacity level or closer to it? (4) To what degree does the exercise of individual "rights," such as having as many children as one wishes, carrying out activities on one's property that endanger adjacent properties and ecosystems, or destroying habitat on one's personal property adversely affect maintaining bio-regional ecosystem integrity? (5) Given the

uncertainties in estimating carrying capacity for any region, how much of a safety factor should be built into this sustainable use design to allow for episodic events that will strain resiliency of natural systems? These are illustrative questions only, since making a complete list is almost certainly beyond the capabilities of any individual or any bioregion. Nevertheless, these questions illustrate some of the issues likely to be contentious when developing a bottom-up sustainable use strategy to implement the lofty goals of the top-down sustainable use strategy. Clearly, a bottom-up sustainable use strategy will involve territoriality to a degree that could be conveniently glossed over in the top-down sustainable use strategy.

Abundant literature cover territoriality in other species of animals. In essence, an individual, mated pair, or larger social group (e.g., lion pride) will select a territory with sufficient resources for long-term maintenance and defend the territory with considerable vigor. The fate of individuals whose presence would endanger the carrying capacity is not attractive and yet, in the long term, the species and the group benefit as a consequence of measures taken to ensure that carrying capacity is not exceeded. It is ironic that organisms often with brains only a fraction of the size of brains of *Homo sapiens*, manage to stay within their carrying capacity, albeit with very harsh measures, while the "intelligent" species uses the intelligence often to deny that carrying capacity exists and is unwilling to take the necessary measures to stay well within its limit. This is not to say that humankind should necessarily follow the models of other animals, but rather humankind should use intelligence guided by reason to find compassionate ways

to stay within the regional carrying capacity for sustainable use.

The biospheric life support system is governed by self-organizing and self-regulating natural laws, which include those of biology, ecology, sociology, psychology, genetics, and various short- and long-term cyclic events, to mention a few illustrative examples. The self-organization includes such complex phenomena as migrating species that exploit a temporary carrying capacity in different geographic locations, albeit that for each migratory species these are fairly predictable. For breeding birds that may travel thousands of miles to reach an intermittently resource-rich habitat or breeding ground, there is a tremendous expenditure of energy to reach temporarily available resources. There is also considerable risk involved in extended travel, particularly when the stopover places may in recent years have been altered by humans. Nevertheless, a self-regulating system has been developed to meet a very complex interactive series of temporal and spatial conditions. How humans could adjust to temporarily available increased resources that increase the carrying capacity of a particular locale for a comparatively short period of time is not clear. Harvesting the resources and moving them elsewhere requires considerable energy but, arguably, not as much as providing temporary housing, shelter, and other amenities for transient use. Nevertheless, there may well be a significant number of places in the world where the carrying capacity for humans is temporarily increased seasonally, which may, properly utilized, increase the carrying capacity for humans elsewhere on the planet.

Carrying Capacity

Carrying capacity is defined as the maximum, equilibrium number of organisms of a particular species that can be supported indefinitely in a given environment (Random House Dictionary of the English Language, 2nd Edition Unabridged). Alternatively, the population carrying capacity can be defined as population that a given area will support without undergoing deterioration (Webster's Third New International Dictionary of the English Language, Unabridged). As Cohen (1995) notes, calculating the carrying capacity for humans of the entire planet or of any region is an extremely difficult task. However, one thing is abundantly clear: calculations will not be helped if there are mass migrations of people from one part of the planet to another, especially if the carrying capacity is not known in either area. Presumably, however, most of the migrants will be leaving because living conditions are marginal or sub-marginal, although some may leave for political, religious, or ethnic reasons as well. It is probable that the immigrants to the new regions will have cultural differences and will very likely not speak the language of the new region well. The immigrants are expecting a better life, which for most of them will be interpreted as more material goods. Menzel's (1994) book has some graphic pictures showing the enormous differences in the quantity of material goods in average families in a variety of cultures and nations. One need only look at the pictures of the two families on the cover to see the enormous range in the quantity of material possessions. A variety of UN reports give the average income, living conditions, etc. of the world's peoples, which

might be summarized as saying that about half the world's population is living marginally, at least by the standards of the richest countries. Worse yet, such books as Postel's (1999) document the serious threats to agricultural productivity that would definitely and significantly reduce the planet's carrying capacity and that of many regions, many of which have high population densities. Equally disturbing is the literature on the ecological collapse of ancient civilizations. If one assumes that people in the past cultures were as intelligent as the present generations or at least reasonably close to the current level, although they did not have present technology, it is still easy to surmise that they must have been aware that their practices were unsustainable; however, the cultural momentum prevented them from making adequate changes in time. Without question, most of the changes needed to stay within the carrying capacity of a particular region or the planet as a whole will be unpalatable to the majority of people. On the other hand, when a nation or region exceeds its carrying capacity, whatever the reasons, there will be substantial loss of individual freedom in choice of family size, mobility, quality of life, and many other factors requiring resource utilization. Of course, it is possible to have a quality life without using huge amounts of ecological resources, but accepting that fact will be a major paradigm shift globally, and particularly in those nations where individuals and the entire nation are materially wealthy.

Unpleasant as the measures necessary to stay within carrying capacity may be, the alternative for most people will be worse. Nature controls species that have exceeded their car-

rying capacity with famine, disease, death, etc. Exponential growth ensures that those areas or nations that feel that they can avoid nature's population controls will experience a rude awakening.

One of the likely consequences of exceeding carrying capacity, even in one or more regions of the world, is resource wars. Political leaders may find it more expedient to go to war over resource allocation than to initiate the social and political changes necessary for sustainable use of the planet, of which not exceeding carrying capacity is a major requirement.

Conclusions

Immigration, emigration, and territoriality are essential components of the quest for sustainable use of the planet. In order to achieve sustainability, there must be a strong desire to stay within the carrying capacity of the region, however this capacity is calculated. This means defending the territory against any activity likely to cause the region or nation to exceed its carrying capacity. Immigration, both legal and illegal, is one of the primary factors likely to impede sustainability, not only because of cultural and language barriers that may well exist, but also because the immigrants will be unfamiliar with the region and require much careful training and education to ensure that their practices are sustainable in the context of that particular ecoregion or nation. Difficult as it will be for nations with high legal and illegal immigration rates to maintain a human population dedicated to not exceeding carrying capacity, arguably the worst problems will be in nations exporting people (emigration)

in order to avoid exceeding their carrying capacity or because they have already done so. Exponential growth ensures that this is a very short-term solution, which will become increasingly difficult when other areas and nations perceive the difficulty of remaining within local, regional, and national carrying capacities. Even a population growth rate of 2% annually means a doubling in 35 years, and there are many regions of the world (e.g., Afghanistan) where the birth rate is already far higher.

Staying within the carrying capacity will be a communal effort that will increase both social capital and natural capital. The latter will provide the ecosystem services necessary

for sustainability and the former the social framework necessary to take the measures required to avoid exceeding the carrying capacity.

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References

- Bateson, G. (1975). *Steps to an ecology of mind*. New York: Ballantine.
- Berry, W. (1989). The futility of global thinking. *Harper's Magazine*, September.
- Cohen, J. E. (1995). *How many people can the Earth support?* NY: W. W. Norton & Company.
- Ehrlich, P. R. (2000). *Human natures*. Washington, DC: Island Press.
- Menzel, P. (1994). *Material world: a global family portrait*. San Fco., CA: Sierra Club Books.
- Postel, S. (1999). *Pillars of sand: can the irrigation miracle last?* NY: W. W. Norton & Company.
- Simon, J. (1981). *The ultimate resource*. Princeton, NJ: Princeton University Press.
- Wackernagel, M. and Rees, W. (1996). *Our ecological footprint: reducing human impact on the Earth*. Gabriola Island, British Columbia, Canada: New Society Publishers.
- Weston, R. F. (1995). Sustainable development: to better understand the concept. In *Sustainable development: rules of the game*, pp. 5-16. West Chester, PA: Roy F. Weston, Inc.
- World Commission on Environment and Development. (1987). *Our common future*. Oxford: Oxford University Press.

Immigration/Emigration and Carrying Capacity

By Stanley R. Ingman

The principal thrust of this article is to argue against permitting emigration from geographic areas where the carrying capacity has been over-extended into areas in which sustainable practices have resulted in a higher quality of life. My problem in reviewing this article is that I know of no communities which meet the author's criteria of being the relatively self-contained sustainable communities where potential migrants are desiring to go. Perhaps some indigenous peoples in remote regions come close (e.g. the Aboriginals of Australia) to being sustainable self-sufficient communities; however even their life ways have been altered by encroachments of the modern world economic system. Where indigenous people are living in a relatively sustainable manner, they have only been permitted to do so because their land base is considered undesirable and because the residents' standard of living is materially lower than others'. There are also some planned communities/commons which have intentionally developed sustainable oases, such as some Amish communities have accomplished within the United States. They have managed to keep others who covet their fertile land at bay; perhaps this is the type of community about which the article is speaking. I agree with the author that promoting more self-contained self-sufficient regions as models of sustainability could be very helpful as a means for convincing the rest of the world that we can and should make drastic changes in our production and consumption patterns. However, the article does not really discuss how this can be achieved. Rather the article focuses on the movement of peoples as being the critical (key) element which needs to be curtailed to allow such sustainable communities to exist.

The author is a biologist with a great deal to offer regarding the characteristics of ecological systems. Certainly his knowledge has an important place in the literature on sustainable communities. However, his biological perspective has serious limitations when addressing human behavior and social/economic systems. He seems to look at populations of humans as though they were populations of other species living in a natural environment. However, because of the machinations of the modern world economic system, our most populated regions are also among the most affluent, such as New York City

and Tokyo. These affluent urban centers are parasites on the rest of the world, and their “hunger” for the rest of the world’s natural resources is at the crux of the problem, not the migration of people from poor nations to wealthy nations and from rural to urban areas. To address the population problem and the desire for people to move, we must focus not on the movements of people but on the circumstances which contribute to the desperation which makes them want to move. In other words, we need to focus on systems of exploitation by the rich and powerful. We know, for example, that fertility increases when and where economic exploitation increases. This is true internationally as well as nationally, historically as well as currently. One needs only to look at England at the time of land enclosure, which was coupled with exploitation of landless peasants (the proletariat) in the mines and factories, to observe increases in fertility and population growth (which ultimately resulted in mass emigration to the Americas and Australia). Fertility (the number of live infants born to women) increased in Africa for similar reasons during the colonial times and under post-colonial economies. If we want to address the “population problem,” we must address economic exploitation, not migration. Migration is a symptom, not the underlying cause of the globe’s failure to achieve sustainability.

I am recommending against publication of this article as it presently stands, even though I do believe there is narrative within it which could be incorporated into another article - not on migration - but on all the necessary elements of an ecologically sustainable community/region. This would make a good article in its own right. If the author is so inclined, s/he might also address methods of achieving such a community in today’s global economy with its gross inequalities. Personally, I believe that the only way the global community is going to achieve sustainability is to withdraw the flow of raw materials (such as petroleum) into the urban industrial consumer nations thereby forcing their populations to live more sustainably. This would be far more effective than withdrawing the flow of people. Third World nations should be withholding resources and using them to meet the material needs of their own people. The urban-industrial nations would be forced to live with less, and the currently affluent nations would become less attractive to potential migrants.

This article “Immigration/Emigration and Carrying Capacity,” as well as the one I am proposing the author consider writing, does have an important function and that is to provoke dialogue on the underlying causes of environmental degradation and on the strategies needed to remedy the situation and to achieve sustainable communities/regions.

Hazardous Waste Transfer to Africa: Implications for the Poor and Marginalized

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Abstract

The article examines toxic (or hazardous) waste traffic to Africa and the implications for the poor and marginalized (older people, women and children). It argues that toxic waste dumping in poor countries of sub-Saharan Africa adversely affect the health and environment in those countries. It argues that multinational corporations and organizations with corrupt individuals in the receiving countries seek profit margins and disregard human well-being as well as exacerbate environmental problems. Chronic exposure to the toxic wastes affects people in numerous ways. The toxic waste compounds the already stressful conditions of the poor and marginalized individuals. The older adults waste away fast and the population, especially women and children suffer a plague of diseases without help or medical care. I suggest that for the millennium development goals to be met by even the poorest of nations, governments need to be transparent and communities need to be vigilant, and hold governments accountable.

Introduction

“Our choices and interventions have transformed the natural world, posing both great possibilities and extreme dangers for the quality and sustainability of our civilizations, and for the intricate balances of nature” (UNFPA, 2001:1).

The world population is more than six billion and counting. Consumption has increased, particularly in richer countries. Technological advancement has generated tremendous wealth for some people. Yet, half of the world population lives in absolute poverty, unable to meet its basic necessities. The extraction of resources for our use is easy, but dealing with the resulting wastes has been near impos-

Therefore, to ensure the sustainability of the environment, including the development prospects of poor countries, harmful production and consumption patterns must change.

sible. The world is facing a difficult problem of waste disposal. Our high tech, consumption-oriented societies produce more waste than they can possibly handle and safely dispose of. Shortage of waste sites and the increased citizen awarenesses in rich nations about the consequences of storing hazardous waste in their own backyards has made it more difficult and costly to store or dump these wastes in rich countries. Thus, there is a great deal of secrecy surrounding the hazardous waste traffic as the United States and European countries make attempts to dump their wastes elsewhere.

Millennium Development Goal 7 and Hazardous Waste Transfer

The millennium development goals were adopted by 189 countries at the United Nations Millennium Summit in September of 2000. These goals range from reducing poverty to reducing HIV/AIDS prevalence to eradicating illiteracy by the year 2015. This article examines toxic (or hazardous) waste traffic to Africa and the implications for the poor and marginalized (older people, women and children) in light of "Millennium Goal 7", which seeks to ensure environmental sustainability. For countries to meet this goal, they must achieve sustainable development patterns and preserve the productive capacity of natural ecosystems for future generations (HDR, 2003). The report further states that many environmental problems arise from the production and consumption patterns of

non-poor people, particularly in rich nations. Therefore, to ensure the sustainability of the environment, including the development prospects of poor countries, harmful production and consumption patterns must change. How should this be done without jeopardizing profit margins for the multinational corporations from rich countries and their collaborators in poor nations? Perhaps, the collaborative efforts of the international community in making sure that the millennium goals, especially the seventh goal, will be a factor in influencing the rich industrialized countries, such as the United States and the European Union to ratify the Treaty on the Control of Transboundary Movement of Hazardous Wastes and their Disposals.

Policies Governing the Transboundary Trade in Hazardous Wastes

The 1989 Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposals under the auspices of the United Nations Environmental Program (UNEP) was the first global environmental treaty that addressed the international traffic of hazardous wastes. The chief aims of the Basel Convention are to reduce the production of hazardous wastes and to encourage disposal of the wastes at the source and ensure that management of hazardous and toxic wastes is environmentally safe. The treaty merely required that the traders in hazardous and toxic wastes meet certain requirements: (i) prior written consent from

the receiving country; (ii) prohibit exports to countries that have banned the wastes and that have not signed the treaty; and (iii) countries that do not have proper treatment and disposal facilities. Clearly, the treaty leaves no doubt about the competence of the receiving country and corresponding obligations of the country exporting the hazardous wastes. However, because of the weakness of the requirements, they were undermined by an international campaign by waste exporting countries.

With billions of metric tons of solid waste generated in the United States and other rich industrialized countries every year from both industrial and municipal sources, it is quite difficult to get rid of the escalating waste build-up (EarthAction, 1996) or to effectively and safely manage the wastes. Efforts to site facilities in the rich industrialized countries to dispose of these wastes have been unsuccessful due to public opposition in these countries, especially in the United States. These countries have been forced to contend with increasingly rigorous environmental laws in their borders and strong regulations protecting the health of workers and the public. These restrictions have forced these countries to find ways of disposing of their wastes. A simple way to dispose of their hazardous wastes while protecting their profits has been to dump it on the poor, least industrialized world.

Hazardous Wastes Traffic to Africa

Studies have documented the “raison d’être” for dumping toxic wastes on poor countries (Gwam, 2000). Gwam notes that toxic and other hazardous wastes are more likely to

be dumped on sites located in areas that are predominantly poor. “The incentive for waste exports and dumping in Africa and in other developing countries could be due to the lower environmental standards, the institutional corruption of political leaders, abject poverty and less public opposition due to lack of information” (Gwam, 2000: 186). Other studies have cited environmental racism (Whitaker, 2001). Whitaker notes that in South Africa, apartheid spatial planning systematically located black residential areas near dirty industries in order to facilitate easy access to cheap labor and that generally these residential areas were located within close proximity of toxic dumps, sewerage treatment plants, and polluting industries. In the United States, the “Love Canal” is still a toxic nightmare. Thus, unless high standards are set and enforced, the toxic nightmare likened to the “Love Canal” is waiting to happen in the least industrialized nations that receive the toxic wastes or poisons.

Vallette and Spalding (1990) have listed types of wastes that are transferred to the least industrialized nations. The wastes have included highly toxic polychlorinated biphenyls (PCBs), acids, sludge, used batteries, paint solvents, and dioxin containing incinerator ash to radioactive waste. Since 1989, more than 500 attempts to export 200 million tons of waste from the 24 member countries of the Organization for Economic Cooperation and Development (OECD) to 122 non-OECD countries have been catalogued (Vallette & Spalding, 1990). At least 5.3 million tons of wastes are known to have been exported and dumped. The dumping sites range from East to West Africa, the Indian Ocean to South Africa.

The uncontrolled dumping of toxic wastes in Africa has been traced back to the early 1970s, when reports of clandestine deals between African countries and companies in the United States, France, Germany, the United Kingdom, Switzerland, Italy and the former USSR began to surface. Rumors of toxic waste sites in African countries, predominantly in West Africa, were soon substantiated by evidence such as leaking barrels with toxic chemicals (Third World Network, 1989). According to Greenpeace (1997), for the past three decades, poor African nations have served as the dumping ground for hazardous waste materials, i.e., raw sewage, sludge, incinerated ashes, contaminated oils,

chemical substances, acids, poisonous solvents ejected by chemical, pharmaceutical, and fertilizer producing plants in the industrialized world.

It should be noted that the financial inducements for poor and indebted nations to accept this poisonous refuse are enormous. These countries' indebtedness and interest charges and payments are astronomical. Table 1 lists selected African countries that have received wastes between 1986 and 1997. Table 2 and Table 3 illustrate the enormous profits for the exporting businesses of the industrialized world from dumping on African countries.

Table 1: Selected African countries that have been proposed for hazardous waste disposal and those that have received the wastes

Proposed to	Received Waste
Congo	Benin
Djibouti	Equatorial Guinea
Egypt	Gabon
Gambia	Guinea
Guinea Bissau	Madagascar
Madagascar	Nigeria
Morocco	Liberia
Mozambique	Sierra Leone
Namibia	South Africa
Senegal	Sudan
Somalia	Zimbabwe
South Africa	
Sudan	
Tunisia	

Source: Hilz (1992: 17-18). "The International Toxic Waste Trade", and A compilation from Greenpeace (1990-1994; 1997) inventory reports.

Table 2: Selected African countries involved in actual hazardous waste trade

Year	Originating OECD Country	Destination - African Country	Type of Waste and cost of dumping on the African Country
1978	United States	Zimbabwe	Waste relabeled as “pure dry cleaning solvent” was bought with funds from United States Agency for International Development (USAID).
1985	United States	Sudan	Nuclear waste dumped in Darfur Desert for \$ 4 million.
1984-1986	Soviet Union	Benin	Dumped radioactive waste on Benin.
1987	United States	Gabon	Denis Mining Company of Colorado Uranium Mines dumped radioactive mine waste on Gabon.
1988	Not indicated	Morocco	Uncertain, planned hundreds of thousands of tons per year.
June 1988	United States	Conakry,Guinea	15,000 tons of toxic incinerator ash was dumped in a quarry on Kassa Island for \$ 40 per ton, which might have cost the United States \$ 1,000 to dispose off the waste.
Sep 1987 - Jun 1988	Italy	Koko, Nigeria	4,000 tons of toxic waste including deadly dioxin were stored on the property of Sunday Nana for \$100 per month.
1988	France	Benin	The French government negotiated a deal for Benin to store radioactive and industrial waste for an advance of \$1.6 mil

Year	Originating OECD Country	Destination - African Country	Type of Waste and cost of dumping on the African Country
			lion and 30 years of economic assistance.
1987-1989	Britain	Benin	British Company, Sesco offered Benin US\$ 2.50 per ton to store 50 million tons of waste over ten years.
1987-1988	Switzerland & Britain	Guinea Bissau	Guinea Bissau was offered US\$ 120 million a year to bury 500,000 tons of pharmaceuticals and industrial waste.
1992	Germany	Egypt	Shipment of shredded car parts and car batteries was turned away after a tip-off from the Netherlands.
1990-1994	United States	South Africa	Approximately 7.5 million tons of mercuric chloride. Thor Chemicals has also stockpiled approximately 10,000 barrels of mercury waste under the guise of recycling.
1995	United States	South Africa	500,000 tons of cupric arsenide containing cancer-causing chemicals and at least 16% arsenic in copper arsenide cake.
1993 & 1997	Not Known	Indian Ocean Madagascar	Undetermined toxic waste

Source: Compiled from Third World Network, 1989; New Scientist, 1985; Ksentini, 1999, and various Greenpeace (1991; 1992; 1993; 1994; and 1997) inventory reports.

Table 3. Selected African countries involved in planned waste trade

Year	Originating OECD Country	Destination - African Country	Type of Waste and cost of dumping on the African Country
1979	United States	Sierra Leone	USA, Colorado-based Nedlog Technology Group, Inc. offered \$25 million to use Sierra Leone's territory for waste disposal. Under mounting pressure, the deal was rejected.
1987	Italy & Switzerland	Djibouti	2,100 tons of chemical waste for \$40 per ton was turned down.
1987	Not known	Tunisia	Hundreds of thousands of tons per year, rejected.
1987-1988	West Germany	Liberia	W. Germany-based company allied to the States wanted to solve its waste problems by building a depot in Liberia. The waste was to include a range of hazardous waste and contaminated earth.
June 1988- May 1989	United States	Congo	Van Santen - Dutch company negotiated a deal to dump one million tons of industrial waste, which included: solvent, paint, pesticide, sludge, and chemical wastes. The deal was for \$84 million over three years. The deal was canceled.
1992	Italy and Switzerland	Somalia	An 80 million dollar contract at a cost of \$2.50 per ton to store 500,000 tons of processed industrial waste per year. The deal was

Year	Originating OECD Country	Destination - African Country	Type of Waste and cost of dumping on the African Country
			canceled because of publicity. The waste was later dumped in the Indian Ocean off the coast of Somalia.

Source: Compiled from Third World Network 1989; New Scientist, 1985; Ksentini, 1999, and various Greenpeace (1991; 1992; 1993; 1994; and 1997) inventory reports.

The majority of the waste trade destined for cheap dumping locations in Africa is clandestinely conducted, through false labeling and under the guise of recycling.

As shown in Table 2 and Table 3, selling untreated waste to an African country is quite profitable. Although the clandestine nature of waste product trade makes it difficult to provide detailed data, estimates of the waste disposal industry are in the multi-billion dollar level. African countries demand relatively very little compensation for accepting the hazardous waste. Estimates for waste processing in the industrial countries reach \$ 3,000 per ton, whereas some African countries have been offered and reportedly accepted as little as \$ 2.50 per ton.

Beck (1993: 41) best captures the African nations' situation. He states that there is "a systematic 'attraction' between extreme poverty and extreme risk". Poverty is linked to environmental degradation. Poor people are often deprived of the means and rights to enjoy a better quality of life by breathing clean air, drinking clean water, and clean technologies. Nonetheless, the effects of poverty also

destroy the environment. Ending poverty is one of the millennium goals closely linked to sustainable environment. However, judging from some of the countries' profiles, it is difficult not to see the imperialistic nature of the waste trade and quite easy to conclude that the huge task of achieving any one of these goals is doomed. Countries cannot engage in illicit hazardous waste trade and industrial interests and support treaties that call for environmental justice. A number of national governments in Europe and North America press for recycling waste exports. Masked however, by the label of "recycling," it is easy to disguise economically motivated waste export, which makes it easy to buy and sell toxic waste just like any other commodity (Greenpeace, 1997). The majority of the waste trade destined for cheap dumping locations in Africa is clandestinely conducted, through false labeling and under the guise of recycling.

Selected Cases and Impact on Marginalized Communities

In 1988, a Norwegian ship commissioned by Philadelphia, United States of America, dumped 15,000 tons of toxic waste labeled “raw material for bricks” in a quarry on Kassa Island, off the mainland capital of Guinea, Conakry. The waste was eventually removed after killing a large part of the island’s vegetation and probably contaminating the water system. Kassa Island has been greatly affected and the people suffer destitution because of the disappearance of its maritime wealth.

From 1990 to date, Thor Chemicals, a South African branch of a transnational corporation has been known to accept thousands of barrels of mercury wastes each year from United States companies (Cyanamid and Borden Chemicals and Plastics) and several European companies for “recycling,” only to store them in warehouses. Greenpeace (1990; 1992) notes that Thor workers and villagers living around the plant and warehouses have high mercury levels 1,000 to 1,900 times higher than the World Health Organization’s (WHO) acceptable level. In one area around the plant, the mercury level was 1.5 million times higher than WHO’s acceptable level.

It should be noted that it is not only the shipments of waste with which less developed countries have to contend. Big corporations are shipping their entire “dirty” corporations. While operations in the industrialized regions are usually accompanied by environmental impact assessments, social and environmental policies, and intense lobbying to appease the justified concerns of local communities, these practices are not exported to less

developed regions. For example, the Royal Dutch/Shell Group, which has interests in over 3,000 companies and operations in more than 100 countries has been operating in the Ogoni region of Niger Delta since 1958, with no regard for the lives of the Ogoni people (Emiroaf, 1992). Flaring of gas is done in the middle of villages or very close to human habitation, which destroys wildlife, plant life, poisons the atmosphere and makes the residents partially deaf and prone to respiratory diseases. Rains produce acid rain, which further poisons watercourses, streams, creeks and agricultural land (Emiroaf, 1992). According to Ube and Akpa (1993), in one of the most recent oil spills in Ogoni, oil leaked from a Shell flowline for 40 days without repair and further contaminated farmland. The Ogoni people are now subjected to hunger because their farmlands have been contaminated and they cannot grow subsistence crops.

Each dumping poses a serious threat to life; demonstrates a complete lack of moral values and shows that the worlds of politics and business strive to make money at the expense of human life. When an industry can easily send its wastes to countries or regions with fewer progressive environmental practices (Greenpeace, 1991) skewed moral values are operating in that industry. From an economic aspect, it is not worthwhile for the least industrialized countries to accept the toxic wastes offered to them in exchange for money. The short-term monetary gains from importing toxic wastes hurt the poor and undermine long-term gains. The damage to health and environment as well as the eventual costs of cleaning up wastes outweigh the short-term gains.

South Africa, Nigeria, Guinea and Madagascar are only a few examples where trade in hazardous waste has affected people, their land and contaminated waterways and streams. Kala (1994) has noted that the government of South Africa inherited a toxic time bomb of rivers, valleys, gorges, and mine dumps. South Africa's mining of large quantities of uranium as a secondary product and the importation of hazardous chemicals add to the dangerous situation. Communities living near the mines are exposed to the cancer-causing radium and radon that commonly leak into rivers. A Thor Chemicals worker has died while others have been incurably poisoned through exposure to mercuric waste imported yearly from the United States and Britain by the company (Puckett, 1994). Furthermore, Engen refinery in South Durban is one of the two largest sources of sulphur dioxide pollution and it is located near two residential low income black communities. The communities have on numerous occasions raised concerns regarding the pollution; flaring, sulphur dioxide emissions and oil spills to no avail (see Peek, <http://www.goldmanprize.org/recipient/recipients.html> and <http://www.katunetwork.fi/Artikkelit/kirja2/tekstit/Peek.htm>). Studies have found that children in the suburbs south of Durban, where Engen refinery is located, are more likely to suffer from chest complaints, high levels of asthma than children from other areas (Kirk, 2000). These children bear the public health costs of Engen refinery and other toxic industries.

In the Koko, Nigeria case, the government spent an estimated \$1 million in the clean-up plus peripheral costs. Nigerians employed in the clean-up were hospitalized with severe

chemical burns, nausea, vomiting blood, partial paralysis and coma. The rate of premature babies in Koko soared (Greenpeace, 1991). Research on the effects of hazardous wastes and industries in Nigeria has been documented (Ake, 1996; Robinson, 1996; Ikein & Ogbuigwe, 1994). Recent reports have documented massive environmental destruction in the Niger River Delta region. Oil spills on farmlands and into community water supplies have devastated the ecosystem and abused human rights. Ayeni (1992) notes that, in the Ogoni region, water is not safe to drink and to fish in; and the soil is not good to farm. Describing a site where there was an oil spill in 1969, Robinson (1996: 34) stated: "The soil and oil are caked together into a thick black crust that covers the area. Liquid crude oil is still present in deep crevices (2 to 3 feet deep), formed in spots where trees once stood.... The air remains polluted by the vapor from the spilled crude oil. The spilled oil polluted the creek nearby and oil flowed into the body of water that people still drink. So much devastation still exists after 26 years".

Community Efforts for a Sustainable Environment

A sustainable environment is not exclusively the responsibility of governments but is a matter for society as a whole. Communities are mobilizing to safeguard their environments and they are doing that by eliciting active partnerships with their governments and stakeholders. For example, to protest against the injustices in the Ogoni region in Nigeria, in 1990, under the leadership of Nigerian author, Ken Saro-Wiwa, the Ogoni people

founded the Movement for the Survival of Ogoni People (MOSOP), a grass roots group that educates and informs the public about their environment and their rights. Although MOSOP's leader, Saro-Wiwa was murdered in November 1995, the group has not relented in its efforts to fight environmental injustices.

In South Africa, communities of South Durban have committed themselves to the struggle for environmental justice. In 1996 the South Durban Community Environmental Alliance (SDCEA) was created to fight for environmental justice in South Durban and other marginalized communities in South Africa. With a unified front, under the umbrella of SDCEA, the communities in South Durban mounted pressure on dirty industries located in their neighborhoods to reduce sulphur dioxide pollution. To date, marginalized communities in Africa continue to struggle for environmental justice with the knowledge that relenting in this struggle would be tantamount to obliterating the next generation.

Conclusion

Although the international community has addressed some of the problems emanating from hazardous waste traffic, so far, it has not

To date, marginalized communities in Africa continue to struggle for environmental justice...

been able to agree on a complete ban and in fact there are suggestions that the ingenuity of waste traders can not be overlooked. Therefore, communities in the receiving countries need to mobilize and as one voice work toward a sustainable environment. Communities in South Africa and Nigeria have fought environmental injustice and some have succeeded in forcing the culprits to redress the injustices.

These communities have realized that since toxic wastes dumping has adverse effects on the right to health, clearly, it will have implications on the right to life, liberty and security of people, adequate standard of living, food, housing, education and development. A community that is affected by the illicit toxic waste dumping will not be healthy to provide for its members. The people within the community will not be able to work or farm, which affects the productivity of the community, leading to hunger and poverty. Communal and family poverty affect the education of the children, which maintains communities in a state of poverty making it impossible to achieve any one of the millennium development goals.

References

- Ake, C. (1996, January 29: p. Forum). Shelling Nigeria Ablaze. TELL.
- Ayeni, O. (1992, May 13-19: p.75). Nigeria: Rectifying the Damage. West Africa.
- Beck, Ulrich. (1992). Risk society: Towards a new modernity. London: Sage Publications.

EarthAction. (1996). Bury the toxic waste trade.

Emiroaf Magazine. (1992, December 8).

Greenpeace International. (1990). The gods must be crazy: Mercury wastes dumped by Thor in South Africa. Greenpeace, Washington, D.C.

Greenpeace International. (1991). Greenpeace waste trade update, 4 (1).

Greenpeace International. (1992). Greenpeace Toxic Trade Update, 5.1.

Greenpeace International. (1993). Toxic trade update, 6 (4).

Greenpeace International. (1994). Poisonous lead battery waste trade from Australia, United Kingdom, and USA to Asia and Latin America.

Greenpeace International. (1997). The Basel Ban: A victory for the environment and justice ban waste trade and promote clean production.

Gwam, C. U. (2000, Summer/Fall). Toxic Wastes and Human Rights. *The Brown Journal of World Affairs*, Vol. VII (2), 185-196.

Human Development Report. (2003). Millennium Development Goals: A Compact among Nations to end Human Poverty. United Nations Development Program, New York, New York.

Hilz, C. (1992). *The international toxic waste trade*. Van Nostrand Reinhold, New York.

Ikein, A. and Ogbuigwe, A. E. (1994). The conflicting choice between environmental quality, development, and human welfare in Africa: Gas flaring in the Nigerian oil industry. Chapter 4, in Valentine Udoh James (Ed.), *Environmental and economic dilemmas of developing countries: Africa in the Twenty-first century*. Praeger, Westport, Connecticut.

Kala, H. (1994). Human rights: Apartheid and its environmental legacy. South Africa Exchange Program on Environmental Justice.

Kirk, P. (2000). Stink over SA's Foul Air.
[<http://www.mg.co.za/mg/news/2000apr2/28apr-pollution.html>]

Ksentini, F. Z. (1999, January). Adverse Effects of the Illicit Movement and Dumping of Toxic and Dangerous Products and Waste on the Enjoyment of Human Rights. Report of the Special Rapporteur No.E/CN.4/1999/46/Add.1 (CHR doc.) 7.

Peek, S. South Africa: Toxic and nuclear contamination.
[<http://www.goldmanprize.org/recipients/recipients.html>].

Peek, S. Conflict and cooperation in Durban's petrochemical basin.
[<http://www.katunetwork.fi/Artikkelit/kirja2/tekstit/Peek.html>]

Puckett, Jim. (1994). Disposing of the waste trade: Closing the recycling loophole. *The Ecologist*, 24 (2): 53-58.

Robinson, D. (1996). Ogoni, the struggle continues. World Council of Churches. Geneva, Switzerland.

The Basel Convention on the Transfrontier Movement of Hazardous Wastes and their Disposal, Opened for signature March 22, 1989, UNEP Doc. IG. 80/3, reprinted in 28 *International Legal Materials*, 657 (1989).

Third World Network. (1989). Toxic waste dumping in the Third World. *Race & Class*, 30 (3), 47-55.

Ube, A. and Akpa, N. (1993, July 29). *The Daily Sunray*.

UNFPA. (2001). *The State of World Population 2001 Footprints & Milestones: Population and Environmental Change*. United Nations Population Fund: New York, New York.

Vallette, J. & Spalding, H. (eds.). 1990. *The international trade in wastes: A Greenpeace Inventory*. (5th edition), Greenpeace, Washington, D.C.

Whitaker, D.M. (2001). News from South Africa: Planning and Environmental Racism under Apartheid – what the Built Environment is like Around the Durban Racial Conference. [<http://csf.Colorado.edu/envtecsoc/2001/msg00373.html>].

Domestic Violence; a threat to sustainability

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Abstract

Domestic violence is a devastating and pervasive problem. It is costly in both human and financial terms, and serves as a threat to community sustainability. This article examines the impact of domestic violence on individuals and communities through a review of the literature. The traditional “coordinated community response” to domestic violence is outlined and recommendations for responding to and eliminating domestic violence in communities are offered.

On a cool autumn evening, 32-year-old mother of two, Mireya Salazar, was viciously attacked in her home. Her attacker punched her repeatedly in the face, bound her with rope, sexually assaulted her, then left her tied up on the floor of her bedroom. Her children witnessed part of the assault.

The attacker was her estranged husband, John. As a result of the attack, Mireya was hospitalized for five days, lost her manufacturing job for excessive absences, and was evicted from her apartment for creating a disturbance.

While Mireya was in the hospital, John took both of the children to an undisclosed

location, filed for divorce, and gained temporary custody of the children. Later, he was charged with a misdemeanor family violence assault crime. He received a 12 month probated sentence in which adjudication of the case was deferred to the end of the probationary period. He completed the probation successfully and no conviction was registered.

Today, John has a new relationship, continues to work for the same employer, attends the same church he has attended for years, and enjoys the ongoing support of both his family and a large group of friends. He has joint custody of the children and they spend half their time with him.

Mireya battles depression, was diagnosed with Post Traumatic Stress Disorder, and struggles to make ends meet on her minimum wage income. Creditors are threatening to sue her over her unpaid hospital and doctor bills. The ambulance ride alone cost over \$1500 and she had no insurance. She is angry about being victimized by the court system and losing sole possession of her children, and she worries that John will hire a lawyer and attempt to terminate her parental rights. She notices that he often drives by her apartment at night, and she suspects that it is John that frequently calls her at work and home and hangs up.

of life for citizens is compromised, as legal, financial, emotional, and social resources are consumed in response to family abuse. People must recognize and address this very real threat to sustainability to create environments where all members of the community have opportunities to achieve their maximum potential.

Strategies are needed for communities to discourage family abuse, support the victims and children affected, hold batterers accountable, and, ultimately, eliminate domestic violence.

Domestic violence is a pervasive problem that weakens the social fabric of communities.

The children, John Jr. and Elizabeth, are confused and disoriented. They love their father and want him in their lives, but it bothers them that he continually demeans their mother in their presence and constantly questions them about her life. Both children have had problems in school recently and John Jr. was arrested last week for assaulting a boy in a classroom.

Domestic violence and community sustainability

This scenario, while hypothetical, represents reality for tens of thousands of families across America. Domestic violence is a pervasive problem that weakens the social fabric of communities. Resources are wasted in the aftermath of domestic violence and community standards are compromised. The quality

The scope of the problem

Though incomplete, the literature on domestic violence, or intimate partner abuse, in the general population is extensive. The data has long suggested that partner assaults are very common, with estimates of between 25% and 50% of all marriages experiencing violence at some point (Straus, Gelles, & Steinmetz, 1980). Crime victim survey data indicates that approximately one million American adults are victims of violent crimes committed by spouses and other intimate partners each year (Mignon, Larson, & Holmes, 1996, p. 193).

Domestic violence is, overwhelmingly, a gender based crime, although same sex relationships may experience high rates of domestic violence as well (Burke, 1999). Women are approximately six times more likely than men

to be assaulted by an intimate acquaintance (Bachman & Saltzman, 1995). Almost one third of all violent assaults against women are committed by intimate partners (Bachman & Saltzman, 1995). It has been surmised that up to 50% of all emergency room visits by women are the result of a partner assault (Campbell & Sheridan, 1989), and domestic violence has been identified as the primary cause of homelessness for women and children (Zorza, 1991). One recent study found that as many as 12% of women suffer some form of domestic violence each year, including “mental cruelty, threats, physical violence, [and] violence with injury and rape” (Mooney, 2000).

The financial costs of domestic violence

Domestic violence is a costly problem. Individuals, of course, suffer, but entire communities are impacted as well. The (“The business case for domestic violence programs in health care settings”, 2003) reports that battered women are hospitalized twice as often as members of the general population, and the cost of hospitalizing victims of domestic violence can be double the cost of hospitalizing other patients. The same source further reports that while the cost of medical treatment for injured women is easily calculated, hidden costs may be less visible; more than half of battered women miss three or more days of work per month, and 37% report diminished productivity at work. Almost three out of four Employee Assistance Programs in America report having dealt with an employee who has been the victim of stalking while on the job.

The abuse of pregnant women appears to be a worldwide phenomenon,...

The Corporate Alliance to End Partner Violence (downloaded 2003), in a summary fact sheet on the costs of domestic violence, report that more than a quarter of all Americans receiving crime victimization compensation funds are domestic violence victims. They further report that American businesses lose approximately \$3 to \$5 billion per year in lost time and productivity.

To further add to the costs of domestic violence, community resources are often spent on law enforcement, judges, jail, probation, and intervention programs for offenders. Additionally, social service dollars are directed to shelter and counseling for victims and their children.

Domestic violence as a public health issue

The most vulnerable members of our communities are often those at greatest risk of experiencing domestic violence (Gitterman, 1991, p. 9). People with disabilities seem to be at much higher risk for abuse in the home than the general population (Sobsey, 1994; Sigmon & Edmonds, 2002), as are women who are pregnant. The abuse of pregnant women appears to be a worldwide phenomenon, with as many as 78% of all pregnant women experiencing some form of abuse, much of it serious physical abuse (Johnson, Haider, Ellis, Hay, Lindow, 2003; Moraes &

Reichenheim, 2002; Nasir & Hyder, 2003). Approximately one in six American women experience physical or sexual abuse during pregnancy (McFarlane, J., Parker B., & Soeken, K. ,1996) and that figure appears consistent with findings in other countries. Twenty percent of pregnant teenagers report being victimized during their pregnancies (Parker , McFarlane , & Soeken, 1994).

A report on global gender violence analyzed more than 1,000 articles, surveys, and studies and found that not only is the abuse of pregnant women common, it is a major public health issue (Heise & Ellsberg, 2001). The report found that abuse during pregnancy is positively correlated with multiple health problems, including “ 1) late entry in to prenatal care, 2) increased smoking and substance abuse during pregnancy, 3) premature labor, 4) bleeding during pregnancy, 5) vaginal and cervical infections, 6) miscarriage and abortions, and 7) low birth weights”. Other research has established a strong relationship between domestic violence and mortality of children under five years of age (Asling-Monemi, Pena, Ellsberg, & Persson, 2003).

Women who experience domestic violence often experience both physical and mental health problems for years with symptoms persisting long after the abuse stops (Heise & Ellsberg, 2001). They may live with chronic and painful physical conditions, injuries, negative health behaviors such as alcohol and drug abuse, reproductive health issues such as STD's and pregnancy complications, and mental health problems such as post-traumatic stress disorder, depression, or anxiety.

The impact of domestic violence on young children can be devastating. Numerous studies have been conducted on the effects of children witnessing violence between their parents. A summary of these findings (Barnett, Miller-Perrin, & Perrin, 1997, pp. 140-141) concludes that children who are exposed to domestic violence suffer psychologically in four ways: 1) as a result of the immediate trauma, 2) they are effected developmentally, 3) they live under very high levels of fear and stress, and 4) they are negatively exposed to violent adult role models. The same summary reports that Strauss, in 1991, found that as adults, this population is at very high risk of physical and mental health problems, substance abuse, relationship violence, and generalized criminal activity and violence outside the family.

The development of community responses to domestic violence

Historically, communities have served to reinforce and support men in their role as the dominant gender. In the developing western culture of Europe, men were granted permission to batter and, at times, kill their wives without interference. Women were seen as chattel, as belonging to their husbands. (Anderson & Zinsser, 1988). Women in America fared no better for the first two centuries of this nation. David Peterson del Mar (1996) chronicles the manner in which American communities allowed men to beat and murder their wives in order to “enforce their authority”.

Large scale attempts at institutional change to end wife beatings in western society were

observed as a result of work done in the women's movement in the 1970's, but other, lesser known attempts to award wives protection are documented much earlier. For instance, English common law, the foundation for American family law, attempted to limit injuries to female partners by restricting the size of the stick that men could use in beating their wives. Men were prohibited from using a stick any larger in diameter than their thumb to beat their wives, hence the expression, "the rule of thumb" (Fleming, 1979, p. 270; Sigler, 1989, p. 9). In the settlement era of the mid 1800's, some American communities, particularly in central Illinois, seemed to grow less tolerant of domestic violence and began providing outlets from marriage in the form of divorces (Peterson del Mar, p. 13). Peterson del Mar also notes that women in Oregon, while not free of spousal abuse, gained a greater level of power during the same era (pp. 14-19), which afforded them some recourse to domestic violence not previously seen.

The last four decades have seen much change in the way American communities respond to domestic violence. Danis (2003), reports that most American communities have developed mechanisms in the legal and criminal justice systems to provide sanctions against batterers and legal protection and assistance to battered women, though the results of these efforts seem inconclusive.

The concept of a 'coordinated community response' to domestic violence emerged in the early 1980's, primarily through the work of the Domestic Abuse Intervention Project in Duluth, Minnesota (Pence & Shepard, 1999, pp. 3-4). The coordinated community

response model that evolved linked all the institutions in the community that had a stake in the issue of domestic violence. Law enforcement, prosecutor's offices, the judiciary, activists, battered women's shelters, and sometimes the clergy worked and planned together in an effort to react effectively to domestic violence. Task forces on domestic violence often brought these somewhat disparate constituents together in order to collaborate. The coordinated community response has been a very effective model in developing community systems that hold batterers accountable and provide services to battered women and their children and is in wide use today.

A challenge to communities

Traditionally, the response of most individuals and communities, when confronted with incidences of domestic violence is to first ask, "Why doesn't she leave?" (Jones, 1994). As Jones points out, this question is actually an indictment, a statement that places the blame for the abuse squarely on the shoulders of the abused. Perhaps the better question would be, "How is it that our communities allow abuse to continue?"

What sort of changes would have to occur in a community to shift the focus and blame for the abuse away from the one person with the least power to stop the abuse, the victim, and work instead on developing standards and a community culture that refuses to tolerate domestic violence? How can communities appropriately respond to domestic violence and, more importantly, how can they be proactive in preventing it from occurring in

the first place? Perhaps more than any other entity, communities have the power to develop social norms that prohibit violence. A generation ago, it was recognized that social patterns and cultural supports were more causal in domestic violence than relationship problems, substance abuse, stress, anger problems, and other micro-focused explanations (Straus & Hotaling, 1980). Communities have the ability to alter social patterns and promote equality and safety for women.

Recommendations

First, communities should perform a thorough evaluation of the manner in which they currently respond to domestic violence. The traditional alliances found in a coordinated community response between service providers and shelters, law enforcement, the judiciary, probation, and other key members of the domestic violence 'system' should be in place. Batterers should be arrested and held accountable by the courts and, when appropriate, referred to battering intervention programs, although there are far too many offenders to hope that counseling alone will end domestic violence. Battered women should be provided with shelter and other resources such as medical assistance, long term-housing, counseling and childcare. If there is no coordinated response, a task force should be organized to facilitate communication between the players and develop strategies to promote cooperation between the members of the task force.

Because this is not an issue that concerns only law enforcement and domestic violence professionals, all members of the commu-

nity should be involved in the effort to end domestic violence. One article describes efforts at training librarians to recognize and respond to domestic abuse because battered women may seek out information in public libraries ("Illinois Helps Violence Victims", 2002). Other efforts have been made to train dentists and hairdressers to recognize the signs and symptoms and properly respond.

Small, simple changes can yield large benefits. Researchers have found that a three question screening instrument in a pre-natal setting was found to be very effective in identifying pregnant women who were experiencing abuse (McFarlane, Parker, Soeken, & Bullock, 1992). Does & McDermott (2002, p. 261) recommend that all women who present in any health care setting be screened for domestic violence. Such protocols are easily followed with the cooperation of the medical community.

Other vocational groups could also be trained to identify and respond to symptoms of abuse: grocery and convenience store checkers, mechanics, department store clerks, waiters and waitresses, taxi and bus drivers, and other groups that come in contact with the public. Citizens might be trained not only on how to assist battered women, but also on intervention strategies with abusive men. Again, everyone in the community should be an ally in ending domestic violence.

Most communities have developed plans for dealing with natural disasters and other catastrophic incidents. Unfortunately, research indicates that disasters bring with them an increase in domestic violence following the

crisis, therefore communities should plan accordingly (Bower, 1984; Enarson, 1999; Clemens & Hietala, 1999). All disaster relief plans should include contingencies for dealing with the ensuing domestic violence in a pro-active way, and domestic violence experts should be involved in planning emergency response plans.

While these steps are important, they are not enough. Communities should also develop strategies to not only react to domestic violence, but to eliminate it. Such change requires more than just the work of professionals associated with domestic violence, it requires changing social traditions and community attitudes. Domestic violence is not a professional issue. It is a human issue that everyone should work to eliminate. Strategists should be creative in developing ways to co-opt community partners into ending domestic violence.

Traditionally, domestic violence has been seen as a 'women's issue'. The harsh reality is that domestic violence is primarily an issue of male behavior. Since the bulk of domestic assaults include male perpetrators assaulting female victims, men must change their behavior with, and their attitudes toward, women. As Claude LaBrosse, a long time activist and battering intervention worker in Texas, once said, "Violence against women will stop when men decide it is time for it to stop" (personal communication, October 19, 1995).

All community efforts to end domestic violence should include men. Pro-feminist men who oppose abuse in relationships need to become active in challenging the attitudes of

other men in the community and serve as visible role models for young boys and men. Many communities in North America see men mobilizing to end violence against women. The White Ribbon Campaign is one such effort. Each November in Canada, thousands of men across the nation don white ribbons as "a personal pledge never to commit, condone nor remain silent about violence against women" (The White Ribbon Campaign, 2003). On college campuses across the United States, young men are organizing groups such as Men Against Violence at the University of North Texas. Other organizations such as NOMAS (the National Organization for Men Against Sexism), and Dads and Daughters are comprised of men working to promote gender equality and end violence and abuse against women.

Conclusion

Domestic violence is a pervasive problem that affects individuals, families, and communities on many levels. It strips the community of resources and diminishes the potential of individual members of the community as well as institutions and the community itself. Domestic violence jeopardizes the achievement and maintenance of community sustainability.

Strategies to respond to and eliminate domestic violence should be creative and include as many members of the community as possible. In order to end or significantly reduce domestic violence, it must be viewed not just as a problem of individual behavior, but as a broad community or social problem. Therefore, attitudes, primarily male attitudes, about

abuse in relationships must change. Men must assume the responsibility for ending the abuse of women and work diligently and collaboratively on a community level towards that end.

The elimination or curtailment of domestic violence will strengthen communities. The

failure to address the problem of violence against women will render efforts to maximize both human and financial resources difficult. In order to provide an opportunity for the community and all its members to achieve their full potential, domestic violence must be stopped.

References

- Aisling-Monemi, K., Pens, R., Ellsberg, M., and Persson, L-A. (2003). Violence against women increases the risk of infant and child mortality: a case—referrant study in Nicaragua. *Bulletin of the World Health Organization*, 81 (1), 10-16.
- Anderson, B.S., & Zinsler, J.P. (1988). *A History of Their Own: Women in Europe from Prehistory to the Present*. New York: Harper and Row.
- Barnett, O.W., Miller-Perrin, C.L., & Perrin, R.D. (1997). *Family Violence Across the Lifespan*. Thousand Oaks: Sage.
- Bachman, R., & Saltzman, L. E. (1995). Violence against women: Estimates from the redesigned survey (Bureau of Justice Statistics special report). Rockville, MD: U.S. Department of Justice. (N.C.J. No. 154348).
- Bower, B. (1984). Volcanic ash takes stressful toll. *Scientific News*, 125 (4), 214.
- Burke, L.K. (1999). Violence in lesbian and gay relationships: Theory, prevalence, and correlational factors. *Clinical Psychology Review* 19 (5), 487-512.
- Butchart, A. & Villaveces, A. (2003). Violence against women and the risk of infant and child mortality. *Bulletin of the World Health Organization*, 81 (1), 17-18.
- Campbell, J.C., & Sheridan, D.J. (1989). Emergency nursing interventions with battered women. *Journal of Emergency Nursing*, 15, 12-17.
- Clemens, P. & Hietala, J.R. (1999). Risk of domestic violence after flood impact: Effects of social support, age, and history of domestic violence. *Applied Behavioral Science Review*, 7(2), 199-206.
- Corporate Alliance to End Partner Violence (undated). Facts and statistics: financial costs. Retrieved July 22, 2003, from http://www.caepv.org/membercenter/fact_display.asp?fs_id=2
- Danis, F.S. (2003). The criminalization of domestic violence: What social workers need to know. *Social Work*, 48 (2), 237-246.

- Does, M. & McDermott, V. (2002). Helping battered women. In A.R. Roberts (Ed.), *Handbook of Domestic Violence Intervention Strategies* (pp. 255-277). New York: Oxford University Press.
- Del Mar, D.P. (1996). *What trouble I have seen: A history of violence against wives*. Cambridge: Harvard University Press.
- Enarson, E. (1999). Violence against women in disasters: A study of domestic violence programs in the United States and Canada. *Violence Against Women*, 5(7), 742-69.
- Family Violence Prevention Fund. The business case for domestic violence programs in health care settings. Retrieved July 1, 2003, from <http://endabuse.org/programs/healthcare/files/businesscasepresentation.ppt>
- Fleming, J.B. (1979). *Stopping wife abuse: A guide to the emotional, psychological, and legal implications for the abused woman and those helping her*. New York: Anchor Press/Doubleday.
- Gitterman, A. (1991) Introduction. In A. Gitterman (Ed.), *Handbook of social work practice with vulnerable populations*. New York: Columbia.
- Heise, L. & Ellsberg, M. (2001). Violence against women: Impact on sexual and reproductive health. In E. Murphy & K. Ringheim (Eds.) *Reproductive Health, Gender and Human Rights: A Dialogue*. Washington DC: PATH. Retrieved June 27, 2003 from <http://www.path.org/files/RH-GHR-08.pdf>
- Jones, Ann. (1994). *Next Time She'll Be Dead: Battering and How to Stop It*. Boston: Beacon Press.
- McFarlane, J., Parker B., & Soeken, K. (1992). Assessing for abuse during pregnancy. Severity and frequency of injuries and associated entry in to prenatal care. *JAMA: The Journal of the American Medical Association*, 267 (23), pp.3176-8.
- McFarlane, J., Parker B., & Soeken, K. (1996). Abuse during pregnancy: Associations with maternal health and infant birth weight. *Nursing research*, 45 (1), 37-42.
- Mignon, S.I., Larson, C.J., & Holmes, W.M. (2002). *Family abuse: Consequences, theories, and responses*. Boston: Allyn and Bacon.
- Mooney, J. (2000). Revealing the hidden figure of domestic violence. In J. Hanmer, C. Itzin, with S. Quaid, & D. Wigglesworth (Eds.). *Home truths about domestic violence: Feminist influences on policy and practice- a reader*. New York: Routledge.
- Moraes, C.L. & Reichman, M.E. (2002). Domestic violence during pregnancy in Rio de Janeiro, Brazil. *International Journal of Gynaecology & Obstetrics*, 79 (3), 269-277.
- Nasir, K. & Hyder, A.A. (2003). Violence against pregnant women in developing countries. *European Journal of Public Health*, 13 (2), 105-107.
- Parker, B., McFarlane, J., & Soeken, K. (1994). Abuse during pregnancy: effects on maternal complications and birth weight in adult and teenage women. *Obstetric Gynecology*, 84(3), 323-8.

Pence, E.L. & Shepard, M.F. (1999). An introduction: Developing a coordinated community response. In M.F. Shepard & E.L. Pence (Eds.), *Coordinating community responses to domestic violence* (pp. 3-23). Thousand Oaks: Sage Publications.

Sigler, R.T. (1989). *Domestic violence in context: An assessment of community attitudes*. Lexington, MA: Lexington Books.

Sigmon, J. & Edmonds, C. (2002). National victim assistance academy: Foundations in victimology and victim's rights and services. Chapter 15. Retrieved June 4, 2003 from <http://www.ojp.usdoj.gov/ovc/assist/nvaa2002/welcome.html>.

Sobsey, D. (1994). *Violence and abuse in the lives of people with disabilities: The end of silent acceptance?* Baltimore, MD: Paul H. Brookes Publishing Co.

Straus, M., Gelles, R. & Steinmetz, S. K. (1980) *Behind Closed Doors: A Survey of Family Violence in America*. New York: Doubleday & Co.

Straus, M. & Hotelling, G.T. (1980). *The Social Causes of Husband-Wife Violence*. Minneapolis: University of Minnesota Press.

The White Ribbon Campaign: About us (2003). Retrieved July 24, 2003 from http://www.whiteribbon.ca/about_us/#2

Zorza, J. (1991). Women battering: A major cause of homelessness. *Clearinghouse Review*, 61, 421-429.

Microfarm Project using Simplified Hydroponics and Fertigation in the Lerma Chapala Basin

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Abstract

Unsustainable water use in the Lake Chapala Lerma River watershed is reducing the lake levels and depleting some of the 37 watershed aquifers. Currently irrigation for agriculture is using 86.5 % of the water in the watershed, overusing an estimated 1.4 to 1.9 billion m³ of water each year^(4, 5). A microfarm project is proposed for the basin to increase productivity of farmers, utilize degraded lands and reduce water requirements for farming. The microfarm is designed for a family using a hectare of land to produce from 40 to 140 kg of agricultural products a day. The farm uses simplified hydroponics and Israeli fertigation techniques to reduce the amount of land and water required to grow produce⁽⁸⁾. Rainwater is captured for use on the microfarm. Fish ponds of 1060 m³ capture and store rainwater and drip irrigation fields utilize the fish waste water. Watershed average precipitation of 736 mm a year provides 7360 m³ of water falling on a microfarm hectare each year. The microfields are estimated to require about 1440 m³ a year and fish pond evaporation is estimated at 1964 m³ a year. The total 3344 m³ a year is less than available rainfall so if sufficient water can be captured, out water resources for irrigation will not be required. In the Lerma Chapala watershed, of the 78,000 farmers, 52,125 are classified as small farmers. Currently 820,000 hectares are irrigated and an estimated three

million hectares are in agricultural production. These practices currently use at least 6.5 billion m³ of water. If microfarms use 3444 m³ of water per year, the estimated 52,125 small farmers would require total water of about 180 million m³ of water a year on 52125 hectares of land. Reduction in land space and water could relieve the excess water use in the area, restoring both lake levels and aquifer waters. As estimated 3.2 billion m³ of water could be saved with this change in practice.

Introduction

Lake Chapala is in danger of drying up completely. Its current level of 1.2 billion m³ is only 15% of its capacity, not enough to provide for its annual evaporation of 1.5 billion m³. It could dry up this year, leaving the city of Guadalajara without its current supply of drinking water. In the past century, Mexico's largest natural lake ranged in volume from 1.5 billion cubic meters to 8.1 billion. The national environmental protection agency, SEMARNAT ⁽³⁾, determined the red line or lowest possible level of the lake for environmental protection is 3.3 billion m³. At 1.2 billion m³ it is less than half its critical level. The key reason for the low levels of water in Lake Chapala is the unsustainable use of watershed water resources for irrigated agriculture. Currently, an estimated 7.5 billion m³ are available for all water uses and irrigated agriculture is using 86.5% of the water used. The excesses amount to a water deficit for the lake of about 700 million m³ a year and to groundwater about 1.3 billion m³. This unsustainable use is drying up the lake and depleting the aquifers in the watershed.

In 1991 and with subsequent updates SEMARNAT has published a report on the Master plan for the watershed. This report explains that the average hectare in Mexico is using 8000 m³ per year when the interna-

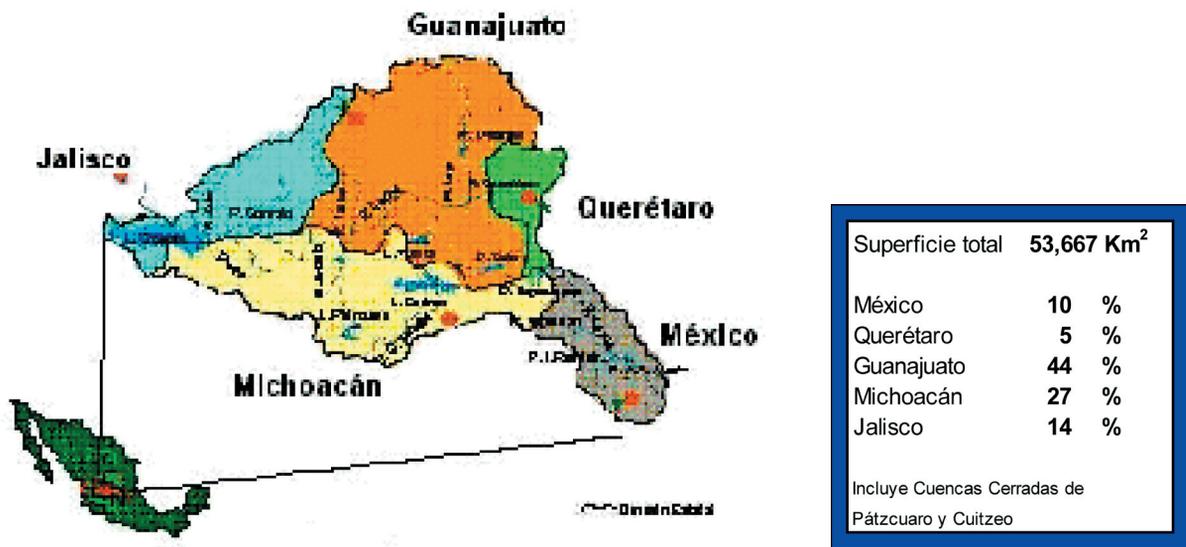
tional average is 4000 m³ per year. The report recommends updating the irrigation channels that are reportedly only 35% efficient (65% of the water not reaching the plants and modernizing the methods of irrigation into the farms. This paper addresses the recommendation of SEMARNAT to update the methods of irrigation and agriculture in Mexico.

The Lerma Chapala watershed

The Lerma watershed of Lake Chapala is an area of 53,667 km² shared by the states of Mexico, Michoacan, Guanajuato, Queretaro and Jalisco. The principle tributary of the watershed is the River Lerma, that traditionally fed Lake Chapala. The source of the Lerma River is near the town of Toluca in the western Mexico City metropolitan area. There are about 10 million people living in the watershed area. The region contributes 30% of the national GNP and occupies only 3% of Mexico's land surface. (See Map 1).

Of the water users in the Lerma watershed, 86% of the surface and groundwater utilized is used for irrigated agriculture. The amount overused of surface water is estimated at .800 million m³ and for groundwater over 1 billion m³. Of the 5.3 million hectares watershed, about 3 million hectares are used for agriculture and an estimated 830,000 hect-

Map 1. The Lake Chapala Lerma River watershed includes 53,667 km² in portions of five Mexican states.



ares are irrigated. These irrigated lands use 6.375 Mm³ of water a year or average about 8000 m³ per hectare. This is double the international average of 4000 m³ year (SEMARNAT 2001) and amounts of water used by individual farmers range from 1000 m³ to 15,000 m³ per hectare per year. (See Table 1).

Currently the irrigation practices used in the watershed include flood irrigation, sprinkler systems and some modern drip irrigation. About 117,000 hectares of irrigated lands are considered modern and conserve water use. Flood irrigation can use even more than the 8000 m³ per hectare of water a year, as there is little regulation or control on how much water is added. One farmer explained that in flood irrigation, the water access end of his field receives over 4 meters of water and the far end from the gates only 20 cm. This uneven application leads to poor crop growth, excessive use of water and problems

in excess drainage and runoff. The practice of flood irrigation has been un practice in Israel for over 50 years⁽⁹⁾.

With a sprinkler system, water is sprayed on the plants with mechanical devices. This is less wasteful than flood irrigation but still uses excessive amounts of water for optimum plant growth. Sprinklers require flat lands or water collects in pools and low spots, and the sprinkled water promotes fungus growth on the plants. Fields under sprinkler cultivation can use as much as 8000 m³ of water per hectare per year. Drip irrigation uses individual lines the deliver water directly to the plant roots. Drip line water use can be regulated through valves and so the area surrounding the plant is not watered. This reduces evaporative losses and restricts the area of competing weeds. Drip irrigation was designed to reduce the amount of water required for agricultural crops and is used in areas where water is scarce or valuable. The

Table 1. Agricultural water use in the Lerma watershed

	Hectares	Water used Mm3	Surface Mm3	Groundwater Mm3
Total land area of watershed	5,366,700			
Total agriculture	3,000,000			
Rainfed agriculture	2,170,000			
Irrigated hectares	830,000	6,375		
Large scale irrigation	286,017	2,720	2225	495
Small scale irrigation	543,983	3,655	1506	2149
Modern irrigation	117,000	468		
Traditional irrigation	713,000	5,907		

average cost of setting up a hectare with drip irrigation is from 3000 to 5000 US dollars. In Israel, average use of water per drip irrigated hectare is about 4000 m3 of water per year⁽⁶⁾.

Current practices unsustainable

Current practices, according to the Master Plan for Lake Chapala Lerma watershed, a SEMARNAT publication, currently 8 billion m3 of water are being used for agricultural crops with 800 million m3 of surface waters and 1.3 billion m3 of groundwater used unsustainably. The Lake Chapala level keeps dropping and the aquifers are being depleted. Throughout the watershed, the irrigated lands are now used for low value crops such as corn, wheat and sorghum, so the estimated total value of watershed crops is less than 1 billion dollars or about 0.14 per m3 a year.

Groundwater extraction unsustainable

Each of the five states in the watershed utilizes groundwater for some of their agriculture, and together the states are using 1.3 billion m3 more groundwater than is recharged each year. In the watershed, only 117,000 hectares have modern methods of irrigation, usually either sprinkler systems or drip irrigation systems. (See Table 2)

According to SEMARNAT, if all irrigated hectares were switched to drip irrigation, about 3.2 billion m3 of water could be saved, enough to maintain the aquifers and the critical level of the lake. This is assuming that repairs and restoration of the irrigation system in the watershed improves the overall efficiency of 35%. But the situation in the watershed is more complicated and requires not only modernization of irrigation systems,

Table 2. Groundwater extractions and recharge for each state (2000) SEMARNAT

State	Extraction Mm3	Recharge Mm3	% recharged
Guanajuato	3523	2049	58.20%
Jalisco	108	76	70.50%
Mexico State	630	456	72.30%
Michoacan	689	1111	161.20%
Queretaro	208	150	72.00%
Total	5159	3841	74.50%

but attention paid to the needs of small farmers, including those currently farming without irrigation, depending upon seasonal rain to water their crops. About 2.17 million hectares in the watershed are being cultivated without irrigation, including lands being cultivated by some of Mexico's poorest farmers. Guanajuato state, in 1996, was cultivating 524,493 of the 830,000 hectares under irrigation, or 63% of the irrigated watershed lands. The average annual income per hectare is \$1140 US. Most of the lands are growing corn, wheat, sorghum and other lower value crops; another half million hectares are under cultivation without irrigation. The average yield of these lands is much lower, with annual income averaging only \$147.00 US per hectare per year. (See Table 3)

This proposal addresses the intention of SEMARNAT Master Plan for the watershed to reduce water use by modernizing agriculture and diversifying to higher value crops. We propose introducing the concept of a micro-farm for the smaller farmer, who may or may not be using irrigation water now ^(1, 2).

Irrigated agriculture is 520,493 hectares in Guanajuato or about 63% of the total irrigated farmland in the watershed. These hectares average in income of \$1172.30 US dollars a year and if extended across the entire watershed this would be 973 million dollars a year for all the irrigated hectares. The rain fed cultivated land of 503,913 hectares averages \$147.10 US dollars per hectare in income and if this were extended across the entire watershed of 2.17 million hectares, the value of rainfed production is 310 million. Combined the value of agricultural production is about 1.28 billion dollars.

To provide each hectare with a drip irrigation system will cost 3.5 billion dollars in investment, averaging \$5000 per hectare for costs. With a crop only being worth \$1140 per hectare it takes several years for the farmer to recover expenses, unless they also switch to higher value crops that increase income per hectare.

Table 3. Agricultural production in Guanajuato, 1996.

	Irrigated	Rainfed
Sowed hectares	524,493	503,913
Harvested hectares	520,166	415,092
Production tons	3,352,643	556,483
Value \$M (pesos)	6,149	741
Value per ha US dollars	1,172.3	147.1

farms at least 1.8 billion m³ of water could be saved each year. If they changed their practices to cultivate only one hectare instead of ten the savings could be as much as 3.44 billion m³ of water saved.

Reaching small farmers with microfarm technology

The 52 124 small farmers in the watershed are basically organized in small villages and towns, per-

Saving Irrigation Water

According to CAN, 830,000 has are irrigated, with 66% owned by small farmers and 34% by large farmers. The total number of water users is 78,976, with 52,124 small farmers. If all farmers switched to drip irrigation on all 830,000 hectares of land, 2.4 billion m³ of water could be saved each year. There are basically three types of farmers in the basin. The first are larger farmers that have substantial holdings of land and are in large scale production. The second is small farmers using ten hectare or less, and the third are subsistence farmers who only provide for their own families food supply.

Microfarm project

The microfarm project addresses the needs of the small farmer and subsistence farmer. With 51,124 farmers listed as small farmers using 66% of the irrigated land, their total water used is about 3.655 billion m³ of water for an estimated income of about \$11,000 per year, on farms of 10 hectares. If all these farmers switched to single hectare micro-

haps as many as 6000 in the watershed. To reach each farmer with his or her options, an organization is needed that will train farmers, provide the tools and equipment to begin, and then ongoing technical support and marketing support to maintain production and income.

The microfarm project begins with a single gravity fed drip irrigation system of 435 m² in surface area. This system requires an estimated 144 m³ of water a year to produce about 3650 kilograms of food, or 10 kilos of food a day. When managed with corn and bean production in rotation along with other vegetables, this small microfield can produce the daily food requirements for a family of seven year round. It will require substantial investment in hydroponic nutrients of \$160 per year and an initial investment of about \$400 for the drip system, plastic mulch and seeds. (See Table 4)

The microfield can be offered to each farmer through existing federal and state programs either with a subsidized part of the cost, or a loan program. This program would have to be offered to the subsistence farmer, who

Table 4. Single field in gravity fed microdrip culture for family food supply

Crop	Rows	Spacing	Time Days	Plants per year	Yield kg/plant	Total kg/yr
Corn 1	20	10	90	3000	0.1	300
Beans 2	20	10	90	3000	0.1	300
Corn 3	20	10	90	3000	0.1	300
Beans 4	20	10	90	3000	0.1	300
Tomato	1	3	360	45	7	315
Tomatilla	1	3	360	45	7	315
Chili	1	3	360	45	7	315
Cabbage	1	5	90	300	1	300
Spinach	1	3	60	270	0.25	67.5
Celery	1	10	90	600	0.5	300
Brocoli	1	3	90	270	0.5	135
Lettuce	1	6	60	540	0.25	135
Cucumber	1	3	360	45	7	315
Peas	1	10	90	900	0.1	90
Peanut	1	10	120	450	0.2	90
Sunflower	1	10	90	900	0.1	90
Total Kg produced						3667.5

perhaps is not currently using any irrigation water at all. So the potential users of the microfarm would include more than the 51,125 small farmers currently using irrigation water.

Microfarm proposed for small farmers

A microfarm is proposed as a technology for a small farmer to increase family income and decrease land and water requirements for producing food. A microfarm is proposed that produces from 40 to 140 kilograms of food a day for the family food and income. The value of this produce will vary accord-

ing to type of food produced and available market, but should be between 14,600 to 51,000 dollars a year if the kilograms of produce are worth \$1.00 each. This represents a significant change in the lifestyle of the small farmer family in the watershed under present circumstances.

The total productivity calculated for the microfarm is about 11 kg per meter² per year. The average productivity in hydroponic and fertigation culture is actually much higher in many existing farms. The value of the produce will be subject to worldwide markets and local conditions. A primary objective of the microfarm is to begin by providing the

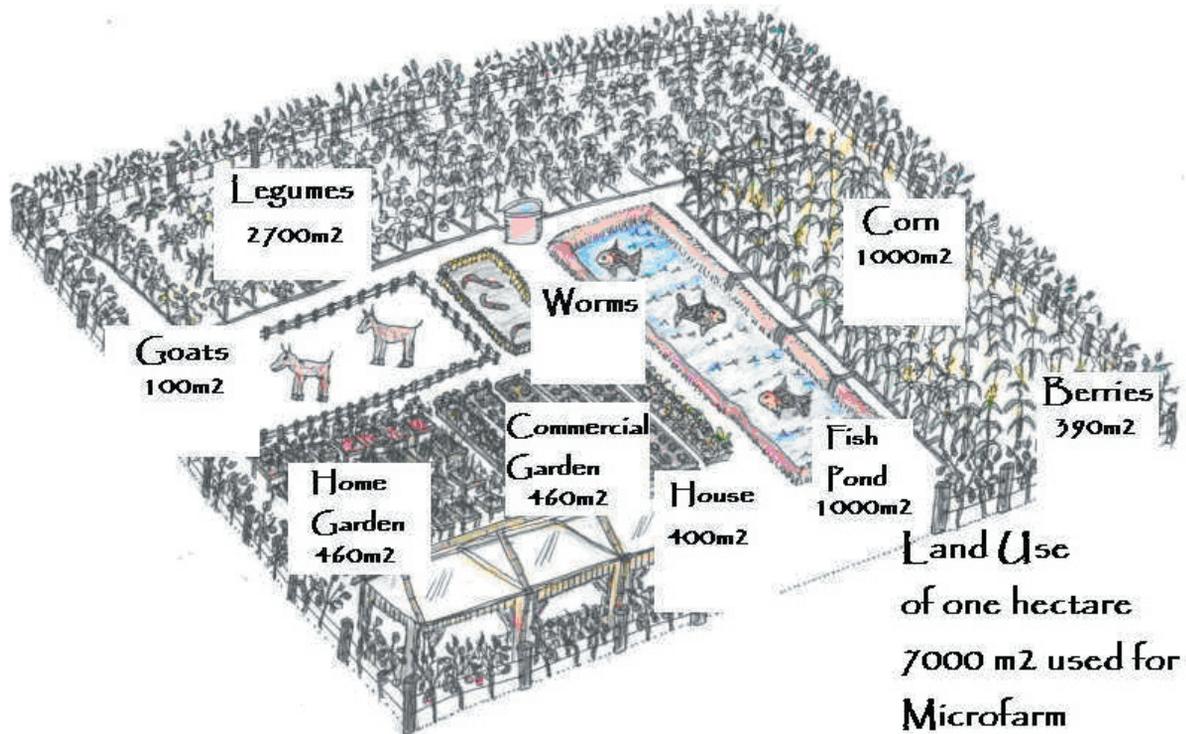


Image 1. A microfarm on a single hectare of land uses intensive agricultural techniques to produce from 40 to 140 kg of produce a day. This provides a family with basic food each day and additional income.

family all their own food needs so that food security is obtained before income producing crops are established. (See Image 1)

In experiments in Africa (7), the microdrip system produced 100 tons of corn per hectare. This is when it is used with fertigation, supplying nutrients to the plants through the microdrip lines. The normal amount of corn produced on a single hectare of land in Mexico can be from 200 kg (.2 tons) to 10 tons.

The 100 tons of corn per hectare was an experimental yield, but similar field trails in Mexico are yielding 90 tons per hectare.

These are yields in areas where the climate is such that corn can be grown year round. This normally allows for four rotations a year. Corn is planted at ten plants per meter, in rows on meter apart.

For use with vegetables, the fields are modified with soil built up in mounds approximately 14 cm high and 40 cm wide. The area between the rows of vegetables is dug down 14 cm. The mounded soil is covered with a very thin plastic mulch. The microdrip tubing is normally placed below the plastic mulch and this conserves water from evaporating.

Table 5. Calculations for the rainwater capture ponds for a one hectare microfarm in Lake Chapala area.

	Jan	Feb	Mar	April	May	June
Precipitation	1	5	5	6	22	184
Temperature	16	17	19	22	23	22
Cubic meters/month	10	47	54	62	219	1837
Required for farm	120	120	120	120	120	120
Pond water used for farm	1458	1385	1327	1269	1488	1600
Required for pond evaporation	162	162	162	162	162	162
Volume water in ponds	1133	898	802	582	320	1600

Fish ponds proposed for capturing rainwater and runoff

In hydroponic or fertigation, a fish pond or aquaculture pond can provide some of the nutrients for plants. The microfarm proposes for the Lerma Chapala watershed to use aquaculture ponds as an integrated part of the hydroponics and fertigation of fields. The five ponds in the microfarm combine for a total of 1068 m² in surface area. They are all located to capture runoff of excess rainwater from the drip irrigated fields. The total capacity of the fish ponds for storing water is 1602 m³ of water. Each field requires 144 m³ of water a year and there are ten fields so the expected water use is 1440 m³. However, when evaporation from the ponds is also included, the total for evaporation is 1900 m³ and so the total for the farm is 3400 m³, about 46% of the expected annual rainwater of 7360m³ to fall on the hectare. So if rainwater could be successfully captured during the year, there would be no need additional irrigation water for a microfarm in the Lerma

watershed. (See Table 5)

Conclusion

The microfarm project addresses several of the objectives SEMARNAT Master Plan for Lake Chapala. The use of drip irrigation systems under fertigation for crops will release much of the irrigation water now used by small farmers. The farm includes diversification of cultivars and the reuse of agricultural water in the utilization of fish pond waste water for crops.

An important component of the recovery of the Lake Chapala Lerma River watershed is the successful harvesting of rainwater for a small farmer in the region. In addition to harvesting rainwater is the importance of establishing drip irrigation fertigation technology to deliver the captured water to plants in a water conservative manner that reduces evaporation and increases yield per plant.

Table 5 Cont. Calculations for the rainwater capture ponds for a one hectare microfarm in Lake Chapala area.

	July	Aug	Sept	Oct	Nov	Dec	Total
Precipitation	232	191	160	51	16	9	883
Temperature	21	21	21	20	18	16	
Cubic meters/month	2322	1913	1595	514	164	88	8825
Required for farm	120	120	120	120	120	120	1440
Pond water used for farm	1600	1600	1600	1600	1600	1568	
Required for pond evaporation	162	162	162	162	162	162	1949
Volume water in ponds	1600	1600	1600	1600	1600	1406	

In the microfarm project Israeli technology of fertigation is combined with aquaculture and water capturing technology to reduce the need for using either surface waterways such as the Lerma river or the groundwater supply to produce crops.

If existing water users and potential waters could successfully produce crops using microfarm technology, family farm income

would increase, regional income would increase due to primary production, and land and water use could be conserved.

A complete switch to microfarming from traditional soil based agriculture of flood irrigation could save 3.44 billion m³ of water a year, enough to allow both Lake Chapala and the aquifers to be used sustainably.

References

Bradley, P and Marulanda, C. (2000). Home Hydroponic Gardens, Mexico ISH, Mexico City.

Bradley, P and Marulanda, C, (2001). Simplified Hydroponics to Reduce Global Hunger. Proceedings of the World Congress on Soilless Culture: Agriculture in the Coming Millenium, Acta Horticulturae No. 554. June 2001.

Commision National del Aqua, Mexico (2003) annual report.

Guzman Arrollo, M., (2002). Lake Chapala 7 International Living Lakes Conference August 2002.

Guzman Arrollo, M. (2003). Chapala, Una Crisis Programa.

Israeli Export Institute, (1999). Israeli agriculture Achievement through Innovation.

Kafkafi, U. and G.H. Xu. (1999). Chapter 19. Potassium nutrition for high crop yields. In "Frontiers in potassium nutrition: new perspectives on the effects of potassium on physiology of plants" (D. M. Oosterhuis, and G. Berkowitz, eds.). Proceedings of a symposium sponsored by the Potash and Phosphate Institute and the Crop Science of America. pp.133-142. Published by PPI/PPIC, Georgia, USA.

Katzir, R., (1994). People Security Through Agricultural Production and Rural Development in Developing Countries. Mexico City, Mexico.

Katzir, R., (2000). Sustainable Agriculture, the Israeli Experience. Trivandrum, India.

Ten Dimensions of a Biocultural Conservation Approach at the Austral Tip of the Americas

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In the context of the conference “Building Sustainable Communities in Mexico & U.S.A” organized by the Center for US/Mexico Alliance for Community Renewal, UNT in January 2003, we were invited to present a view on sustainability and conser-

vation based on our experience at the southern extreme of the Americas: the Region of Cape Horn. First, we introduce the regional scenario of biological and cultural conservation, and then we provide an overview of our approach by defining ten criteria that aim

to achieve social well-being and biocultural conservation at the austral tip of the continent.

Cape Horn: a unique part of the world's biological and cultural diversity

The Cape Horn Archipelago region in the extreme south of the American continent includes an extensive and remote area of sub-Antarctic (or subpolar) Magellanic forests, which Conservation International (Mittermeier et al. 2002) recently identified as one of the Earth's thirty-seven most pristine ecoregions (Figure 1). These are also the world's southern most forested ecosystems (Veblen

et al. 1996, Silander 2000), and have been free from direct human impact during the last decades thanks to their geographic isolation and due to the fact that they have been a military reserve, controlled by the Chilean navy. As a result, the Cape Horn Archipelago region is an area of world importance for the conservation of biodiversity.

The Cape Horn region also possesses a high value for cultural conservation, given that it is the habitat of the Yahgans, the world's southernmost ethnic group. Nomadic hunters, fishers and gatherers, the Yahgans canoed the channels of Cape Horn and the sub-Antarctic archipelago region to the south of Tierra del Fuego, leaving behind a valuable Amerindian cultural legacy (Bridges 1949, Gusinde 1961, McEvan et al. 1996). Their complex cosmology and sophisticated ecological understanding survive today in the oral stories, the artisan practices and the old ethnographic records (Rozzi et al. 2003a).

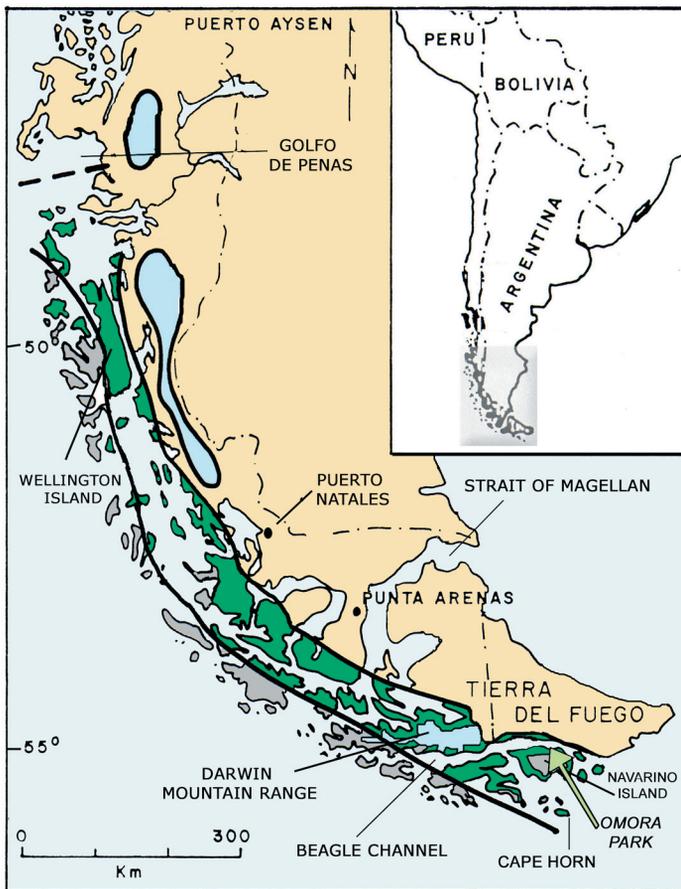


Figure 1. The region of Cape Horn at the southern extreme of the American Continent hosts a significant portion of the sub-antarctic or subpolar Magallanic forests, identified as one of the 37 most pristine ecoregions in the world. This ecoregion (dark green in the map) runs along the Chilean Pacific Coast from Golfo de Penas (48° S) to Cape Horn (56° S). The map also shows the location of the Omora Park on Navarino Island south to Tierra del Fuego and the Beagle Channel. The criteria to identify the 37 most pristine or wilderness areas in the world were: (a) 70 % or more of their original vegetation intact, (b) cover at least 10,000 square kilometers (3,861 square miles), and (c) have fewer than five people per square kilometer (Mittermeier et al. 2002).

Hundreds of shell middens found along the coasts of Isla Navarino and other islands in the archipelago stand testimony to their material culture and at the same time constitute a unique concentration of archeological sites (Rivas et al. 1999).

The archipelago is furthermore a landmark for the history of science. Charles Darwin spent a significant part of his voyage on the *Beagle* in the Cape Horn area, and his experiences with the Yahgans were essential for the development of his concept of human evolution, detailed in his work *The Descent of Man* (Darwin 1871, Rozzi 1999). Later, at the beginning of the twentieth century, the works of Austrian anthropologist Martin Gusinde and the American archeologist Junius Bird on Isla Navarino, provided crucial insights for the modern-day interpretation of the cultural history and peopling of the American continent.

Concerning its colonization history, the Cape Horn region contrasts with the rest of Chile, which is predominantly Catholic and Hispanic (Rozzi 2003). In the extreme south, the arrival of Anglican missionaries transformed the cultural and natural landscapes with British religion, language and animal husbandry practices. The history of Cape Horn is also tied to its landmark status for sailing and navigation. Rounding the extreme southern tip of the continent and confronting the Drake Passage is the “Everest” of sailing and consequently is marked by a sad world record of ship wrecks ever since the Dutch captain Willem Cornelis Schouten first rounded the cape in 1616 (Vairo 2001).

In summary, this region of fjords, mountains,

glaciers, sea and intact natural landscapes represents a cultural and natural patrimony for all humanity. However, today it confronts a great conservation challenge. Changes in the political-administrative situation, associated with decreasing territorial control by the Chilean navy and the opening of new navigation routes authorized by the Chilean State in December of 2001, have changed the playing field and opened new opportunities and risks in the region. This change in the territorial administration now demands the elaboration of policies that satisfy both needs, those of conserving the biocultural patrimony and those of new economic interests. Associated with these changes, the austral archipelago confronts severe risks at the same time that opportunities. For example, there has over the last 100 years been a large influx of invasive, exotic species, such as the mink. In addition, there is a total lack of park-rangers or personnel in the extensive national parks of Cape Horn County, which constitute over fifty percent of its area. The islands also now must deal with increases in connectivity by way of the opening boat service between Isla Navarino and the Argentinean city of Ushuaia on Tierra del Fuego, which also implies an increase in the number of tourists that arrive to the region. Finally, the interests of salmon aquaculture projects must now be considered as increased connectivity allows the industry to seek to extend its reach to the southern limits.

In this context, motivated by the threat to the great biological and cultural values of the austral extreme and the desire to contribute to the conservation and social well-being of the Chilean Antarctic Province, a group of scientists, artists, philosophers and other

professionals, both Chilean and foreign, initiated in 1999 a program of biocultural conservation that led to the creation of the Omora Ethnobotanical Park.

The Omora Ethnobotanical Park Biocultural Conservation Program

The Omora Ethnobotanical Park is a public-private reserve in the outskirts of Puerto Williams, Isla Navarino. Its most general goal is to contribute to the social well-being and biological-cultural conservation of the extreme southern tip of the Americas. It arose from a group of projects dealing with long-term scientific investigation, interdisciplinary ecological education and biocultural conservation, coordinated by a group of researchers associated with the Omora NGO and the University of Magallanes.

The Omora Ethnobotanical Park is not just a biological reserve, but rather more than anything else it is a center to develop objectives of biocultural conservation. It was formed from a free concession from the Land Ministry and protects the biodiversity and ecosystem integrity of a sector of the watershed that provides drinking water to Puerto Williams. At the same time, ethnoecological research and educational experiences are conducted in the park that bring into a social context the knowledge of biocultural diversity, the practices and methods of scientific exploration and the development of ethical values for the local and national community and international visitors. In order to help explain the varied activities that are done in the Omora Park, it has been defined as:

- A natural laboratory to study the ecol-

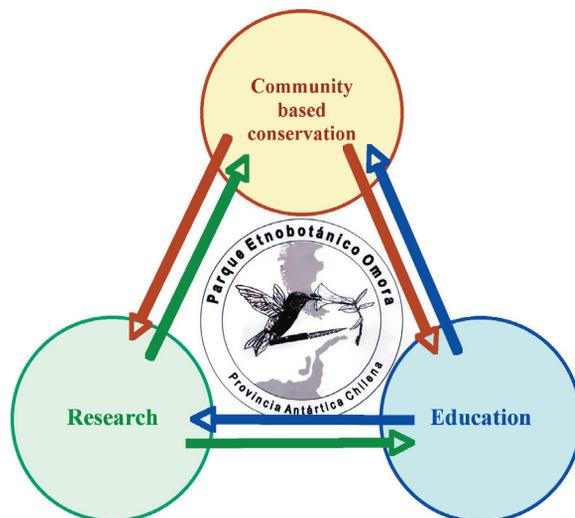


Figure 2. The three main lines of action of the Omora Ethnobotanical Park program are: (a) multi-disciplinary scientific research, (b) formal and informal education (school, university and training courses), and (c) biocultural conservation linked with local sustainable development. The triangle of these three interrelated lines of action as the fundamental program of Omora is inspired by the Ecological Society of America's Sustainable Biosphere Initiative (ESA – SBI, Luchenco et al. 1991a). In Omora's logo a firecrown hummingbird (*Sebanoides sebanoides*) or omora (in Yahgan language) carries its hunting tool (the harpoon), and visits its preferred flower the coicopihue (*Philesia magellainica*). The integration of biological and cultural conservation is one of the central goals of Omora's project.

ogy of the world's southernmost forests, their biological and cultural diversity, focusing attention on the processes and effects of global change in Cape Horn County.

- An outdoor classroom open to the ethnoecological exploration of students and teachers from schools and universities, and for visitors interested in the nature, landscapes and cultures of the austral limit of the Americas.
- A public space where it is possible to teach and experience practices of environ-

mental ethics and biocultural conservation, based on respect, solidarity and co-habitation between diverse human beings, diverse biological species and the natural world.

These purposes of the Omora initiative are incorporated into three broad lines of action: (a) multi-disciplinary scientific research, (b) formal and informal education (school, university and training courses), and (c) biocultural conservation linked with local sustainable development (Figure 2). The triangle of three interrelated lines of action (research, education and conservation) as the fundamental program of Omora was inspired by the Ecological Society of America's Sustainable Biosphere Initiative (ESA – SBI, Luchenco et al. 1991a). The initiative indicated that "the successful implementation of the SBI will require a significant increase in the interdisciplinary interaction that links ecologists with all the scientific community, communication media, educational institutions, the designers of policy and resource managers from all social sectors." The publication of this strategy in 1991 encouraged ecologists in the United States and other regions to join themselves in areas of education and environmental decision-making, which is an attitude apart from the dominant tendency towards specialization and the disassociation between pure and applied science.

The SBI acquired a more international dimension through the Cuernavaca-Mexico workshop "A Sustainable Biosphere: A Global Imperative" (1991), which recommended the establishment of a global cooperative program called the "International Sustainable Biosphere Initiative" (ISBI, Huntley et al. 1991). ISBI has the central goal of "facilitat-

ing the acquisition, dissemination and use of ecological knowledge in order to assure the sustainability of the biosphere." ISBI's goal is still appealing, but the current challenge is to implement it (Rozzi et al. 2003b). In Chile the SBI document was translated, commented and published in the *Revista Chilena de Historia Natural* (Fuentes & Castilla 1991, Lubchenco et al. 1991b). This publication was motivating, especially for young Chilean ecologists, and had an important influence for the creation of the Senda Darwin Biological Station on Chiloé Island at the beginning of the 90s (Rozzi & Armesto 1996, Armesto et al. 1996, Rozzi et al. 2000). Today, the Omora Ethnobotanical Park maintains close links with Senda Darwin and with the SBI (ESA), cooperation that contributes to the articulation of action at the local, regional and international scales.

May be the most distinctive characteristics of the Omora initiative at the austral extreme of the Americas is its strong insertion in social and cultural contexts. With the aim of integrating the three described lines of action (research, education, and conservation), and to effectively orient the actions to achieve ecological, social and economic sustainability in the Chilean Antarctic Province, we have defined ten criteria that guide the actions of Omora: (1) inter-institutional cooperation, (2) participatory approach, (3) identification of a flagship species, (4) fluid communication with the media, (5) networking and international cooperation, (6) curricular integration and intercultural education in the outdoors, (7) interdisciplinary biocultural approach, (8) economic sustainability, (9) social and administrative sustainability, and (10) research and conceptual sustainability. Table 1 pres-

ents a very condensed overview of these ten criteria that guide the actions of Omora with the goal of achieving the objectives of social well-being and biocultural conservation.

Biocultural conservation at the austral tip of the Americas: Difficulties and Opportunities

The Omora Ethnobotanical Park is a public-private initiative that on one hand has created a physical space that protects the Robalo River watershed that provides drinking water to the town of Puerto Williams and hosts a rich biological and cultural diversity. On the other hand it's a scientific investigation, education and environmental ethics center in the outdoors, where in cooperation with diverse actors it is possible to explore and teach concepts and actions that contribute to conservation and local sustainable development in the extreme austral tip of Chile, as well as Latin America and the world.

The fact of being the end of the American Continent offers a biocultural treasure in a remote place, identified as one of the thirty-seven most pristine areas on the planet. At the same time, remoteness involves a challenge to implementing and sustaining actions in a situation of geographical and technological isolation. Hence, it would be irresponsible to conclude this article without mentioning such difficulties, and the some of the barriers to implement the defined ten criteria.

Inter-institutionality demands an enormous coordination effort that usually exceeds the effort destined to internal requirements of the Omora NGO itself. Inter-institutionality involves trespassing barriers between differ-

ent buildings and agendas defined by dissimilar people, disciplines, interests, budgets and legal frameworks. It also requires overcoming competition between different government and/or non-government institutions for resources. In addition, institutions are subject to frequent changes in personnel and power structure, which involves a lack of program continuity. Finally, the highest risk is represented by the fact that today the power of some national or transnational companies can frequently override the power of government and non-government institutions. For example, there is a real risk that salmon farming companies might override at any moment the territorial plan prepared by our technical – scientific teams together with the responsible government institutions and authorities.

Regarding the participative approach, it does not just create meetings, but also collisions between dissimilar personalities, languages and interests, within and outside the localities and regions. The perspectives of persons that work in conservation in large cities or international organizations are usually very different from those hold by local communities in remote areas. This gives origin to considerable difficulties regarding communication, agreements and coordination among local and global scale perspectives. Interdisciplinarity also adds additional difficulties of communication between disciplines, as well as coming to terms with validation, evaluation and support on the part of the scientific community which continues to be dominated by specialization. For scientists and other professionals, the participative activities demand a great deal of time and dedication, the costs and efforts of which are an "extra" added on to the research projects. Finally, re-

garding communication the interactions with the media can also generate mistakes and the creation of expectations that are greater than the capacity of the projects to deliver. In addition, articles for communication with the public and press are not a habit for scientists, who are evaluated principally based on indices of citation in specialized journals.

In summary, the difficulties have been great for the creation of the Omora Ethnobotanical Park. It requires profound dedication and conviction in the face of difficult recognition and social understanding on the part of professional peers and the community at large in a remote geographic setting with scarce infrastructure, a lack of technical services and high transportation costs. This article does not intend to present a final, resolved situation, but rather to propose criteria that can contribute to generating a process of conservation built upon that which is local and going up to the regional and international levels. Many of the described actions are in progress and will require follow-up and future evaluation. Regardless of the difficulties, though, there are numerous university and

school students, politicians, public service and private professionals, and members of the local and international community that have had the opportunity to experience the biocultural diversity of the austral tip of the Americas in the Omora Ethnobotanical Park. This opportunity to look, feel and share the austral biodiversity is stimulating some collective and individual changes in the relationships that we establish with other human beings and other living beings. This transformation reminds us of the hummingbird omora in ancestral times, when according to the Yahgan cosmology the birds were humans and the humans flew like birds.

We hope that by strengthening the networks and exchange of innovative conservation ideas among conservation initiatives, such as those presented in this conference "Building Sustainable Communities in Mexico & U.S.A," which are taking place in diverse regions of the Americas, a contribution can be made to sustainability and to the purpose of conserving life in its diverse expressions in the New World and the planet.

References

- Armesto, J.J., R. Rozzi & M. Willson (1996). Bridging scientific knowledge, education, and application in temperate ecosystems in Southern South America. *Bulletin of the Ecological Society of America* 77 (2): 120-122.
- Bridges, L. (1949). *Uttermost Part of the World*. E.P. Dutton & Co, New York.
- Darwin, C. (1871). *The Descent of Man*. Princeton University Press, edition (1981). Princeton, New Jersey.
- Fuentes, E.R. & J.C. Castilla (1991). Cambio global, desarrollo sustentable y conservación de la biodiversidad: ¿Qué podemos hacer? *Revista Chilena de Historia Natural* 64: 171-174

Gusinde, M. (1961). *The Yamana: The Life and Thought of the Water Nomads of Cape Horn*. Volumes I-V, translated by F. Schutze. New Haven Press, USA.

Huntley, B.J. et al. (1991). Una biosfera sustentable: el imperativo global. *Revista Chilena de Historia Natural* 64: 227-235.

Lubchenco, J. et al. (1991a). The Sustainable Biosphere Initiative: an ecological research agenda, *Ecology* 72: 371-412.

Lubchenco, J. et al. (1991b). Iniciativa para una biosfera sustentable: una agenda de investigación ecológica. *Revista Chilena de Historia Natural* 64: 175-226;

McEvan, C., L. Borrero & A. Prieto (1997). *Patagonia: Natural History, Prehistory and Ethnography at the Uttermost Part of the Earth*. Princeton University Press, New Jersey.

Mittermeier, R.A., C. Mittermeier, P. Robles-Gil, J. Pilgrim, G. Fonseca, T. Brook & W. Konstant (2002). *Wilderness: Earth's Last Wild Places*. CEMEX – Conservation International, Washington DC.

Rivas P., C. Ocampo & E. Aspillaga (1999). Poblamiento temprano de los Canales Patagónicos: el núcleo septentrional. *Anales del Instituto de la Patagonia* 27: 221-230.

Rozzi, R. (1999). The reciprocal links between evolutionary-ecological sciences and environmental ethics. *BioScience* 49 (11): 911-921.

Rozzi, R. (2003). Biodiversity and Social Wellbeing in South America. In *Encyclopedia of Life Support Systems (EOLSS)*. UNESCO-EOLSS. [<http://www.eolss.net>]

Rozzi, R., F. Massardo, J. Silander Jr., C. Anderson & A. Marin (2003a). Conservación biocultural y ética ambiental en el extremo austral de América: oportunidades y dificultades para el bienestar ecosocial. In *Biodiversidad y Globalización* (Figuerola E & J Simonetti, eds.), pp. 51-85. Editorial Universitaria, Santiago, Chile.

Rozzi, R., F. Massardo, J. Silander Jr., C. Anderson, O. Dollenz & A. Marin (2003b). El Parque Etnobotánico Omora: una alianza público-privada para la conservación biocultural en el confín del mundo. *Ambiente y Desarrollo* XIX (1): 45-71.

Rozzi, R. & J.J. Armesto. 1996. Hacia una ecología sintética: la propuesta del Instituto de Investigaciones Ecológicas Chiloé, *Ambiente y Desarrollo* XII (1): 76-81.

Silander Jr., J. (2000). Temperate forests: plant species biodiversity and conservation. In *Encyclopedia of Biodiversity*, S.A. Levin, ed., Academic Press, New York, pp.: 607-626.

Vairo, C.P. (2001). Shipwrecks in Cape Horn, Isla de los Estados, Magallanes, Mitre Peninsula, Malvinas, and South Georgias. *Zagier & Urruty Publ.*, Ushuaia, Argentina.

Veblen, T., R.S. Hill & J. Read (eds.) (1996). *The Ecology and Biogeography of Nothofagus Forests*, Yale University Press, New Haven, CT.

Senior Environment Corps Fights Rabies

The Upper Cape Codder on TOWNONLINE.com
Wednesday, March 17, 2004

By Joe Burns
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Gathering at the Bourne Scenic Park, coffee cups in hand, good natured ribbing at the ready, they could be a group of fishing buddies heading out for a day on the water. But the only fish that Lew Schlotterbeck of Bourne, Tom Ulrich of Yarmouth Port and Carl Valenti of Centerville will be seeing this Monday are one-inch cubes of fishmeal containing a rabies vaccine packet that they will toss at regular intervals out the window of Schlotterbeck's Toyota Prius. The trio are members of the Senior Environment Corps. Their mission this Monday morning is to saturate the Cape side of Bourne with enough bait to beat back the spread of the mid-Atlantic strain of raccoon rabies which was detected on the Cape for the first time, after two raccoons found in Bourne tested positive for the disease.

The confirmation of rabies on the Cape generated an emergency response led by the Tufts University School of Veterinary Medicine. Tufts, which manages the state-funded anti-rabies program throughout Massachusetts, has until recently, been successful at keeping raccoon rabies from crossing the canal. This expansion of the infected area comes on the heels of several funding cuts to the program, down from \$209,000 three years ago, to \$60,000, which forced Tufts to shrink its area of vaccination.

"In the past we had been baiting as far out as Kingston, Rochester and Matapoisett. We had to pull that line in closer to the canal. We just couldn't cover that whole area with the amount of bait we could afford," said Dr. Steven Rowell, director of Tufts' veterinary hospitals.

Rowell could not speculate as to whether the shrinking area, reduced from 20 miles to five miles away from the canal, is responsible for the beach. But it did mean that the bait they had purchased for use in May along the mainland side of the canal would have to be used now on the Cape side, leaving nothing

for later. It also meant that a group of volunteers had to be brought together quickly to distribute the bait.

It is here where the Senior Environment Corps shines. Sponsored by Elder Services of Cape Cod and the Islands, and consisting of members of AmeriCorps and the Retired Senior Volunteer Program, the organization has served as a 100-strong force that has been utilized for projects such as monitoring for West Nile virus and mapping storm drains for the EPA. This is the second year the Corps has taken part in the rabies vaccine baiting, only this time there is an added urgency to their efforts. Arthur Neill, Upper Cape fieldwork coordinator for the Senior Environment Corps and a former deputy director for the Massachusetts Division of Fish and Wildlife, is the man responsible for gathering a volunteer force together at short notice.

Arthur Neill is the hero," said Sean O'Brien, senior environmental specialist for the Barnstable County Department of Health and Environment. "I just made one phone call to Arthur and he got everyone together. Arthur has helped us out immensely. What he's done is just incredible."

Nearly 20 Senior Environment Corps volunteers were on hand Monday. It is the second round of the baiting, and for Schlotterbeck, Ulrich and Valenti, it means saturating the Gray Gables section of Bourne with bait. Valenti, a retired Quincy firefighter, is in charge of tossing the bait out of the car window as they drive up and down every street that is on the map and even some that are not. Ulrich, a former executive director with Easter Seals in Connecticut, keeps track of the route by marking off on a map where they have been and letting Schlotterbeck know where to go. Schlotterbeck, a former deputy director for the Massachusetts Division of Fish and Wildlife and a 40-year resident of Bourne, knows the area and the environment like the back of his hand. He not only maneuvers his car up and down and in and out of every labyrinth and cul de sac, but also veers off the marked and paved roads, on to unmarked dirt roads that cut through bogs and small patches of woods. Bait is tossed with an eye to efficiency and economy. Spacing is essential. Rowell said that they have found that if fewer than 70 baits are put out per square kilometer it is not going to be effective and that in some areas they have had to put out 100 or 125 per square kilometer in order to get enough raccoons vaccinated.

It is not just the quantity but also the location that is important. Each bait crew is provided with a printout giving the ratio between tosses and the speed at which the car is going. In a car going 45 mps, bait would be tossed out every 10 seconds. This is the second time they have covered the area, and there will likely be others. The first time was with old bait, and there was not enough to bait the whole area. This time they have been given a fresh supply of bait,

which according to Tufts' project co-director Alison Robbins, should be more efficient.

The bait will likely be gone within four days. Bait not eaten will dissolve, exposing the vaccine packet, which will become inactive after exposure to the sun and air. According to information provided by Tufts, the vaccine is safe for dogs to eat, however if a dog eats several baits it may temporarily have an upset stomach.

"We're hoping that if we're aggressive enough, maybe we can contain it and then push it back on the mainland side. It has been done in Ohio and it has been done in Texas. I'm not sure we have the resources to do that," Rowell said, emphasizing that the efforts and expense are not simply for the benefit of the raccoons. "We want to save the animals, but the real issue is the exposure of people to rabies," Rowell said.

Rabid bats have been on the Cape, but because they do not have the contact with humans that raccoons have, they do not present as great a health threat. Now that rabid raccoons have arrived on the Cape, the dynamics have changed.

"It will take us quite a bit of time to convince everybody that [the cape is] rabies-free. We're going to have to take a look at it over the next several months to see how many cases crop up," Rowell said.

The cost of rabies prevention will increase on the Cape not only because of the vaccination programs but because a bite from a wild animal now includes the risk of rabies.

"The folks on the Cape have been spared the expense of having to follow up on every animal encounter like the rest of the state does," Rowell said. "They're now going to have to gear up for a full new set of encounters. Every time a person comes in contact now with a wild animal they have to suspect rabies and they have to follow that up. And that costs money."

For more information, please contact EASI at (540) 788-3274 or at easi@easi.org. This is one member of a network of Senior Environment Corps started with the help of the Environmental Alliance for Senior Involvement (EASI).

http://www.townonline.com/bourne/news/local_regional/ucc_newubrabies03172004.htm

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Introduction

Hiram J. Friedsam

Book Review Editor

Aldo Leopold's respect and concern for our natural heritage had an enormous influence on the environmental movement and its emphasis on sustainability. Thus, it is most appropriate that the reviews in this issue begin with a review essay devoted to the posthumous publication of a book of his "essays and writings". The review essay is followed by reviews of three books that look at concern for sustainability on an international level through politico-economic lens and find it wanting. Two challenge "globalization," in large part because of the unequal distribution of economic and political power among and within nations, while the third evaluates what has and has not been accomplished and what yet may be accomplished through international law. Two other books reviewed are also "international," but only in the sense that they offer a sharp contrast between how two communities have created their economic environments and impacted their natural environments. The contrast is between a highly developed industry in the U.S. and the environmental problems that are its by-product and the success of a Mexican village in adapting its agriculture to its environment and the larger society. The last two books are directed to the larger context of community organization and change. One is essentially a call for communities to heed the need for action; the other looks at the actual and potential impact of the internet as a method of action. In the broadest perspective, each of these eight books is concerned with some dimension of what we are doing or not doing about sustainability and what we should be doing.

For the Health of the Land, Essays and other Writings of Aldo Leopold

Edited by J. Baird Callicott and Eric T. Freyfogle.
Island Press/Shearwater Books, Washington DC, 1999, 243pp.

This book represents an excellent collection of essays and successfully describes Aldo Leopold's thoughts on conservation, the value of wildlands, and the intricate linkages among human agricultural activities, natural habitats, wildlife and social mores. If there is one overriding theme, it is a call for better integration of human activities into the biotic ecosystems that support *Homo sapiens*. Because my area of expertise is water and sediment quality, I will begin with Leopold's call to maintain agricultural lands as "whole" ecosystems. In the influential essay, *The Land-Health Concept and Conservation*, Leopold particularly disparages the "violence in land conversion." He describes flood control dams, hydroelectric dams, channelization and diking of rivers, water authorities, drainages, lake outlet controls, and impoundments as "running riot." These activities and constructions "deal with symptoms, not with organic causes." Further, Leopold adds "In all of them, the control of nature by concrete and steel is held to be inherently superior to natural or biotic controls." Given the floods on the Missouri and Mississippi during the mid-90's (resulting from the lack of marshes and wetlands to absorb the rising waters) and the "dead-zone" of hypoxic water in the Gulf Coast off Louisiana (resulting from the cumulative loss of soil and fertilizers across the broad Midwestern farmlands), there has been little progress since his essays were written in controlling soil erosion or containing the loss of nutrients, soils and productivity from farmland in the US heartland.

The phrase used by Leopold, "control of nature" says a lot about how a society views itself. Above the main entrance to the College of Engineering at my alma mater is carved, "The Control of Nature is Won, Not Given." The impudence and arrogance of that quote inspired James McPhee to use it as the title of his book, "The Control of Nature." Like this series of essays, McPhee describes the folly of tinkering with natural systems and the delusional belief that we can control nature or natural processes. McPhee and Leopold would strongly agree that we are going down the wrong road, building too many roads, malls, and eating up

too much land with too little thought given to “the seventh generation.” Further, I think they are somewhat cynical about our ability to change our behavior.

Regarding conservation and education, other essays in this book provide a legacy picked up by, among others, Professor David Orr of Oberlin College, Ohio. A recurrent and strong thesis coming through Leopold’s essays is exemplified by this quote (pg. 161), “Conservation means harmony between land and men,” and (pg. 164), “Conservation is keeping the resource in working order, as well as preventing overuse.” Leopold’s influence on David Orr is apparent when Orr asks the question “Can we effectively teach, if we only lecture in classrooms about ecosystems?” I think we know Leopold’s answer: “Only he who has planted a pine grove with his own hands, or built a terrace, or tried to raise a better crop of birds can appreciate how easy it is to fail; how futile it is to passively follow a recipe without understanding the mechanisms behind it.” Leopold asks, “Can our schools, by teaching, create this something?” He answers, “The child must bring something he gets at home...” [These days, with virtual entertainment providing the vast majority of “exposure” to wildlands, agriculture, and nature, this reviewer is doubtful that most children can “bring something they get at home!” We must have more experiential education!] David Orr, in his book “Earth in Mind: On Education, Environment, and the Human Prospect” presents a philosophy of teaching that stems – seemingly directly - from Leopold’s influence. Orr calls for academic ecologists to step out of the ivory towers and voice concerns (e.g, teach the public) more about ecosystem services and the value of biodiversity. Leopold’s essays and the writings of Orr, agree about the value and urgency in getting to know one’s own watershed.

Another theme running through these collected essays is the value of “weeds” and our lack of knowledge about what factors lead to cycles in “boom and bust” of weedy species. Leopold addresses the role of farmer as “controller-of-nature”: “The pioneer tradition that uncut or ungrazed brush, weeds, grass or timber bespeak an incomplete victory over the wilderness, and that any vestige of them in gully, rockpile, bank or fencerow brands the farmer as a sloven.” In organic farming and in developing integrated pest management strategies, this view is changing, albeit slowly and only on farms that are not industrial monocultures. In Part II, Leopold writes with obvious love and respect about managing farmlands to optimize the presence of hawks, foxes, peppermint,

muskrats, and prothonotary warblers (along with other species). One fantastic essay on "Woodlot Wildlife and Plant Disease" concerns the necessary aspects of plant disease in woodlots – and their part of succession and the cycle of life and death (even disease has its "role"). Not only prothonotary warblers, but many other bird species benefit from dead snags and the "bramble" of undergrowth. This has many ramifications, and we have to look no farther than our own university to see the shortsightedness of development-at-all-costs; in the name of "tidiness," the university has cut down many trees and understory plants that would have provided for much avian biodiversity. It shows how far we have to go to convince "educated folk" about the benefits and ecological services of a healthy urban greenspace habitat, as opposed to the sterile, biological deserts of St. Augustine lawns and manicured gardens.

Ingrained within the lack of human-ecosystem integration are lingering aspects of "control," as discussed above. In many (but not all) USDA Cooperative Extension Service programs, we still find chemical and physical means promoted to rid ourselves of "noxious" weeds. In his essay "What is a Weed?" Leopold's damnation of the Weed Flora of Iowa (published in 1926) provides a long list of weeds, "...beautiful flowers which don't serve an immediate need or are simply part of the mind-set that they are unnecessary, undesirable, and nuisances." The flowers listed include chicory, wild rose, peppermint and Black-eyed Susans with suggestions as to their eradication. Leopold suggests "rather than control the weeds by physical or chemical means, their presence represents overgrazing, soil exhaustion, and needless disturbance of more advanced successional stages." Leopold writes "It is a sad commentary on our Americanism that the prairie flowers are ignored by commercial seed-dealers and nurseries.... there is no literature on how to grow them." There has been some progress in this: Tarrant Regional Water District (Fort Worth, TX) has recently promoted a program in xeriscaping, a program which is experiencing much success in using native species, promoting low water use and biotic diversity.

Leopold knew, or at least had a strong awareness, of what was coming, in terms of soil loss, invasive species, and loss of productivity. He states, "The symptoms of disorganization, or land sickness, are well known. They include abnormal erosion, abnormal intensity of floods, decline of yields in crops and forests, decline of carrying capacity in pastures and ranges, the outbreak of some species as pests and the disappearance of others without visible cause, and a general shortening

of species lists and of food chains.” He had great hope that an educated electorate would be able to change the direction in which we have been traveling. He writes

“Sometimes I think that ideas, like men, can become dictators. We Americans have so far escaped regimentation by our rulers, but have we escaped regimentation by our own ideas? I doubt if there exists today a more complete regimentation of the human mind than that accomplished by our self-imposed doctrine of ruthless utilitarianism.

The saving grace of democracy is that we fastened this yoke on our own necks, and we can cast it off when we want to, without severing the neck. Conservation is perhaps one of the many squirmings which foreshadow this act of self liberation.”

In this essay, we again see the early genius of Aldo Leopold as he discusses approaches to water and soil conservation that have been urgently built upon by folks he inspired. For example, in a presentation to a large audience in Dallas in October 2003, Peter Gleick, an internationally recognized expert on global freshwater resources, approached water policy by integrating water resource availability, linked to human consumption, ecological habitat, irrigation, power generation, etc. Gleick’s talk built on issues developed by Leopold in these essays, and highlighted the interdependence of security, health, environment, and economic development and the place of water as the critical nexus between and among key economic and environmental sectors. By defragmenting social, political, economic, and environmental considerations determining water resource development and allocation, Gleick outlined the importance of establishing a framework for water policy decisions today and in the future. The influence of Aldo Leopold could be felt in the audience!

One last remark about an essay in this collection that I will probably remember longest. In “Why Maintain Wildlands?” Leopold writes,

“Completely wild lands have one function which is important, but as yet ill-understood. Every region should retain representative samples of its original or wilderness condition, to serve science as a sample of normality. Just

as doctors study healthy people to understand disease, so must the land sciences study the wilderness to understand disorders of the land-mechanism.”

This is a wonderful statement about the value of wilderness, showing early-on the thoughts later expressed by David Brower, Mardy Murie, John Muir, Sandra Postel, and others. The value of understanding how forests work has helped in maintaining tropical forests. It is still a fight, however, and usually the “value” of forests must be “sold” as helping to “bio-prospect” for fungi, plants and animals useful to humanity. Leopold was one of the first to make the argument to maintain these same forests for their own value.

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Worlds Apart: Civil Society and the Battle for Ethical Globalization

By John Clark.

Earthscan Publications, London, 2003, 269pp.

When I read the subtitle of this book, I confess that the first thought that flashed through my mind was “ethical globalization”—an oxymoron! But of course it is not. Civil society critics are generally opposed not to globalization as such but to the specific kind of economic globalization that the world has experienced over the last 25 years. Under the aegis of neoliberal economic theory, government regulations and barriers to world trade and capital flow have been dismantled and corporations have been freed to pursue their own selfish interests with little social responsibility. This has resulted in growing inequality within and between nations and an immense amount of suffering and deprivation among the poor of the world, while at the same time the macroeconomic results have been decidedly mixed.

Clark argues that it doesn't have to be this way. There are growing protests by civil society organizations—development NGOs, church groups, labor unions, environmental groups, consumer groups, etc.—as well as more diffuse social movements and protest groups that are discovering new ways to mobilize through the internet. He is skeptical that the governments of the major powers of the world will undertake reforms to make the globalization process more “ethical” if left to themselves. It is only through the pressure of civil society that there is hope of reforming the process.

In a recent article in Harper's Magazine (March, 2004), John Ralston Saul proclaimed the death of globalization as an economic theory. He points out that grand economic paradigms rarely last more than a few decades. Keynesianism in its different forms lasted perhaps 45 years, but globalization theory with its “technocratic and technological determinism and market idolatry” is already dead after 30 years. As evidence he points to the growing protests around the world as well as to the resurgence of nationalism and the weakness of global corporations, which do not have the capacity of a nation state to mobilize force.

I think Saul's obituary for globalization theory is premature, since its

proponents are still in positions of power in the dominant nations of the world and in the major international financial organizations. This is especially true in what some call the “G-1” (Group of One—the United States), where every presidential candidate in both major parties for the last three decades has been committed to the ideology of free trade. Obviously Clark and Saul are observing the same phenomena, but Clark emphasizes the need for civil society to work in a more effective manner to bring about positive change so that globalization can proceed in a more ethical way to benefit the poor as well as the rich of the world.

In the first part of the book Clark examines the nature of globalization as the world has experienced it in recent decades and reviews briefly some of the arguments of both the proponents and critics. He goes into greater detail showing how globalization has affected poor countries, poor people, and inequality. Although he says that his own views are closer to the critics of globalization than to its supporters, he is less critical of the process than most of the civil society critics who have written on the subject—authors such as Susan George, David Korten, Martin Khor, Walden Bello, William Greider, John Cavanagh, Richard J. Barnet, Subcomandante Marcos, Jeremy Brecher, and Tim Costello. Although his analysis is on the mark as far as it goes, it remains mostly on a general level and tends not to get into specifics. For example, he does not point out the many ways in which NAFTA has been a disaster in its first ten years of operation.

For the most part Clark accepts the theory of comparative advantage, and he even includes a three-page appendix explaining the theory in its classical form. Though this is a cornerstone of neoclassical and neo-liberal economic theory, it has never been demonstrated empirically to be true. Trade protectionism has been the rule and free trade very much the exception during the past two centuries. The economic historian Peter Bairoch points out that in 19th century Europe in all cases protectionism led to or was concomitant with industrialization and economic development. Britain was the primary advocate of free trade, but this followed 150 years of strict protectionism in Britain. It was only after its industries were well advanced and more productive than in other countries that it turned to free trade policies; by then it was to its advantage. When the continental countries experimented with free trade policies, there was a negative effect on their economies, sometimes disastrously so.

Clark's experience in both of the "worlds apart" gives him a special vantage point for viewing the controversies surrounding the globalization process. He worked for 18 years in NGOs, mostly with Oxfam UK, but then moved to the World Bank between 1992 and 2000, where first he was manager of the NGO and Civil Society Unit and then lead social development specialist for East Asia. He tries to present a balanced view of the issues, but to my mind he is not sufficiently critical of the World Bank. Most of the civil society critics of the World Bank have recognized that the bank has done many useful things and that there are many officials there who are truly concerned about poverty reduction. But they argue that these programs are for the purpose of legitimation and public relations, while the bank relentlessly pursues its fundamental aim of opening up the economies of the world to capitalist penetration by the rich nations and global corporations regardless of social consequences.

A radical Turkish social scientist who worked at the World Bank told me that it did not matter that a great many of the staff there were progressives or "closet Marxists," for the institutional imperatives ruled, and those imperatives were set by the neoliberal True Believers in the top policy positions. Yet Clark's own experience at the bank shows that it is possible for progressives within the bank to bring about change if they are leveraged by civil society protests. One of the major things he learned was something that sociologists have long recognized—that the way to change an institution is not to start with changing values or attitudes of people but with changing their actions. Slavery and racial segregation did not come to be regarded as ethically evil denials of human rights in the American South until the dominant whites were forced to change their actions by an occupying army or by the vigorous enforcement of court decisions. As Clark puts it, ". . . changed actions lead to changed values, not the other way around."

Following this principle Clark was able to make the project planning activity of many parts of the World Bank much more participatory and much more sensitive to social and environmental objectives. Though I would be more critical of the World Bank than Clark is, I agree with him strongly that the World Bank and IMF should not be demonized and regarded as the authors of all evil in the less developed world. That lets the governments of the major powers and the global corporations off the hook, though they are largely responsible for the policies pursued by

the international financial organizations.

The second and third parts of the book are the strongest sections. Here Clark charts the growth of civil society organizations, analyzes their activities and tactics, and considers some specific areas of transnational activism and the backlash that they have generated. Finally, he devotes the concluding chapters to a guide on how to “civilize” the globalization process and deliver benefits to the poor of the world as well as the rich

In spite of any reservations I have expressed above, which reflect my own biases as much as Clark’s, I believe this is an excellent book. Clark is an immensely knowledgeable observer with a wide range of experiences and an intimate knowledge of the role of various types of civil society organizations in the development process. He is fair-minded and incisive in his analyses, and his conclusions are always well worth consideration and debate. Best of all, his sound advice on how civil society organizations can become more effective in their efforts to bring about a more just world can bring hope to activists during a time when most of the news we receive is bad news.

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Democracy's Dilemma: Environment, Social Equity, and the Global Economy

By Robert C. Paehlke,
MIT Press, Cambridge, MA: 2003, 306pp.

“Democracy's dilemma is this: global economic integration virtually requires some form of corresponding political integration, but the very notion of global government in any form is worrisome, especially to those with strong liberal democratic instincts.” So begins Paehlke's analysis. As Professor and Chair of the Environmental and Resources Studies Program at Trent University in Canada, he brings considerable talent to his task and his solutions are moderate and balanced.

His solution is simple. It is global governance without global government. Easy to state but rather difficult to realize since nationalism remains the singularly most powerful ideological force on the planet. Despite his measured narrative he underestimates nationalism's force.

Paehlke recognizes the issue of distance and scale and the national defense in judging the success or failure of electronic capitalism, his term for the second industrial revolution. For him electronic capitalism has both negative and positive aspects. Regarding the former, governments have a difficult time collecting taxes and controlling unemployment as community bonds and families weaken along with decay of ecology. The positive is mostly in the realm of potential. It has not happened. Electronic capitalism has three aspects that makes it difficult to judge future developments, a situation inherent in books dealing with possible public policies in the future. Electronic capitalism is still capitalist and thereby maintains a special revolutionary role in modern life. Second, control of investment decisions are increasingly private in nature. And last, information has become a valuable commodity.

Several valuable chapters deal with what the author refers to as three bottom lines. They are economic, social, and environmental. It is difficult, as he admits, to bring these three lines into some sort of harmony. The reason is found in history, which is generally ignored or assumed in Paehlke's text. As the world rushes into electronic capitalism the issues of equitably distributing the benefits from the first industrial revolution remain.

All in all, *Democracy's Dilemma* is a fine book, well worth reading. As a historical document, it is an interesting item. The unwritten sub-text is an argument against economic growth, driven by the increase of population and human expectations. The planet is restless. And given the power of nationalism, the issues of poverty and equity will not disappear. Many nations are poor and few are wealthy and content—if for no other reason than worrying about maintaining a relative position of wealth on a poor planet. In that situation national defense takes on additional meaning.

Despite these issues and problems, Paehlke believes that the three bottom lines can be linked together and that rich and poor nations can mutually benefit from their combined efforts and institutions. One can be hopeful but the historical record of imperialism and realism in foreign policy can offer little encouragement.

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The Global Environment and International Law

By Joseph F. C. DiMento,
University of Texas Press, Austin, TX, 2003, 246pp.

As the title of the book indicates, Joseph DiMento has embarked on the gargantuan task of examining both the current environment of Earth and the effect, if any, international law has had on its present status. The author's goal is to explain to what extent international law has impacted the global environment. DiMento examines past historical environmental harm, past and present procedural issues that foster cooperation among nations, and varying cultural beliefs across the globe that yield differing viewpoints about the need for and application of environmental law. His use of various perspectives is especially effective. For example, the book begins with a "dateline" report set in the year 2030 about a small fictitious island in the Pacific. By verbally creating a visual image of a once-beautiful island now evacuated, desolate, and devoid of beaches and vegetation, a startling glimpse into the possibilities of long-term environmental neglect becomes apparent. At another point he takes the perspective of an impoverished worker in an undeveloped country who needs to put food on his family's table and contrasts it with the perspective of a large corporation dealing with complex regulatory bodies in the U.S. and abroad.

The text is based on thorough research and includes appendices that are nearly exhaustive in their detail. In addition, the extensive notes, bibliography, and index are invaluable. Examples from every corner of the world provide readers with a good overall picture of the environmental problems we face as a global society. While the tables in the text are few in number, they are thorough and helpful. The reader, whether a practicing environmental lawyer or a layperson wanting to learn more about the possible legal solutions to environmental pollution and erosion, will find this book helpful.

Statistics cited in the book are alarming. The author contends that there are five million cases of acute poisoning from pesticides annually and 25,000 deaths per day attributable to poor water and waterborne diseases. How should the world's people in 2004 deal with such massive problems? DiMento offers a combination of solutions. He discusses a multitude of laws from treaties, "soft" law, international instruments

such as conventions and agreements, case law, customary law, scholarly writing and research, and various policy suggestions. He outlines the numerous methods that have been successfully used in the past and puts forth arguments articulating why some methods have failed.

DiMento ties voluntary commitment, national cooperation and coercion, relational movements between environmentalists and corporations, and thirty years of environmental law into a readable format which explains, in great detail, its positive and negative results. To illustrate, "civic environmentalism" and "environmental governance," policies of the pro-environmental community through voluntary participation, are contrasted with definitive positions advocating criminal penalties and trade sanctions for non-cooperating nations that continue to pollute the environment.

The Global Environment and International Law is a reader's complete guide to international environmental law. It can be useful for studying the past, present, and future potential of international environmental law. DiMento has mastered the intricacies of many pieces of this complex arena and has put them into a user-friendly format for any reader interested in the subject of our environment and how to protect it better on a global basis.

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Uneasy Alchemy: Citizens and Experts in Louisiana's Chemical Corridor Disputes

By Allen, Barbara L,
Cambridge, MA, MIT Press, 2003. 211pp.

I sought to discover, through this review, what constitutes environmental justice. What dispute resolution processes do parties use in search of it? Who are the stakeholders and what are their issues? How important is the role of technical expert in resolving these disputes? What strategies do stakeholders and experts employ in seeking or avoiding a resolution? Is a win-win outcome achievable; if not, who wins and who loses and what gets compromised in the resolution process? Is environmental justice a reality or just an apology for human ineptitude and indifference? In the end, I found more than I bargained for.

In her detailed and stirring accounting of the citizen struggle for environmental justice, *Uneasy Alchemy: Citizens and Experts in Louisiana's Chemical Corridor Disputes*, Barbara Allen used a variety of methods for developing evidentiary materials. Through ethnographic techniques, she interviewed stakeholders including local citizens and activists and technical experts including health professionals, lawyers, economists, and scientists. She examined media accounts, governmental documents, policy reports, company statements regarding their environmental policies, and minutes of public hearings. Allen criticizes Louisiana for its historical lack of environmental protection and its encouragement of growth in chemical industries that compromise safe environmental standards. She documents the existence of more than 125 potential producers of environmental contaminants in the petrochemical industry in a Louisiana area known as Cancer Alley. This area tracks for about 80 miles along the Mississippi River between New Orleans and Baton Rouge, an area identified with inordinately high rates of respiratory diseases and cancers in its local population. That population generally is described as low-income minority and disenfranchised.

It would seem that the Louisiana case study was well chosen for several reasons other than the characteristics cited above. First, Louisiana produces more toxic wastes per citizen than any other state. Second, the conflicts between the corporate sector and citizens are well documented. And third, the issues depicted are highly complex and politically contentious, making the disputes concerning environmental justice of

potential interest to a broad audience.

One may conclude a lot from reading the book: Environmental policies and their enforcement are set aside in favor of elite economic and political gains and that is largely to blame for environmental injustice. The consequence of this neglect is poor health and unemployment that spawn environmental disputes. Environmental justice would be achieved if environmental safety was restored and the local economy benefited the local citizens. However, favoritism in the form of tax exemptions and political support given to polluting corporations deny local citizens needed resources for their public health and education, while alliances of local citizens and advocates led by a cadre of experts look to the courts in attempts to remedy environmental injustice. In this woeful account, the courts rarely rule in favor of citizens by imposing fines on corporations and charging them with cleanup or improvement in their environmental impact, but when they do, there is a lack of sufficient enforcement for implementation. Despite rare exceptions and minor political victories for citizens, the corporate moguls and political stooges too often win. It is hard to deny that in such situations environmental justice is elusive, a mere apology for human ineptitude and indifference. Nevertheless, those who are most negatively impacted will need more than an apology and will continue their struggle for environmental justice as a matter of survival based on faith that someone will care enough do something about their condition.

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Zapotec Science. Farming and Food in the Northern Sierra of Oaxaca.

By Roberto J. Gonzalez. Austin, TX.
University of Texas Press, 2001. 328 pp.

Few academic books exhibit the Aristotelian dexterity of embracing both “hard” and “soft” science audiences. Roberto Gonzalez has adventured brilliantly in this holistic discourse to explain why Zapotec farmers in the Northern Sierra of Oaxaca have developed a local agricultural knowledge which has allowed them to produce in an ecologically sustainable fashion. This book should help those believers in the cosmopolitan scientific approach as the only venue for advancement and progress to consider the value and the power of local knowledge in maintaining an ecological balance in agricultural production. Gonzalez spent approximately one and a half years doing fieldwork; for thirteen months he worked in the farms and fields of Talea, a village in the Northern Sierra of Oaxaca. During this time, he immersed himself in the language, culture, rituals, and emotions of Taleans. This pure ethnographic research is quite compelling in showing Taleans as not only practitioners of a traditional knowledge but as agents constantly engaged in the process of adapting and accommodating their scientific and technological knowledge to current global demands.

There are a number of strengths to this book; the one that immediately grabs the reader’s attention is the author’s mastery of the written word. It is a beautifully written book. The depth of the ethnographic description coupled with the scientific and technological analysis of the local knowledge and the cultural sensitivity to its subjects are difficult to find among current ethnographies. The second strength is the use of a dialectical relationship between the historical past and the current socio-economic and political context as significant variables in the generation of local knowledge regarding agricultural production. Indeed, while the main focus of the book is the scientific rationale embedded in Zapotec farming practices, Gonzalez provides important insights into the everyday Taleans activities and their religious and broader epistemological frameworks. It is precisely through the historical development of the region, through the pre-Hispanic, colonial and modern periods, that the author identifies the conceptual fundamentals that characterize Taleans’ scientific and technological practices in farming. For instance, the

particular and sacred practices associated with maize bring us to the pre-Hispanic epistemological world according to which humans, corn and cosmos are alter-egos, different representations of one and the same essence: That's the reason why Taleans continue referring to the "heart" and "soul" of maize. This "humanized" way to deal with maize responds to the presence of the pre-Hispanic worldview according to which corn and humans are divine products. Farming techniques and concepts embrace the meanings encapsulated in maize not only as the source of material survival but as spiritual survival within Zapotec epistemology as well. Therefore, Zapotec farming science becomes "the campesino's craft," a metaphorical tapestry embroidered by the plurality of peasants' knowledge about nature and the cosmos, internalized by their farming practices.

The third strength of the book is the embroidering of the world system perspective, which strengthens the dynamic nature of Zapotec farming science in adapting their practices to local conditions. As such, the references to sugarcane and coffee cultivation allow the author to show a deep cultural analysis of colonial and modern scientific and technological accommodation to the changing political and economic contexts. Finally, Zapotec Science is a major ethnographic lesson for those in favor of "development" as it is conceptualized and planned outside of local cultural dynamics. Gonzalez provides numerous examples of factory farming implementation by transnational corporations, in conjunction with Mexican development agents, that have proved to be ecologically and socially destructive.

The book is remarkable in conveying its main ethnographic message: "Mexican farming may depend on the knowledge of campesinos, who have developed sustainable subsistence methods that have served them for thousands of years." Zapotec Science is a major triumph of ethnographic insights in the understanding of farming practices. It can only be hoped that the power of Gonzalez' descriptions and analysis will influence those dealing with government policies regarding farming in becoming more sensitive to local knowledge and practices.

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A Community Manifesto

By Chris Wright,
London, Earthscan Publications, 2000, 1788pp.

Wright's book is a 178-page response and commentary to a LETS (Local Exchange and Trading System) conference that the author attended in Portsmouth, UK in October of 1998. The conference stimulated and led the author to put down his thoughts about the power of community to transform our world in the desired direction. Hence the term "manifesto" in the title.

The author's experience has included serving as the manager of a social service agency in a local community in England and prior work on education programs for children in Nepal. He then became a consultant and commentator on related issues. Based on this experience, he develops a broad critique of current operational styles of living, especially in developing societies. He highlights and describes the fragility of four sectors: the global money economy, large-scale agribusiness, modern command and control systems, and the cult of the individual.

Wright points out that the kind of language and concepts that we use, and the identity and self-awareness with which we work, are crucial to our chances of succeeding in our search for "community". This gives him the opening to present ideas and arguments for how we can regain the proper sense of direction.

The crucial elements, according to the author, are: the strength of (a sense of) personal responsibility, the strength of consensus, the strength of local economies (this is where the author links to the LETS topic), and the strength of properly perceived and enacted "community". These are the features that the author banks on for our finding the way out of the current crises.

This much for a sketch of the volume's main claims. The section on the strength of local economies (LETS exchange networks) is the one that, in my opinion, is the most factual and illuminating. The rest of the book talks the language of crises and their resolution without much grounding either in experience or in reasoned argument.

On balance, my sense is that this particular volume is a commentary on LETS and on “community” that most of us can probably do without. I do not mean to gainsay the author’s (albeit limited) experience with the practice of LETS (church members trading services within St. Clements Church in Manchester, England). Elsewhere, in an earlier volume, he has in fact produced a useful general overview of proposed main ingredients/starting points needed to begin “changing the world.”

To document this, and to conclude the review, let me quote a summary paragraph from Wright’s earlier work (*The Sufficient Community: Putting People First*, Green Books Ltd., 1997.)

“There are three main areas that we should concentrate on and begin to experience in our lives if that change [improving the world] is to happen: first, relationships and personal development; second, token economies and learning to be ourselves; and, third, community building and building a sense of belonging. These categories obviously overlap but can be approached quite separately. There are many starting points and, in dealing with each issue in turn, I can only hope to touch the surface. Much of what we already do and think of as being important will come under these headings. Recognizing that may help us to find the next step most appropriate to us.” (p. 153)

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Advocacy, Activism, and the Internet: Community Organization and Social Policy

Edited by Stephen F. Hick and John G. McNutt,
Lyceum Books, Chicago, 2002. 256pp.

Social work has a long and proud history of advocacy and political activism on all three practice levels: micro (individuals), mezzo (families and small groups), and macro (organizations and communities working for change in policies or legislation). As with all advocates, social workers have had to work with and use the tools and means at our disposal. And over time we have become quite proficient in using them to advocate and engage in political activism on behalf of clients or to bring about social change. With the invention of the Internet, a new tool needs to be added to our arsenal. In *Advocacy, Activism, and the Internet* we learn how this “fairly neutral thing” can be used by social activists, especially those engaged in macro activism.

Advocacy, Activism, and the Internet has three main sections. The introductory section contains five chapters that focus on why the new technology is important to social change, how it coincides with our notions of community, and the state of the art of using the internet for advocacy. The second, “Organizing for Social Change”, looks at two new issues emerging from using the internet for organizing: people often work apart from others and organizers can create virtual communities. While these issues may make using the internet for organizing and advocacy seem daunting, the six chapters in this section contain case studies of how organizers from around the globe have overcome these concerns and have been successful. Here we see successful examples as diverse as a year-long campaign involving a faith-based organization in Philadelphia, a flash campaign initiated when a mentally ill woman was arrested for failing to pay for a cup of coffee, and the Jubilee 2000 Campaign to cancel unpayable debts among the world’s poorest nations. The final section focuses on social policy and advocacy via the Internet. Unlike the second section with its numerous case studies, the final section takes a more theoretical approach to discussing topics such as teledemocracy and reinventing governance and the digital divide issue.

Advocacy, Activism, and the Internet is an excellent attempt, possibly

even the first such attempt, to demonstrate that the Internet can be used successfully by social activists. It includes some of the history of social activism and how the Internet fits into that history, the impact activism has on social policy, and detailed examples of using the Internet as a tool to engage in successful community activism. Given the proliferation of the Internet and its accessibility, social activists and community organizers simply must learn to use the Internet and add it to their bag of tools if they are to be effective in the future. Thus, Advocacy, Activism, and the Internet is must reading for anyone interested in remaining an effective, relevant advocate.

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SUSTAINABLE COMMUNITIES REVIEW
General Instructions to Authors

Sustainable Communities Review is dedicated to the understanding and expansion of the concept and creation of sustainable communities in all parts of the world. The Review seeks to broaden the traditional focus of sustainable development to include other dimensions of community life that promote sustainability, such as empowerment, education, enterprise, and environment. Our definition of environment includes social and cultural influences as well as the more physical dimensions of our ecology. We welcome articles, commentaries, and news about ways to engage all citizens in sustaining quality community life and healthy environments to be submitted for consideration for publication. The Review is published semiannually.

1. Submission of manuscripts: Three hard copies of manuscript to be considered should be sent or faxed to the Editor:

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2. Length of manuscripts: Scholarly articles should not exceed 10 double-spaced pages. Shorter articles or essays describing innovative community projects and concepts, etc. should not exceed 4 double-spaced pages. The Review also welcomes brief notes on community activities (1 double-spaced page or less).

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