

Section 1



Fundamental Concepts in Environmental Education and Communication (EE&C)

Chapter 1

GreenCOM Weaves Four Strands

Martha C. Monroe, Brian A. Day, and Mona Grieser

Knowledge alone doesn't harm or help the environment.

Human attitudes don't harm or help the environment.

Human behaviors, on the other hand, have greatly harmed, yet hold a great deal of hope for helping, the environment. Those of us who work for environmental sustainability must address human behavior.

Behaviors, of course, must be supported by knowledge and attitudes. But research in the field of environmental education and in commercial marketing have shown that there is no cause-and-effect progression from knowledge to attitude to behavior as educators have long believed (Hines, Hungerford, and Tomera, 1987). In fact, the relationship among these three things is puzzling.

Research shows that people who take positive environmental actions often have no better understanding of the problem than those who don't act. In the United States, national opinion polls show consistently strong positive attitudes toward the environment, yet most of these Americans still won't do simple things to conserve energy and water. What does cause people to act? What can we as educators say or do to get people to behave in environmentally responsible ways?

The Environmental Education and Communication Project (GreenCOM) was started six years ago by USAID to apply a set of social marketing and communications techniques that have proven successful in the field of health to the field of environment. GreenCOM has had the opportunity to make use of some of these new strategies in 28 countries. This book shares both the theories behind the communications techniques and some of the practical results.

GreenCOM draws on four complementary disciplines and works closely with practitioners in these four fields: social marketing, environmental communications, environmental education, and public participation. Many GreenCOM projects, as described in the case studies in chapters 13–15, blend elements of these fields into workable methods on the ground. But the four fields do not simply offer a cafeteria of strategies; each has its own framework and logic. This chapter gives a brief background on these four fields that form the strands of GreenCOM's strategies.

STRAND 1: SOCIAL MARKETING

In a relatively new field collectively referred to as *social marketing*, models derived from commercial marketing and behavioral psychology are used to encourage new (healthier, more environmentally friendly) behaviors in groups of people. Social marketing relies on behavior modification theory as its base and identifies key factors that determine the behaviors of target audiences. These “determinants” may operate at the individual, family, community, or system levels. This framework suggests communicators consider a range of ways of making the new behavior desirable and accessible to the target population by looking at barriers to, and benefits of, their adoption.

GreenCOM uses a form of “social marketing” that involves a simple five-step process that we feel will bring about environmental behavior change. It is divided into sections corresponding to the five basic steps of social marketing (Day & Smith, 1996).

The first step—Assessment—identifies why the people you want to influence behave the way they

do. People almost always have good reasons for doing what they do. They are not stupid nor are they often irrational. People need to be empowered to take action. Some small fraction of the audience may already carry out the behaviors we want a larger portion of the population to do. Knowing what people think and why they act the way they do can pinpoint a problem and identify the right way to solve it. What are the differences between doers and non-doers? When possible we want to build on what people are already doing correctly. We are looking for opportunities to develop appealing messages that make the desired behavior sound fun and easy. We are also learning what their sources of information are so we can select a medium for communicating these messages.

In the design and planning step, we take what we learned from the assessment step, compare it to our goals, and design our message. Based on what we learn about doers and non-doers we attempt to identify what might motivate people to stop or start a specific behavior—conserve water, dispose of waste correctly, or take steps to protect critical wildlife habitat. When designing a message we try to remember to find an incentive for people to do (or not do) the behavior. Every person in one form or another asks, “What’s in it for me?” Our message must clearly answer that question. Applied research provides insights into the benefits and barriers that people perceive about the proposed behavior. We conceive a message and prepare a draft script, storyboard, or rough tape to convey the message in terms that people can readily relate to. But we do not go into production yet.

In the pre-test and revise stage we actually test our draft campaign items with a small subset of the target audience. In one project GreenCOM worked on in Egypt, we took a draft message out to 40 people to see if the message was effective. (The tested message was what the “experts” believed people should hear rather than one based on marketing research.) We found that 39 out of 40 people with whom we pre-tested the materials did not understand the message. Pre-testing can save enormous amounts of money and time.

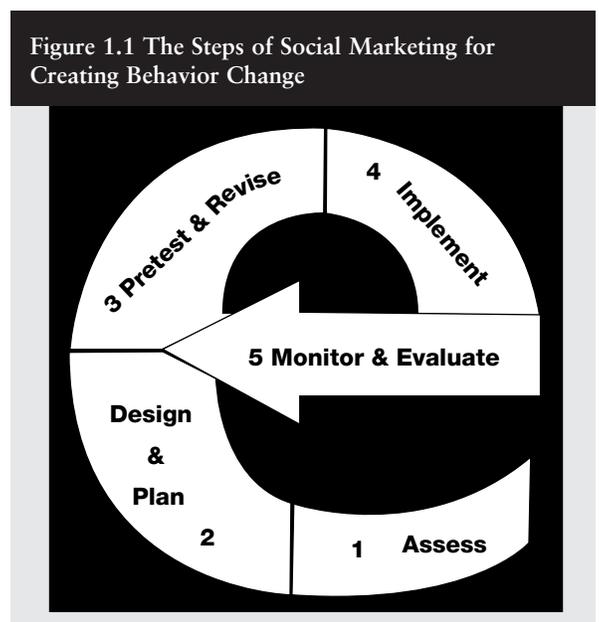
After revising, and even re-pre-testing if necessary, it is time to implement.

Here we look back at our research or where our audiences get information and we deliver our messages through those channels.

Monitoring and evaluation are critical. Changing behavior doesn’t happen overnight. As people are exposed to new behaviors they often seek additional information. Campaigns need to be reworked to speak to those needs. Which media are being helpful or effective? Do we need to change the media mix? Figure 1.1 shows step 5 pointing back to a point between steps 2 and 3. Progress is made in a spiral with constant revisions, new pretests, and further evaluations.

STRAND 2: ENVIRONMENTAL COMMUNICATION

Drawing on social marketing theories, described above, as well as experience in communication programs in other sectors (e.g., health, family planning, and AIDS), environmental communicators create strategies for reaching certain audiences, they develop messages and select the appropriate media to reach these audiences.



The goal is to instill in learners the knowledge about the environment, positive attitudes toward the environment, competency in citizen action skills, and a sense of empowerment.

Communications campaigns are varied, multifaceted, highly planned, and strategically assembled media symphonies designed to increase awareness, inform, or change behavior in target audiences. A model for designing communications campaigns uses these four steps:

1. First, set a clear goal. What exactly do we want people to do? Which behavior do we want to focus on and why? Environmental practices often involve a myriad of behaviors. Which of these should be the focus of our efforts?
2. Then select the audience that can have the most impact and focus on it.
3. Learn that audience's "media diet." What media does the target audience get its information from—radio, TV, newspaper, community bulletin boards, their doctor, boss, or children?
4. Only then can we focus on message. A message written for a community bulletin board is quite different—and could be more effective in changing behavior—than one written for TV.

These four steps: Goal, Audience, Medium, Message must stay in order.

STRAND 3: ENVIRONMENTAL EDUCATION

GreenCOM also draws heavily on the tradition of environmental education. Since the 1970s, environmental education has been characterized as a process that prepares citizens to prevent and solve environmental problems. Delegates to the 1977 United Nations Intergovernmental Conference on Environmental Education in Tbilisi, Georgia in the former USSR acknowledged the various aspects of environmental education when they agreed upon the following definition:

Environmental education is a process of developing a world population that is aware of and concerned about the total environment and its associated problems, and which

has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones (UNESCO, 1978).

The delegates identified five objectives of environmental education programs:

Awareness—to acquire an awareness and sensitivity to the total environment and its allied problems.

Knowledge—to gain a variety of experiences in, and acquire a basic understanding of, the environment and its associated problems.

Attitudes—to acquire a set of values and feelings of concern for the environment and motivation for actively participating in environmental improvement and protection.

Skills—to acquire the skills for identifying and solving environmental problems.

Participation—to encourage citizens to be actively involved at all levels in working toward resolution of environmental problems (UNESCO, 1978).

Environmental education is mission-oriented. A good environmental education program does not stop with the presentation of information, but helps learners wrestle with values and gain the skills to take relevant and responsible action.

Formal environmental education differs from social marketing and environmental communications in that it does not always directly target specific behaviors. It teaches students "how to think" not "what to think." Thus the goal of environmental educators is to help learners form the capacity to collect and analyze information, make good judgments, and participate fully in civic life. Because research shows that people who take action not only have some knowledge and awareness of the problem they are addressing, but also knowledge of *how* to effect change, environmental educators often stress civic and public participation skills. The goal is to instill in learners the knowledge about the environment, positive attitudes toward the environment, competency in citizen action skills, and a sense of empowerment.

Environmental education materials and programs reflect an evolution from science-based information to skill-based participation in problem solving. In some nations, environmental education objectives nicely complement education reform efforts to make subject areas more relevant to local situations and to prepare students to become responsible citizens.

Environmental education activities are easier to start in the nonformal education system, through youth group activities, religious communities, extension visits, agency outreach materials, and field visits to museums and zoos. Environmental educators develop and implement programs that engage learners in discovering information and developing skills to convert that information to meaningful practice.

In some nations, environmental education has a third important aspect: training professionals to consider the environment in their work. Through training, engineers, architects, business leaders, legislators, planners, and other decision-makers in society come to understand how environmental principles and concepts affect their work in housing, water treatment, transportation, urban development, automobile manufacturing, and other spheres (see Chapter 10).

STRAND 4: PUBLIC PARTICIPATION

The growing democratization around the world clearly shows the growing desire of people to participate in decisions that affect them. In Eastern Europe, the former Soviet Union, Latin America, Asia, and Africa the news of the past two decades has been of increased control of people over their governments.

Participation by local residents and stakeholders changes policy. It also makes policy more likely to be effective. The need for public participation is a basic tenet of GreenCOM's strategies. And communication and education techniques can enhance the effectiveness of people or groups seeking to participate.

The complexity and specificity of environmental issues also makes participatory techniques important tools. Today it is less likely that outside experts will have the answer.

With a growing community wariness of consultants, governments, and authority in general, it is paramount that residents design their own communication strategy and messages. Their participation not only improves the program and adds credibility, but also strengthens their skills to do similar work in the future (see Chapter 3). Participatory materials development workshops and participatory research efforts are but a few of the new tools that ensure greater participation by stakeholders in environmental communication activities. The result can be improved quality in a considerably shorter time than would be needed by experts to familiarize themselves with issues, actors, and behaviors.

Participation in communication activities is not just a matter of including local stakeholders in the design of a project, but also partnering with them in the collection of formative research data (see Chapter 6), decision making, and program implementation. The degree to which participation increases local capacity to initiate and manage similar programs at a later time may be the true measure of success (see Chapter 13).

These new approaches are also changing the nature of the communication tools themselves. With greater authority for managing programs devolving to decentralized agencies and community groups, larger numbers of people are being trained to use new communication techniques effectively. Their techniques include: community resource centers, community radio, and community websites.

References

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- Day, B.A. and W.A. Smith. (1996.) The Applied Behavior Change (ABC) Framework: Environmental Implications, *Advances in Education*, pp. 5-9.
- Hines, J.M., H.R. Hungerford and A.N. Tomera (1986-1987). "Analysis and synthesis of research on responsible environmental behavior: A meta analysis." *The Journal of Environmental Education* 18(2), 1-8.
- UNESCO. (1978.) *Final Report, Intergovernmental Conference on Environmental Education*, organized by UNESCO in cooperation with UNEP, Tbilisi, USSR, 14-26.

Chapter 2

Thinking about Behavior

Orlando Hernández and Martha C. Monroe

One woman sorts household waste for recycling; the other throws it into a garbage container bound for the landfill. Why?

Do non-recyclers need more information in order to recycle? Do they need a monetary incentive? Or do they simply not understand the link between trash and groundwater quality? Are recyclers motivated by the wisdom from frugal grandparents, or peer pressure from their neighbors?

If you are in charge of a recycling program, you will think long and hard about these two behaviors. This chapter is meant to guide thinking about recycling—or any other activity to improve the environment—toward an effective and efficient program.

For years, communicators have tried to identify the factors that determine behavior (determinants of behavior) to explain why people behave differently. A variety of theories have been proposed, but no one model explains all human behavior.

Why does one woman recycle when the other doesn't? Perhaps one woman perceives the "cost" of recycling (in time, convenience, or space) to be inconsequential, while the other finds it overwhelming. Or perhaps the recycler gets support for her efforts from people she values—family, neighbors, or community leaders—while the non-recycler does not. Maybe the recycler is willing to take the time, effort, and space to do something she believes to be right, but the non-recycler does not have that discipline. These three broad categories—external barriers, social personal norms, and personal values—form the basis for considering a variety of determinants of behavior.

Since in the real world these categories overlap and interact in patterns that vary from person to

person, issue to issue, and place to place, it is not practical to defend one "best" theoretical model for developing behavior-change programs. In this chapter a variety of theories that explain different facets of behavior will provide us with a "mosaic model" to use in designing EE&C programs.

The design of any activity should include the basic steps outlined in Chapters 6–9, beginning with the needs assessment and formative research phases. But to ask the right questions and to then build a program that will address the most important determinants of behavior, start with this simple question: "Why do you do that?"

FOCUSING ON BEHAVIORS

Successful EE&C focuses on behaviors for several reasons:

1. *The behaviors of individuals have environmental repercussions.*

To change the state of our environment, we must learn how to encourage individual behaviors that are environmentally sound and alter those that are damaging to the environment.

2. *Awareness that an environmental problem exists does not necessarily lead to behavior to fix the problem—as we saw with our two women above.*

Often, EE&C interventions focus only on developing awareness about environmental problems. But awareness is only a first step. Awareness that forests are diminishing does not get enough forest users to adopt appropriate silviculture practices or to reduce the consumption of firewood. Awareness that sea turtles are diminishing does not convince enough people to harvest fewer sea-turtle eggs.

Many factors other than awareness influence behavior, and those factors must be understood. An analysis of the behaviors that individuals currently perform, both beneficial and detrimental to the environment, is the starting point to understanding which programs should be supported and which changed.

3. *Adopting this behavioral approach makes EE&C activities more focused and targeted, and ultimately more effective.*

Resource users know best how rapidly their resources are diminishing. But they may not have the ability to correct the problem—they may need alternative specific behaviors, training in the skills to perform these behaviors, and then the opportunities to use them. Identifying the effective alternative behaviors will help identify the skills and training they need. For example, an Andean program attempting to stabilize agriculture and prevent encroachment into forest areas suggested that farmers limit burning when preparing the ground for cultivation. Farmers knew that biodiversity was affected by clearing more land and understood the importance of burning only the land they intended to plant. But they needed the skills to burn small patches of land in a controlled manner; skills such as opening fire breaks and burning into the wind. Training in these skills then supports environmentally friendly behaviors.

4. *EE&C techniques work well in involving multiple stakeholders—organizations, agencies or individuals.*

For example, urban waste collection involves several stakeholders: waste generators, waste handlers, waste disposers, neighborhood associations, government technicians, elected local and central government officials, and residents. The solution to waste-collection problems needs to involve all these actors. Residents, for example, need to recycle, to reduce the amount of waste transported from the neighborhoods to the landfill. Neighborhood associations need to promote recycling and help households transport their waste to a central collection point. This may require hiring waste collectors and charging for services provided to house-

holds. Drivers of municipal garbage trucks need to keep good records for their vehicles in order to prevent vehicle breakdown and avoid service disruption. Elected municipal officials need to obtain funds to increase staff assigned to waste collection. Identifying behaviors of each stakeholder helps to define action plans and distribute responsibilities accordingly.

WHAT IS A BEHAVIOR?

Behavior is what people do. People perform a host of environmentally appropriate and inappropriate behaviors everyday.

GreenCOM defines behavior as a single, observable action performed by an individual. Although the behavior may be performed by habit, it could also be the outcome of a conscious decision. *Behaviors* are distinguished from *practices*, which are a series of related behaviors. For example, recycling solid waste is an environmental practice that can be broken down into many, separate, observable, and measurable behaviors:

- ◆ Separating glass, cans, paper and organic material into different containers
- ◆ Cleaning, tying or preparing recyclables for pick-up
- ◆ Storing recyclables in appropriate containers prior to pick-up
- ◆ Putting recyclables on the curb on appropriate days for pick-up

Correct agro-chemical use is another environmental *practice*, made of separate, observable, measurable *behaviors*. Behaviors associated with the use of Pesticide X may include:

- ◆ Storing Pesticide X out of the reach of children and animals
- ◆ Using the correct amount of water to mix the pesticide
- ◆ Wearing shoes that cover the foot while mixing pesticide
- ◆ Wearing shoes that cover the foot while applying pesticide
- ◆ Applying Pesticide X only when there is no wind

When defining a behavior, Ajzen and Fishbein (1980) have suggested that behaviors have four distinct elements: action, target, context and time.

The *action element* is the easiest to understand because actions are associated with verbs. In the previous list concerning pesticides, the actions were *store*, *use*, *wear*, and *apply*. In another example regarding a project to restrict beach use in a protected area during turtle nesting season, *patrolling* the beach in a wildlife refuge to prevent poaching is different from *reporting* violators of beach boundaries. Both behaviors relate to protected area management, but they are different behaviors.

The *target element* of behavior refers to the person or group affected by the action. Continuing with the beach protected area example: reporting cousins, grandfathers, or daughters is different from reporting unrelated violators. When the target changes, so does the behavior.

With respect to *context*, reporting violators of beach boundaries to the police is different from reporting them to a village oversight committee. Context refers to how the action is done.

The *time element* of behavior implies that patrolling the beach during the night or on weekends is a different behavior from patrolling the beach during the day or workdays.

These four elements of behavior may be helpful in specifying the behaviors that should be targeted in an education or communication project. For example, turtle-egg poachers may engage in a number of poaching behaviors that are relatively different from each other and may require vastly different messages or techniques to alter. Consider the following:

- ◆ Poachers extract eggs from a beach in a protected area
- ◆ Poachers extract eggs from an unprotected beach
- ◆ Poachers extract eggs from sections of a beach where eggs are likely to be eaten by natural predators
- ◆ Poachers extract eggs from a beach likely to be eroded away
- ◆ Poachers extract eggs from a beach regularly trampled by cattle

◆ Poachers take eggs laid during an *arrivada**

Each one of these behaviors may have different environmental impacts, different rationales, and different predictors.

Defining specific behaviors is the crucial first step for planning an education or communication program. Without specific behaviors, a message campaign on conserving fuelwood would easily become mired in confusion and excuses for both the message recipient and the campaign planner. “Who should conserve fuelwood?” someone might think. “Certainly I’m not the problem, since I only boil water in the morning.” “Should the campaign focus on the type of stove?” a planner will wonder. “Why doesn’t information about tree growth rates translate into fuel conservation?” foresters will ask. A specific behavior helps focus the activity on the audience and the context for the behavior.

On the other hand, environmental issues are associated with so many specific behaviors that it may be helpful to group them into categories and seek common or underlying behaviors that could form the focus of an educational or communication program.

ENVIRONMENTALLY FRIENDLY AND UNFRIENDLY BEHAVIORS

Education and communication programs may develop different strategies for helping people begin or strengthen environmentally friendly behaviors, or stop environmentally unfriendly behaviors. Each strategy may require a different set of motivators, depending upon the context. The examples of recycling behaviors discussed earlier are illustrations of environmentally friendly behaviors, while egg poaching is an environmentally unfriendly behavior.

Pollution, illegal logging, illegal fishing, and destructive farming methods are only a few of the common problems confronted by environmentalists

*“*Arrivada*” is a term used in Central America for massive arrivals of nesting sea turtles to select beaches. These events occur from July to January. Olive ridley sea turtles are one of the few species that nest in this manner.

and environmental educators. Unfortunately, these unfriendly behaviors often have short-term economic and political payoffs that encourage people to continue. Indeed, people don't do things without a reason. Additional measures may be necessary to stop or change them, such as legislation and enforcement. Most evidence shows that enforcement is much easier if accompanied by an appropriate education campaign to explain the need for the new legislation.

A thorough needs assessment can determine whether EE&C strategies should focus on environmentally unfriendly behaviors, and can suggest strategies to support the transition from damaging to friendly behaviors. Usually a satisfactory alternative must be offered to provide the target audience with the food or finances they obtain. Offers of opportunities to experiment with new techniques for growing food or preventing pollution may generate an outpouring of creative problem solving.

CRITERIA FOR SELECTING FEASIBLE BEHAVIORS

EE&C programs can seek to address an enormous number of specific behaviors. Not only could this be time-consuming and inefficient, but also some behaviors may be better suited to intervention than others. GreenCOM has developed a set of criteria to help select and prioritize "feasible" behaviors to include in EE&C interventions. This scale has been adapted from the health field (Graeff, Elder and Booth, 1993; Green, Kreuter, Deeds and Partridge, 1980) and is supplemented by the work of Ray DeYoung in the field of conservation behavior (1993). More guidelines for defining these target behaviors can be found in Chapter 7.

Potential for Impact on the Problem

Prior to launching an EE&C intervention, ask yourself whether the behaviors to be promoted make sense technically. For example, for farmers to make a living in arid areas, appropriate irrigation practices are crucial. Although night irrigation is

often suggested as a solution, studies from some desert countries show that irrigating at night may not save as much water as other, more feasible options. So, selecting the behaviors that make technical sense is important. It is difficult to rebuild credibility if the previous campaign was technically incorrect.

Sometimes, a group of technicians may not agree on the "best" behavior or environmental solution. In these cases, you need to field test solutions in relevant and appropriate settings. Water conservation techniques in the United States may not conserve water in Jordan, because water pressure may be reduced, or other elements in the system are different. Evidence from field trials is essential to decide on appropriate behaviors.

Exploring solutions from the technical perspective also implies that every relevant arena should be considered. Most environmental issues are connected to other problems; so one particular solution may create more problems. Before choosing a behavior, determine if that behavior might have negative consequences in other areas. For example, in El Salvador a behavior that environmentalists considered appropriate was "heating the family's food only once a day." This practice would limit the amount of firewood consumed and reduce deforestation. However, reheating children's food immediately before consumption is necessary to reduce the contamination that causes infant diarrhea. Although once-a-day-cooking would have a positive impact on deforestation, this behavior could have a devastating effect on infant health.

Immediate and Obvious Consequences for Behaviors

Behaviors that have immediate positive consequences or bring tangible benefits are likely to be adopted more easily than those that generate distant benefits. For example, families who conserve water may perceive the immediate consequence of a lower water bill. It would be more difficult for families with their own well to perceive the effects of water conservation at the end of the month. By

the same token, supporting fish hatcheries that stock fish for sportfishing is an easier behavior for fishermen than supporting legislation that improves fish habitat.

Similarly, while environmentally unfriendly behaviors may be stopped if appropriate sanctions are defined, made public, and enforced; it may be easier and more effective to substitute an environmentally friendly behavior than to completely eradicate an unfriendly one.

People like to get quick feedback from their behavior. Programs that seek changes for long-term, far-away, tenuous benefits (e.g., reducing automobile use to prevent global climate change) are less successful than programs that provide economic or health benefits within a year. Consider choosing behaviors that offer feedback mechanisms, or designing proxies for feedback that will encourage a similar behavior (e.g., car exhaust testing to curb air pollution).

Compatibility With Cultural Norms or Current Practices

Behaviors proposed also need to make socio-cultural sense. For example, in many cultures, high consumption of electricity and water is an acceptable social norm, especially among the middle and upper classes. People feel that they have worked hard to obtain their income and deserve to consume all the resources they can afford. They may construe conserving electricity and water as incompatible with their socio-cultural norms.

Cost: Time, Money, and Effort

Avoid behaviors that are costly for target audiences. Cost may be measured in terms of time, money, and effort.

Recycling, for example, could have a high cost in terms of time—sorting, storing, bagging and disposing of waste. In this case, other ways for reducing the time demands need to be identified.

The behaviors chosen also need to make financial sense. For example, residents may refuse to

recycle waste if the municipal program requires them to forego the income they would have received by selling materials to scavengers. Consequently, organizing a recycling program with scavengers (an existing recycling program of sorts) may be more acceptable than organizing one with municipal waste collectors. Either way, recycling happens, but the scavenger approach is more attractive to the public and therefore gets more cooperation.

Complexity: Keep it Simple

Proposed behaviors need to be simple. Participants may need to break them into elements or steps to learn or practice the skills one at a time. For example, many of the behaviors required for sustainable agriculture, such as contour farming, live fences, composting, and crop rotation, are much more complex than those performed with slash-and-burn agriculture. Adopting these new practices will require a significant commitment by traditional farmers.

Generality: One Thing Leads to Another

Often, one behavior change will lead to another. It may be easy for people to generalize from conserving water in the household garden to conserving bath water. However, it is not generally accepted that people generalize from one *issue* to another (successfully conserving energy doesn't lead to reducing waste). Whether one behavior leads to another depends on which behaviors are chosen, and how behavior change information is presented.

Durability

Some behaviors “stick” better than others. If an education or communication campaign succeeds in changing a certain behavior, one would hope that it is durable to the extent that, even after the program is over, people will continue to perform the behavior. Clearly, durability is also a function of changes in the community, the environment, the

communication message, the feedback system, and in a variety of other dimensions. Encouraging these supportive changes is the mark of a successful, durable, program.

Individual Versus Group Behaviors

Individuals can perform some environmental behaviors in the privacy of their homes, such as installing faucet flow restrictors to conserve water, or insulating their home to conserve energy. A program to introduce and support these behaviors would be aimed at homeowners; and appropriate feedback mechanisms could be directed at them.

Other environmental conditions require that a *group* of people perform a behavior in order to see real change, such as clean-up of a waterway, consumer boycotts, or an awareness parade. A program to stimulate group behavior would be designed differently from one aimed at individual behavior, with appropriate feedback to reflect the group effect.

INVOLVEMENT OF STAKEHOLDERS IN THE SELECTION OF TARGET BEHAVIORS

Because behaviors targeted through an EE&C intervention should be not only technically sound but also socially, culturally and economically viable, the stakeholders—the beneficiaries of those interventions—need to be involved in selecting those behaviors. They can be asked about the extent to which technically appropriate behaviors can be adopted. They can also be observed and

then asked to explain why they perform some behaviors and not others. Or, they can help decide in group discussion with other stakeholders (e.g., technicians), which behaviors are appropriate for an EE&C program to target.

CONTRASTING BETWEEN PERFORMERS AND NONPERFORMERS

This is where we started, with two women, one a recycler, the other not a recycler. Barriers and enabling factors influence the adoption of behaviors. These determinants may be either external or internal to the individuals, and are easier to identify when comparing information from individuals performing the targeted behaviors to those who do not.

Individuals performing these behaviors may be at different stages along a behavior performance continuum. Prochaska and DiClemente (1983) have suggested that there may be five such stages: Pre-contemplation, contemplation, action, maintenance, and advocacy (see Table 2.1).

Individuals at any stage may be motivated to move to the next stage by a message unique to that stage. Thus, a message to insure maintenance behavior will be different from a message designed to promote contemplation. Rather than appealing to the experimental nature of trying something new, maintenance messages should strengthen existing positive consequences by eliminating or changing negative consequences or by reminding individuals of important information that reinforces their behavior (Graeff, Elder, and Booth, 1993).

Table 2.1 Stages of Behavior Performance

Name of the Stage	Description
Pre-contemplation	Not considering or not knowing about an environmentally friendly behavior, or actually engaging in an environmentally unfriendly behavior such as dynamite fishing.
Contemplation	Beginning to think about adopting to changing to an environmentally friendly behavior.
Action	Trying out an environmentally friendly behavior.
Maintenance	Making the adopted environmentally friendly behavior a customary practice.
Advocacy	Multiplying the behavior by encouraging others to do the same.

What real barriers stand in the way of people adopting this new behavior? These are external determinants.

Not only do individuals move along a continuum of awareness and willingness to perform a behavior, but so do populations (Muth and Hendee, 1980). As more people shift from contemplation to action, for example, it becomes easier for others to move because the social norm changes toward accepting the behavior.

MAKING IT POSSIBLE BY MAKING IT EASY: REDUCING BARRIERS

When social marketers take on a communication challenge, they often first consider the context of the behavior. What real barriers stand in the way of people adopting this new behavior? (First and foremost, the behavior must be *possible*.) These are *external determinants*—factors that affect performance of the behavior that are external to the individual. If recycling is not available in the municipality, it does little good to promote recycling behaviors. In comparing recyclers to others, some external determinants might be more obvious: Do recyclers live closer to the recycling center? Do they have a higher income, fewer children, or a flexible schedule that allows them to run errands when the center is open? Thus, all the elements that come into play when the behavior is performed are potential opportunities for the social marketer to alter.

A message could emphasize that the recycling center now stays open longer, or that new containers make storage of sorted recyclables easier. If time and convenience are the major barriers to recycling, the communicator might advocate a message that changes the perception of these determinants, such as, “it’s not so hard; kids do it.”

Clearly, the initial research to understand the audience and their context would need to cover questions that reveal their perception of barriers, the reality of barriers, and the incentives that motivate people (Kotler and Roberto, 1989).

Knowledge and Information

A common myth is that people don’t behave appropriately because they don’t know better, and

therefore information is the cure for changing behavior. If you give people the facts that excess garbage can pollute groundwater, that rapid deforestation increases soil erosion, or that fishing with dynamite destroys coral reefs, they will correct their environmentally destructive behaviors. Clinging to this myth actually limits our efforts to change behaviors or provide the skills needed to perform the appropriate behavior. Providing information must be just part of a larger strategy.

Obviously, information is necessary, though not sufficient. A study in Ann Arbor, Michigan comparing recyclers to non-recyclers revealed that both groups were equally knowledgeable about the status of the local landfill, both cared about their garbage and their future quality of life, yet the non-recyclers were stumped by the procedural details of the recycling process (De Young, 1988–1989). They weren’t sure how to package their newspapers or whether to take the labels off the tin cans. Information was the key to converting them to recycling behavior, but it was only the procedural information, spelling out the skills involved each step of the way. Some people define this type of knowledge as building the skills required to perform the behavior.

Similarly, a complicated recycling pickup schedule in the Municipality of Quito, Ecuador was found to affect compliance. A different type of waste was collected every day: organic kitchen waste on Mondays, Wednesdays and Fridays; recyclable paper, cans, and glass were collected on Tuesdays; and bathroom waste was collected on Thursdays. Neighborhood residents who could not articulate the schedule could not follow it, either. Some residents found the rules for recycling plastic so difficult that they did not recycle plastic at all.

Knowledge of the *consequences* of action or inaction is another type of information that could be a separate determinant and is often closely aligned with attitudes about the future.

Information can be conveyed in the form of prompts, reminding people to turn off the lights as they leave a room or to fill their gas tank after sunset on high-ozone days (Stern and Oskamp, 1987).

Humans are social organisms. We live in communities. We identify with groups. And we care about what other people think.

Prompts tend to be helpful only if well worded and well placed. Their reliability declines as they lose novelty and the new behavior tends to revert to the old behavior once the prompt is removed (DeYoung, 1993).

Confidence and Perceptions of Self Competency

Bandura (1977) defines perceived self-efficacy as the judgements that one may have about one's capabilities "to organize and execute courses of action required to attain designated types of performances." He is simply talking about people's confidence to act. He adds that people who perceive themselves as highly efficacious will act, think and feel differently from those who do not. According to this theory, perceptions of self-efficacy to successfully execute a desired behavior, as well as the positive and negative outcome expectancies of that behavior, are the key determinants of behavior and, consequently, the keys to behavior change.

Mastery of a skill by observation will lead to a perception of self-efficacy. A person seeing similar people successfully perform a given behavior may believe that he or she can also do that, thus enhancing a perception of self-efficacy. Verbal persuasion can be used to make people believe that they possess capabilities that will allow them to achieve certain objectives.

Mastery of a skill by practice is the most influential source of self-efficacy information. So, opportunities that permit skill enhancement through guided practice and corrective feedback are the mark of effective behavior-change programs. Depending on the behaviors targeted by an EE&C intervention, the promotion of environmentally friendly behaviors may require the development and/or the enhancement of appropriate skills. Farmers may not use agro-chemicals appropriately because they lack appropriate skills to do so. Mastery of skills associated with appropriate agro-chemical use will lead to perceptions of self-efficacy, which in turn will help farmers perform

new behaviors. Self-efficacy may generalize to other situations, particularly those that are most similar to the one where self-efficacy was enhanced (Bandura, 1986).

Perceptions About Outcomes

According to Ajzen and Fishbein's Theory of Reasoned Action (1980), an important determinant of behavior is *attitudes*, and attitudes are a function of a *person's salient beliefs about the consequences of a behavior* and the person's evaluation of those consequences. Salient beliefs are top-of-the-mind beliefs about those consequences. The more one believes that performing the behavior will lead to positive consequences the more favorable the person's attitude. Conversely, the more a person believes that performing a behavior will lead to negative consequences (or prevent positive consequences), the more negative the attitude. Individuals will perform behaviors about which they have positive attitudes and avoid those about which they have negative attitudes.

Examples of positive consequences of a behavior include: obtaining fuel wood for cooking meals for the family, obtaining medicinal plants from a forest to cure a family member who is ill, participating in a recycling program to set a good example for the children. Examples of negative consequences of a behavior include: having to pay a fine for disposing of garbage in an illegal dumpsite or having to face social criticism from important others because of reporting relatives whom have violated a fish sanctuary.

Social Pressures

Humans are social organisms. We live in communities. We identify with groups. And we care about what other people think. In some important ways, each of us wants to belong to a group. In some other important ways, each of us may be willing, at certain times in our lives, to step away from the group and do something different. The tension between fitting in and being unique is hard to pre-

dict and will vary from individual to individual. Nevertheless, this continuum represents an important set of determinants of behavior.

Since humans care about what others think, EE&C programs can be designed to use the power of social pressure to help change behaviors. The act of making a commitment, such as signing a pledge, has been shown to be an effective strategy to call upon this type of human response to the perceptions of others. Participants are quite likely to make their word good and continue the changed behavior (Katzev, 1986; Stern and Aronson, 1984).

Education and communication programs can use social norms to their advantage. When a mayor offers to personally congratulate the apartment dwellers that achieved the greatest reduction in their energy usage, residents take pride and other citizens take notice. When movie stars promote certain eating habits, their fans might join them (Monroe and DeYoung, 1994).

SUMMARY

Human behavior is a key element that both contributes to, and helps resolve, environmental problems. Building a behavioral element into EE&C programs requires that programmers work closely with the people involved to choose the appropriate behaviors on which to focus.

A variety of determinants help create and support behavior, so a vast collection of motivators and messages may be available to inform and change behavior. Experience in both health and conservation behaviors indicates that simple, individual behaviors (turn off lights, recycle newspapers) that result in direct and immediate consequences (reduced electricity bills, reduced garbage costs) are the easiest to change. Complex, group-based, long-term behaviors are harder to change. Yet our environmental problems require that we continue to teach and support environmentally

appropriate behaviors that may not have immediate rewards. The degree to which EE&C programs can use the whole range of motivators and generate their own feedback systems will be a key to success in changing behavior.

In this way, we can reinforce the woman who recycles, and understand how to motivate the other woman to become a recycler too.

References

- Ajzen, I. and M. Fishbein. (1980.) *Understanding Attitudes and Predicting Social Behavior*. Englewood Cliffs, NJ: Prentice Hall, Inc.
- Bandura, A. (1977.) *Social Learning Theory*. Englewood Cliffs, NJ: Prentice Hall, Inc.
- Bandura, A. (1986.) *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, NJ: Prentice Hall, Inc.
- DeYoung, R. (1988–1989.) “Exploring the difference between recyclers and non-recyclers: The role of information.” *Journal of Environmental Systems*. 18: 341–351.
- DeYoung, R. (1993.) “Changing Behavior and Making it Stick: The conceptualization and management of conservation behavior.” *Environment and Behavior*. 25(4): 484–505.
- Graeff, J., J.P. Elder, and E.M. Booth. (1993.) *Communication for Health and Behavior Change*. San Francisco, CA: Jossey Bass.
- Green, L., M.W. Kreuter, S.G. Deeds, and K.B. Partridge. (1980.) *Health Education Planning: A Diagnostic Approach*. (2nd ed.). Mountain View, CA: Mayfield.
- Katzev, R.D. (1986.) “The impact of commitment in promoting consumer energy conservation,” in E. Monnier, G. Gaskell, P. Ester, B. Joerges, B. Lapillonne, C. Midden, and L. Puisieux (Eds.) *Consumer behavior and energy policy: An international perspective*. New York: Praeger.
- Kotler, P. and E. L. Roberto. (1989.) *Social marketing: Strategies for changing public behavior*. New York: The Free Press.
- Monroe, M.C. and R. DeYoung. (1994.) “The Role of Interest in Environmental Information: A New Agenda,” *Children's Environments*. 11(3): 243–250.
- Muth, Robert M. and John C. Hendee. (1980.) “Technology Transfer and Human Behavior,” *Journal of Forestry*, pp. 141–144.
- Prochaska, J.O. and DiClemente, C.C. (1983.) “Stages and process of self-change of smoking: Toward an integrative model of change,” *Journal of Consulting and Clinical Psychology*. 51. 390–95.
- Stern, P.C. and E. Aronson, Eds. (1984.) *Energy Use: The Human Dimension*. New York: Freeman.
- Stern, P.C. and S. Oskamp (1987.) “Managing Scarce Environmental Resources,” in D. Stokols and I. Altman (Eds.), *Handbook of Environmental Psychology*. New York: Wiley.

Chapter 3

Participation

Mona Grieser

The past ten years have seen a sea change in philosophy regarding international development projects in general, and education and communication projects in particular.

The new approach, inspired in part by recent behavioral research, prominently features the word “participatory.” Whether called “participatory development,” “participatory learning approach,” “participatory monitoring and evaluation,” or “participatory rural appraisal,” the new methods proceed from the premise that people have a right to be part of decisions that affect their lives. The methods are guided by the observation that local stakeholders know better than anyone else what their problems are and what solutions might work. Behavioral research also shows that when people commit to a course of action that is their idea, the results are more likely to succeed and continue than when ideas are imposed from the outside, or delivered within a top-down structure.

A participatory project aims to involve as many local stakeholders as possible in the process of formulating, designing, implementing and evaluating programs in the hope of making development self-directing, fair, and self-sustaining. In addition, participation aims to erase the feelings of inferiority that stakeholders from developing countries have often experienced in relation to their counterparts in developed countries.

In the process, the development worker sheds his or her status of “expert” and becomes instead a listener and facilitator dedicated to helping stakeholders solve their own problems. “Who’s participating in whose project?” the participatory facilitator may ask. And she answers: “The outsider is actually participating in the clients’ project.” Sim-

ple as the wording may seem, it represents a radical change of perspective.

Participatory development assumes that a diverse group of stakeholders brings sufficient wisdom—technical, social, and political—to produce a sound project. Further, it assumes that a given solution, if not technically superior to an expert’s solution—will benefit from the commitment of the community and will actually be enacted.

The process of participation can benefit projects in health and infrastructure as well as environmental education. GreenCOM’s experiences are each unique, but the lessons learned could be applied by communication and development professionals operating anywhere.

WHAT IS PARTICIPATION IN AN EE&C PROJECT?

Examples from the GreenCOM experience demonstrate the variety of participation in environmental education and communication projects. Each project brings together key actors and representatives of key publics to research, design, implement, and/or evaluate an intervention. Each uncovers important facts, assumptions, and trends through working with diverse groups of people in an atmosphere of respect and discovery—and comes up with solutions that no outside “expert” would likely have found.

- ◆ In Jordan, a participatory GreenCOM workshop brought together representatives of stakeholders in a school system to develop an environmental education curriculum for school clubs. Teachers, students, administrators, NGO environmental education staff, scientists,

Participatory development assumes that a diverse group of stakeholders brings sufficient wisdom—technical, social, and political—to produce a sound project.

donor representatives, curriculum development professionals, gender specialists and communication professionals all met for two weeks to design a water awareness curriculum. GreenCOM helped NGO staff with the preliminary formative research and later trained them to analyze it, but the NGO performed the actual research and analysis (see Chapter 15).

- ◆ GreenCOM/Egypt addressed the problem that villagers were having with decreased waterflow in irrigation canals. The project used video cameras to help people tell their story to government decision-makers. These functionaries are often so far removed from the field and so buffered from local reality by the reports of their own (often biased) field staff that they are unaware of the real problems and issues affecting the final client, the farmer. The video camera allowed the farmer, and most importantly, the women of the community, to speak “directly” to the Minister and his staff. The video was used to effect institutional change in the irrigation Ministry and make it more client-centered.
- ◆ GreenCOM/Nepal sponsored a participatory video workshop in which members of community forest user groups (CFUGs) prepared a community video letter to present their concerns on forest issues to top-level government officials. After the viewing, the government officials provided feedback to the community members, addressing some of their concerns. The gender-balanced group represented castes and ethnic groups who rarely speak together. Using some of the tools outlined below—plus story telling and informal walks in the forest to significant places—the group developed enough trust and openness to come up with their own messages. After some video training, they articulated these with clarity and forcefulness (see Chapter 12).
- ◆ In Fez, Morocco, GreenCOM worked with the municipality of Zouagha to re-engineer the system for collecting solid waste. Green-

COM brought to the same room all possible stakeholders, including such disparate players as the mayor, neighborhood residents, the local member of Parliament, municipal staff including truck drivers, sanitation engineers, health professionals, representatives of community groups, solid waste experts, the directors of the solid waste program, the person responsible for hiring personnel for the municipality, staff of the maintenance depot of the trucks, and GreenCOM technical personnel.

During the two-week activity, the group researched the solid waste system as well as the social structure of the community, analyzed that knowledge and came up with solutions that, while perhaps not technically ideal, represented the greatest consensus possible. Because of the evident transparency of the activity, everyone concerned felt that a milestone in cooperation and understanding had been achieved.

These four examples of GreenCOM activities have much in common. They exemplify the philosophy of participatory development clearly—a philosophy in keeping with the democratic spirit of the age. The activities also build local capacity so that agencies as well as individuals are better able to take charge of their future.

PARTICIPATORY APPROACHES

Generally participation begins with courtesy calls to local leaders and discussions leading to a consensus that there are problems of concern to the community, and that examining their causes could be beneficial to all.

The next step depends on the degree to which one is committed to participation. Pioneers of the participatory approach insist that the development professional step into the shoes of the villager or whoever is experiencing the problem. If this means that a day or a week is spent fetching wood, carrying water, building a local house, repairing a local road—then that is precisely what the development professional must do. This exercise shows the villager that the

Women interviewers solicited women's views, and when they were presented, it was clear to all that women's knowledge filled in many gaps in the record.

“expert” is imperfect, and that the villager, too, has expertise that he can teach to the technical specialist. This helps the two meet as equals.

Living the village life also shows the technical specialist just how difficult that life is, and that suggestions for improvement need to be tempered with humility. GreenCOM has used exercises in workshops that simulate this activity and show all the concerned parties that each person's knowledge and opinion is valuable.

LEVELING THE FIELD

Participatory exercises are relatively simple but require patience and skilled facilitation. In the Fez case, GreenCOM used team-building exercises and ice-breakers to raise the comfort level of participants, ensure everyone's participation, and guide participants to recognize the validity of the points of view of others in the room, despite differences in role and social status. For instance, while the room was originally set up with the government officials seated on a raised dais, the facilitators brought everyone down to one level, literally, and reinforced cross-role communication by dividing people into discussion groups randomly.

To prohibit prominent participants from dominating the discussion, ground rules included not allowing anyone to speak a second time until everyone had spoken once.

While the men at the meeting forbade the presence of neighborhood women, workshop organizers saw to it that women's voices were included. Women interviewers solicited women's views, and when they were presented, it was clear to all that women's knowledge filled in many gaps in the record. The information from women was thus used as an object lesson showing the improved performance that results from inclusion.

Many participatory techniques emphasize visual methods for drawing people out and promoting discussion. Rather than individual sources of information, such as surveys, they focus on group activities that generate shared visual representations such as maps of forest boundaries; charts ranking

social and economic status within a community; maps of irrigation, time-lines of land-use, and so forth. The tools do not depend on literacy. Each tool looks at information in a different way. Use of multiple tools provides a way to cross check data.

PARTICIPATORY ENVIRONMENTAL RESEARCH METHODS

In addition to facilitated discussions, many tools exist to help groups obtain information, analyze it, and make decisions. The following examples will pertain to a sub-objective of improving or building irrigation canals to increase agricultural output.

Mapping

By walking through the territory and performing a group map-making exercise, participants can contribute and gather a great deal of information about possibilities, trade-offs, and concerns. Maps show the relationships between various systems, natural and man-made and illustrate potential problems and alternative solutions. Mapping is often the first participatory exercise in a project. In this non-confrontational and collective experience, women and other marginalized members of society may feel freer to express preferences and ideas.

A map for discussion of irrigation might include:

- ◆ Natural resources (rivers, forests, streams, meadows, mountains)
- ◆ Existing infrastructure (roads, railways, electrical lines, sewage, water pipes, garbage sites)
- ◆ Existing system of canals noting which require repair, upgrading or maintenance
- ◆ Water sources from which irrigation canals would be filled
- ◆ Location of new canals
- ◆ Locations of human habitations (houses, towns or villages)
- ◆ Location of solid waste disposal sites (traditional or formal)
- ◆ Location of fallow land and land not currently under agriculture that might be used for expansion

- ◆ Traditional (ancient) water catchment basins and canals
- ◆ Where aquifers flow below ground and where water is surface water
- ◆ Cattle/sheep pasture land
- ◆ Where women obtain domestic water.

The following comments on mapping come from the final report of the Nepal video letter project:

*The production of the map was definitely a collective endeavor: boundaries and river markers were discussed, erased and drawn again; each member brought an object to mark his/her house; groups went off to collect red mud for drawing. When the map was complete, the specialized representation triggered in nearly every participants mind a different issue as they could situate their own homes and daily concerns within a larger... context. Many commented that they were amazed by how many issues they were able to pin down all at once by making and then consulting...the map. They also found this exercise to be more fun than simply talking or walking, and their interactions with one another become more direct.**

Transect Maps

The transect shows the topography of the land in relation to land usage. It shows where ecological sub-zones might require greater care and attention, where soil loss may be greatest and where gravity flow irrigation will and will not work. A transect map for irrigation could indicate:

- ◆ Hills and mountain areas
- ◆ Streams and drainage
- ◆ Gradient and timber line (if appropriate)
- ◆ Crop production in the various zones
- ◆ Other land uses (e.g. dwellings or human habitation, dams).

*Nepal: Environmental Education and Communication—Environment and Forest Enterprise Activity (EFEA), GreenCOM Final Report, November 1998.

Seasonal Calendars

When it comes to irrigation, seasonality is particularly important. A group exercise might yield, for example:

- ◆ Data on cropping patterns by season
- ◆ Times of maximum use and availability of water
- ◆ Times of minimum use and availability of water
- ◆ Tasks of men, tasks of women
- ◆ Data on planting and harvesting.

Time-Line/Historical Profiles

Historical profiles in irrigation can help a community better understand its own use of water. The time periods can be vast, as in a comparison of Roman irrigation and agricultural methods with contemporary methods. Or a time line could cover a generation, marking important episodes recalled by the community. A time line might note, for example,

- ◆ Major migration patterns in and out of the village
- ◆ Years of flood, drought, epidemics
- ◆ Deaths of leading figures
- ◆ Harvest celebrations or other celebrations and festivals; religious holidays
- ◆ Completion of construction of major monuments such as the village mosque or community center
- ◆ War or other conflicts.

Trend Lines

It is important that the community understand trends that affect their resources. Such trends range from changes in rainfall to shifts in market opportunities. Economic and social differences can be highlighted, for instance if rich farmers feel that productivity has been constant, but poor farmers do not. Trends are represented as graphs or visual charts after plotting the amounts over several years. Research on irrigation might spotlight trends over time in such areas as:

Ranking is a simple way of asking a community to limit its choices to those things that are the most important to all of them.

- ◆ Crop production
- ◆ Soil loss and fertility
- ◆ Rainfall
- ◆ Land cover
- ◆ Forest loss or reforestation
- ◆ Population
- ◆ Employment, for men and for women.

Matrices

Matrices can be used to explore any subject. For example a *historical* matrix for irrigation might be a chart indicating the following items at three points in time: before, during, and after a war:

- ◆ Land under irrigation
- ◆ Size of land holdings and ownership
- ◆ Kind of crops under cultivation
- ◆ Amount of cultivated land
- ◆ Amount of fallow land.

A *classification* matrix might show natural resource use by category of individual over the past year. The vertical axis could indicate land use (food or cash crop production, sheep or cattle ranching, natural forest, wood lots), while the horizontal axis represents categories of individuals (women, men, youth, adults, poor, rich) who use that land.

A *conflict* matrix looks at the various users of the resource and tries to indicate where conflict may have arisen in the past year or two years. In irrigation, possible causes of dispute might be where water is used by the person at the head of the canal leaving little for those at the tail. It could be about landowners who do not maintain the portion of the canal that crosses their land, thus limiting the flow of water to others below them. It can be caused by one village maintaining ownership of the water and limiting its use by other villages in time of drought. Again each box records the actual frequency of such conflicts so that they can be prioritized.

Pie Charts

Pie charts are a simple way of visualizing information and can show, for example, the proportion of a farm family's time spent in planting, or time spent

irrigating. A pie chart could dramatically show the proportions of women's and men's labor involved in irrigation or obtaining household water.

Ranking

Ranking is a way of classifying information and prioritizing sensitive information and is often used to initiate an activity prior to using another participatory tool. For example, when studying the proportion of land ownership by rich people and poor people, it may be necessary to do an exercise with a pie chart to determine who is rich and who is poor in a village. The criteria for determining wealth should be determined by the community itself and is often an occasion for dynamic debate. Sometimes ownership of material things (a bicycle, a car, a tractor, sheep, cattle, etc.) is counted to measure wealth. Sometimes ownership of land is counted. Whatever the criteria, it should be decided by the community. Ranking is a simple way of asking a community to limit its choices to those things that are the most important to all of them.

CONTINUING THE PROCESS

Creating maps, time-lines, trend-lines, and seasonal charts—these help a community collect and sort relevant information, and prioritize it. Once sufficient information is generated, it is orally and publicly analyzed, and solutions are proposed. For implementation, participation implies self-directed development and communities are expected to exhaust their own resources in terms of manpower, money and materials, before asking for external assistance.

POTENTIAL PITFALLS

Western-trained experts look at development through a particular mental model and ask the questions dictated by that model. Other people's mental models are shaped by their own training and experience, which is why it is important that

Western-trained experts look at development through a particular mental model and ask the questions dictated by that model.

the research questions that lead to the design of a project or program be framed by the local community and not by the development expert. No matter how skilled the experts, they cannot presume to stand in the shoes of the client.

To the extent that s/he asks for particular information, the technical specialist still controls the development agenda. This control may satisfy donor concerns for accountability, but it continues to skew the process of development.

Another pitfall is that, in reality, participation is extremely difficult to get—and will never approach

100 percent. Development specialists will do well, though, to try to include at least representatives of the most concerned groups.

Finally, participation may not always be the most useful route to take. Legislation and regulation can be more direct and efficient. Communication activities can then focus on compliance.

In sum, useful participation is less a matter of applying techniques, methods and approaches, than of an attitude that values the views of all who are directly affected by a project.

Chapter 4

Gender Matters

Mona Grieser and Barbara Rawlins

Everywhere in the developing world, women play crucial environmental roles: farmer, silviculturalist, gatherer and distributor of water, fuel, fodder, and traditional medicines. Women not only use natural resources; they manage and protect them as well. So women's participation in environmental project planning can make the difference between success and failure.

In the past, women often participated in environmental projects only as volunteer helpers. Planners assumed that simply working on a project would advance women's interests. In reality, since men tend to dominate decision-making in local government and community-based organizations, women's needs were ignored, and women benefited little from projects like these.

WHEN GENDER ANALYSIS IS MISSING

An example of what can happen in the absence of gender analysis comes from Madagascar. Policies there explicitly acknowledged the need to work closely with communities to maintain local interest and offset the loss of income resulting from park establishment. Buffer zone strategies would provide alternative employment for communities. But no gender research guided the development of the program.

Madagascar officials hired men as salaried guards or foresters in the park or the newly created Association of Tourist Guides. When men became salaried employees, they passed the work on their family agricultural plots to women, adding to the women's burden. Program planners asked few questions about where women would get fuel and water once tradi-

tional sources in the park became off-limits, or about how much more time it would take. They failed to consider where women, often the traditional healers for the community, would obtain the herbs and medicinal products that they used to get in the forests, or whether the income from traditional medicines or forest products would disappear. They also failed to find out which tasks the women would have to neglect to carry out these additional burdens. (Often, it turned out, women had to cut their time with young children, meaning older daughters had to assume family responsibility earlier.)

This example indicates some of the gender questions that environmental education and communication (EE&C) research should ask at the beginning of the project planning or policy formulation process. Such research can bridge the gap between planners, policy makers, and stakeholders, and can help ensure a successful and equitable policy or project (see Box 4.1).

The tools of gender analysis distinguish between practical and strategic gender needs of women:

Practical gender needs are concerned with inadequacies in living conditions such as water provision, health care, and employment. Practical gender needs do not challenge the gender divisions of labor or women's subordinate position in society (Moser, 1993).

Strategic gender needs, on the other hand, relate to gender divisions of labor, power, and control and include issues like legal rights, domestic violence, equal wages, and women's control over their bodies. Meeting strategic gender needs helps women achieve greater equality by changing existing roles and challenging women's subordinate position (Moser, 1993).

The most basic precaution a researcher must take is to ensure that the methods employed, and the wording of questions, do not bias against women.

BOX 4.1

How Gender Research Can Shape Project Design

Gender analysis was integrated into all GreenCOM's programs in El Salvador. For example, one study examining the use of fuel wood by rural populations indicated that two gender-linked reasons drove the high demand for fuel wood:

While women primarily used wood for household fuel, they did so at the direction of their husbands, who expected that freshly made tortillas would always be available. The fire must be kept stoked to be able to make these tortillas. Husbands' ideas of a warm and loving atmosphere in the home included the constant presence of a lit hearth.

Based on these findings, GreenCOM worked with women to promote fuel-efficient stoves and prepared messages for men that addressed their concerns as well.

"ENGENDERING" EE&C PROGRAMS

Integrating gender concerns starts with understanding gender roles. After exploring the different spheres of men and women, we can ask vital questions about the impact and equity of a new program. By changing how people do things, will men or women be more affected? Who will get more, or less, work? Who will get more, or less, money? Who will get more, or less, power or status? Who will get any new jobs? Who will lose jobs? What in fact constitutes equity in this situation? Can the community assimilate these changes, and what will it take to ease the transition? (see Box 4.2).

Gender analysis helps us get more and better information about people's knowledge, attitudes, and behaviors. Again and again we've found that a gender component helps us design better programs

that further both environmental protection and equity. But using gender analysis in a meaningful way entails more than disaggregation of data. Gender awareness plays a part in each step of needs assessment, research, planning, implementing, and evaluation (see Box 4.3).

GENDER-SENSITIVE NEEDS ASSESSMENT

When investigating an environmental problem in a community, it is essential to solicit the views of men and women independently to assess their needs and concerns. Women often hesitate to express opinions when both sexes are present, and males tend to dominate the conversation. It is therefore advisable to interview women alone or in groups of other women using female interviewers and moderators.

Data should be collected from equal numbers of men and women (disaggregated) using gender-sensitive techniques and a mix of research methods. But the most basic precaution a researcher must take is to ensure that the methods employed, and the wording of questions, do not bias against women. Methods involving written responses tend to be biased against women, who generally have less education than men. Additionally, research conducted when women may be unavailable also excludes them.

Non-traditional research methods can expose problems that may not emerge from either quantitative (surveys) or qualitative (focus group) research. Such methods include participatory exercises, use of traditional media (dramas, songs created by women), modern technology such as videos or Polaroid cameras, etc. (see Box 4.2).

Qualitative research can contribute towards developing a quantitative survey that is gender-sensitive and better tailored to the local situation. Initial qualitative research can:

- ◆ Identify gender issues that local people think are important
- ◆ Identify the language people use to describe their opinions and concerns

BOX 4.2

Making Voices Heard: Video Communicates Women's Messages to Policymakers

In Egypt, GreenCOM used video to capture male and female farmers discussing ideas for cleaning up the local irrigation ditches (*mesqas*) and for resolving other community issues. In one village research helped define a communications intervention to encourage farmers to organize themselves to clean up *mesqas*.

Focus group discussions were held with four groups of adults responsible for making farming decisions: women under 40 years; women over 40; men under 40; and men over 40. In-depth interviews were conducted with 21 key informants, including the deputy mayor, supervisors from the cooperative, the village doctor, the Iman, the irrigation

inspector, the irrigation engineer, members of the village council, and male and female farmers. The discussions and interviews covered the largest problems facing the village, opinions about the agricultural and waste disposal systems, the amount and quality of water in the *mesqa*, social issues such as village gatherings, community actions, health care in the village, and gender issues such as women's work.

The innovative part of this research was the use of a video camera as a research tool. The resulting video was critical to developing an understanding of the attitudes, perceptions, and behavior of farmers and key informants, to identify barriers and ways to overcome them.

The video also helped determine what action the community would take regarding the maintenance and improvement of *mesqas*. Finally, the video communicated these findings to national government ministers.

For the first time, village women had a direct link to national policymakers—who listened to their concerns. What the women revealed in this film was that *mesqas* were clogged because women did not have anywhere else to put the family's garbage. This intervention helps to demonstrate both the importance of listening to women as well as the role of communications and research techniques in facilitating community action for environmental improvement.

- ◆ Assess the difficulty of discussing the environmental issue of interest with community members.

The household, in its myriad cultural forms, is generally viewed as the basic unit of social organization and often used as the unit of analysis when conducting quantitative social science research. But domestic gender relations are often characterized by an unequal distribution of power favoring males, mirroring broader gender inequities in political influence and access to resources that are structurally entrenched.

Males and females in the same household may not only have divergent environmental priorities but also separate avenues for effecting change. It

may be useful to conduct *intra-household* research, by independently interviewing at least one male and female from the same home and comparing their views, in addition to comparing men and women across households.

VARIABLES IN GENDER ANALYSIS

Studying the variables listed below may help program planners develop a better understanding of women's triple roles (productive, community management, and reproductive) and men's dual roles (productive, community management) and how these roles might affect their receptivity to, participation in, and benefits from EE&C interventions

(Pfannenschmidt and McKay, 1997). The variables are intended to help assess both women's practical and strategic gender needs (also see Box 4.3).

Variables of potential interest, depending on site-specific needs, include:

Personal Characteristics

◆ Age

- ◆ Occupation
- ◆ Education
- ◆ Marital status
- ◆ Ethnicity
- ◆ Religion
- ◆ Seniority in household
- ◆ Membership in community organizations
- ◆ Seasonal allocation of time

BOX 4.3

Engendering Data Collection

Missing Information in the Philippines

In the Philippines, a GreenCOM desktop review of five local environmental case studies demonstrated that women's subsistence strategies are driven by the family's basic need for food and the barest essentials, and that they manage their activities relative to the tasks of other members of the family. Thus, to understand women's roles one has to understand the roles played by other members of the household (Abregana, 1997).

Several information gaps were identified: there was a lack of information on women as resource managers, sources of information and channels of communication had not been adequately identified, and an intergenerational perspective was missing—particularly important in a country that puts a premium on strong family values passed on to the next generation. Patterns were emerging that showed women's entry into spheres of activities

traditionally handled by men, such as raising corn. The seasonality of fishing and farming as related to gender roles was not adequately explored either.

Gender Differences in Jordan

In Jordan, GreenCOM assisted with a school-to-home water-conservation project implemented through school-based environmental youth clubs. Jordan's sex-segregated schools were an ideal place to investigate different attitudes and behaviors between girls and boys, female and male teachers and administrators, mothers and fathers. Preliminary qualitative research showed that women sensed a greater personal responsibility for water conservation than men did—women offered more alternatives for saving water and avoiding waste. In contrast, men perceived the lack of water as a government problem, blamed the Israelis, felt entitled to as much water as they thought they needed, and evidenced little

personal responsibility for water use and abuse. In sum, water was viewed by men as a women's issue.

One way of looking at the data is to assume that if women's environmental behavior is more responsible than men's, environmental specialists should focus on women. In these particular projects, however, GreenCOM assumed that bringing men up to the women's level of responsibility would substantially reduce negative impact on the environment. Therefore, much of the curriculum content was designed to focus on the ways that men could improve water conservation in the home, such as using drip irrigation instead of a hose in the family garden; repairing leaky faucets, pipes, and storage tanks; building storage tanks for grey water; putting in simple water catchment facilities for rain runoff; washing the car with a bucket of water, not a hose; and turning off the tap while shaving.

- ◆ Environmental knowledge, attitudes, beliefs, and practices

Household Characteristics

- ◆ Hierarchy of household
- ◆ Family size
- ◆ Number and ages of children
- ◆ Social class/caste
- ◆ Gender-based division of labor (adults and children)
- ◆ Sources of income (including out-migration)
- ◆ Spending patterns
- ◆ Financial responsibilities and control
- ◆ Intra household decision-making/conflict-resolution processes
- ◆ Location (rural/urban)

Community/Societal Characteristics

- ◆ Location (rural/urban)
- ◆ Gender-based access to resources and legal framework (e.g., education, training, information, new technologies, extension services, administrative and government services, land tenure, traditional rights and official ownership laws, credit, infrastructure, markets, transportation, labor rights)
- ◆ Social institutions (relevant existing neighborhood and community groups, including membership composition and rules)

The information gathered through gender analysis enables program planners and implementors to answer the following two questions (World Bank, 1992):

What are the *constraints* to environmental action that affect men and women differently?

What are the *opportunities* for either men or women in a specific environmental area or sector?

In deference to the many false expectations created in developing countries by previous assessment activities, the purpose for gathering information from respondents should be clear from the outset so that ethical problems may be avoided.

DATA ANALYSIS CONSIDERATIONS

Gender analysis should describe similarities and differences between men and women in various subgroups within the community. It is important to recognize that women are not a homogenous group but have differing generational perspectives: the needs of teenagers are not the same as the needs of the elderly; single mothers have different needs from married women. Information on age can often provide insight into educational attainment by generation and supports arguments for better access to education for women. (There is generally a change in knowledge and attitude across the board between women under and over 26 years old, due to improved access to education.) Thus, it is vital to disaggregate information not only by sex, but also by age categories and socio-economic status. Based on results of the analysis, specific EE&C strategies may be developed for women and men.

Research findings should be shared with respondents. This can be done by drawing them into the design phase of the program.

DESIGNING AND IMPLEMENTING THE PROGRAM

Education and communication programs reaching women should consider the following key issues:

Literacy: The literacy level of women in developing countries is often much lower than that of men. Therefore materials aimed at rural women need to use minimal text and be appropriately simplified. In addition, words need to be familiar to women and culturally appropriate.

Language: Women in developing countries are often less fluent in the national language, speaking only the dialect in their area. National languages are introduced into the formal school system after third grade, by which time many girls have already dropped out.

Pictorial Convention: Women have far fewer opportunities to view printed material than men do. Consequently they are not always familiar with the conventions associated with pictorial

literacy. This includes understanding the sequence of pictures if more than one picture is on a page, being distracted by unfamiliar objects or persons, not personalizing a message if the pictures are unfamiliar, not understanding common pictorial conventions such as perspective, foreshortening, close-ups. These challenges heighten the need for pretesting materials directed to a female audience.

Context: Women are socialized from an early age to submit to peer pressure and to conform to community norms. If women are to make individual decisions, they often need the security of knowing that their peers are making similar decisions. Involving women in a group setting is more productive, from the communicator's point of view, than trying to deal with women individually. Additionally, women may need some time to come to a decision, and that may mean consulting with their husbands or families.

Timing: Timing an event or a training to best involve women and girls is crucial, since leisure time for participating in extracurricular activities is usually not available. Girls have after-school chores; women have morning and evening chores. Women have major seasonal responsibilities associated with farming or hiring out their services to reach the family's economic goals. In India, a project that looked at women's time over a period of a year found only two months in the year when women could participate in project activities. The rest of the year, their time was fully engaged.

Commitment: Communicators in EE&C will readily notice the eagerness of women to involve themselves in activities that will improve conditions for their families or their communities. Women will often assume tremendous sacrifices to assure their families a benefit. By the same token, however, if women do not perceive an immediate benefit to their families, they will not commit their time and efforts to promote a project. In natural-resources activities, the communicator has the additional problem of demonstrating to women that conservation or sustainable use will benefit their families.

PRETESTING BY GENDER

Whether the intervention is a media campaign to support a technical program, a formal curriculum for children, or an adult training course, it should be pretested in three settings: women/girl only groups; men/boy only groups; and mixed sex groups. If the needs assessment finds that audiences should be further segmented, then they should be segmented for the pretest.

MONITORING AND EVALUATION

Creating appropriate, gender-sensitive indicators of success is no easy task. Indicators must reflect the local social and cultural context within which the project operates. The time-frame within which the project is implemented and results are expected must be realistic. For example, indicators may not focus on environmental outcomes and benefits to women, but on changes in the local power structure which may help women's voices to be heard. Since many EE&C activities in both rural and urban areas focus on supporting the development and strengthening of grassroots organizations to manage resources, program evaluations should assess the involvement and role that men and women have in decision-making within these organizations. In addition, economic benefits for women can be especially difficult to measure in communities where most local income comes through barter or trade.

Three Measures of Impact

- ◆ *Head counts:* The number or percent of men and women who: participate in or are exposed to project activities, are members of local counterpart organizations, participate in training, recall communication messages, perform a specific behavior, hold positive attitudes and beliefs about a practice, etc.
- ◆ *Type of benefit:* The number or percent of men and women who joined the Board of Directors; received allocation titles, obtained salaried jobs, benefitted from alternative employment schemes, and so forth.

- ◆ *Average benefit by gender:* Differences in benefits for female-headed versus male-headed households.

Monitoring

As the project proceeds, useful questions include:

- ◆ Are all data disaggregated by sex, age, and socio-economic status?
- ◆ Were women employed and trained by the project? Did women participate equally with men and were they paid equally as men?
- ◆ Were appropriate indicators developed to measure the on-going impact of the project on men and women (short-term, medium-term, and long-term where appropriate)?
- ◆ Does the project use the extent to which women's relations with men have improved as an indicator of effectiveness?
- ◆ Are women and men treated with equivalent respect—both as participants and staff personnel?
- ◆ Are women and men segmented into different target audiences? Are there age segments within groups? Where appropriate, were gender-specific messages developed for each group and subgroup?

Impact Evaluation

Ideally, after the project has been completed, gender-sensitive indicators that were developed during the project design phase are either: 1) measured again to compare with baseline measurements taken prior to project implementation (pre-test/post-test design) or 2) are measured in the target community and a control community to assess project impact (post-test only design).

Impact evaluation questions are divided into five categories below, though not all will apply in every EE&C program.

1. Impact on Gender Equity

- ◆ Has the project increased women's involvement in decision-making within their households and community?
- ◆ Are their decisions made independently or are they serving as a proxy for their husbands?

- ◆ Has the project improved women's access to, and control over, social services, environmental resources, or infrastructural facilities? What new resources/services are available to them?
- ◆ What impact has the project had on relationships between men and women?
- ◆ Has the project increased women's ability to act collectively and organize within the community?
- ◆ Has the project had any influence on the gender-based division of labor? Has it increased or decreased the women's workload?
- ◆ Has the project improved women's status in the community or influenced social norms in any way?
- ◆ Are there direct economic benefits for women resulting from their participation, or the participation of men, in the project? Are the benefits reaped by men and women comparable?

2. Policy-Related Impact

- ◆ Has the project strengthened linkages between research findings on gender issues and the formulation of environmental policies?
- ◆ What gender-sensitive procedures and policies have been learned and adopted by local government officials?

3. Influence on Local Capacity

- ◆ Has the number of women members of participating organizations and institutions increased?
- ◆ Has their attendance/involvement increased or are they merely serving as proxies for their husbands?
- ◆ Has the number of women serving as officers in participating organizations during project implementation increased?
- ◆ Has the number of women in participating organizations and institutions who received technical or managerial training increased?

4. Changes in Environmental Knowledge, Attitudes, Beliefs and Practices

- ◆ To what extent has the project impacted environmental knowledge differently by gender?
- ◆ To what extent has the project impacted environmental attitudes differently by gender?

- ◆ To what extent has the project impacted environmental beliefs differently by gender?
- ◆ To what extent has the project impacted environmental practices differently by gender?

5. *Implications for the Environment and Livelihoods*

- ◆ Has the project enhanced men's and women's roles as environmental managers?
- ◆ What impact has this had on project participants access to natural resources and sources of income?

If a follow-up study is possible, ask:

- ◆ What are the participation rates for the project by sex, age and socio-economic group?
- ◆ Is this an improvement over baseline or control group measures?
- ◆ Is the project sustainable? Replicable?

Sometimes our best efforts to seek womens' opinions are frustrated. What if women don't come to group meetings or won't speak with an interviewer? Experience shows trust is worth the trouble of going the extra mile to seek womens' perspectives (see Box 4.4).

BEYOND PROJECTS: PROMOTING GENDER-RESPONSIVE ENVIRONMENTAL POLICY

Policymakers have long recognized that gender and environment are inextricably linked and that programs and projects should formalize that connection.

EE&C can assist in gender-sensitive policy formulation in a number of ways: by promoting and supporting policy through targeted information campaigns to policymakers, by creating an ambience in a country where a particular policy is favored, by creating feedback loops that allow the sharing of stakeholder opinions, and finally by developing fora so that all stakeholders are drawn actively into the policy formulation process.

In 1995 GreenCOM provided technical assistance to USAID/Niamey to support government-led land reform. The project recommended ways to establish a dialogue on land tenure, including a program to inform women of their rights to own land, and a communication/education program showing how women could take advantage of the opportunity being afforded them by land reform.

A country's national education policy can also play a major role in linking gender and environment. Where policies encouraging women's access and participation in formal and non-formal education exist, the programs tend to be more sustainable than where such policies do not exist. The policy can provide the framework to infuse environmental content into gender-sensitive school curricula, literacy programs, and teacher training.

"ENGENDERING" SCOPES OF WORK

NGOs working in EE&C often hire short-term consultants and collaborate with local counterpart organizations to work with communities in designing and carrying out EE&C programs. Steps must be taken to ensure that all project staff—permanent and temporary—understand the need to be gender sensitive. Beginning with GreenCOM's first project in El Salvador, for instance, every consultant hired by GreenCOM has been asked for specific gender information related to their scope of work.

References

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- Abregana, B.C. 1997. *Let the Women Speak*. The Philippines: GreenCOM Project and the Interdisciplinary Research Unit, College of Arts and Sciences, Silliman University.
 - Moser, Caroline O.N. 1993. *Gender Planning and Development: Theory, Practice and Training*. London and New York: Routledge.
 - Pfannenschmidt, S. and A. McKay. 1997. *Through a Gender Lens: Resources for Population, Health and Nutrition Projects*. Women's Studies Project, FHI. For the Gender Working Group, Population, Health and Nutrition Center, Washington, DC: USAID.
 - World Bank. 1992. *Gender Information Framework (GIF)*. Washington, DC: World Bank.

BOX 4.4

What Happens if You Can't Involve Women as You'd Like?

One of USAID's goals in Morocco includes the development of partnerships between residents and local governments to solve urban problems. A parliamentarian from Fez proposed an exercise in partnership development around the problem of waste management in two peri-urban settlements near Fez: Zouagha Haut and Zouagha Bas. Having only recently been incorporated into the urban boundaries of the city, these neighborhoods received municipal waste-collection services that residents considered woefully inadequate. Neighborhood associations were trying to solve the waste-collection problem, but were hampered by a lack of coordination with others in the community.

GreenCOM convened a participatory workshop of local stakeholders, residents, association members, and municipal government officials, to discuss and agree upon a common problem-solving strategy. The

workshop participants included a representative of the executive branch of government, the parliamentarian from Fez, elected municipal officials, technicians from the municipality and other government institutions in charge of urban problems, and representatives of the neighborhood associations.

Of the 30 participants, only two were women, an educator and a government employee. Neighborhood associations, whose membership is open only to men, objected to inviting women to the meeting at all. Therefore, female researchers were sent into the community to fill the information gaps identified in the discussions and to bring the women's point of view to the table. Male workshop participants interviewed other stakeholders not present at the workshop, such as local officials of Ministry of the Interior and waste collectors.

The research findings revealed the importance of

obtaining women's perspectives on the problem. Women said that they were paying the waste collectors, though they are not association members. Women often do not know that waste collectors work for the neighborhood association. Women described how waste collectors are impolite and/or refuse to collect waste when there is a short delay in paying the waste-collection fee. Good records of who pays and who does not are not kept. Waste collectors may come more than once in the same month to collect the fee.

An action plan was developed, including a working committee composed of stakeholders. To incorporate gender concerns, a female social promoter and a local project advisor also became members of this committee, and the communication and education component included the development of social networks for women and training for women in development issues.

Chapter 5

Addressing the Social Dimension: An Application of Systems Thinking

Robbin R. Hough and Brian A. Day

As professionals addressing environmental education and communications, we occasionally tackle discrete problems. However, more often we confront the needs of an entire company, community, country, or ecosystem.

When GreenCOM is called in to “fix” a situation, we often find that the real need is broader than communication and education. We find that the whole human dimension to a project, program, or policy is missing. People have been left out of the process. Those regulated have not been told what regulations they are subject to. Peoples’ use of resources may have been restricted without involving them in that decision. By the time we arrive, policies have been conceived and in some cases implemented; infrastructure has been built; the resource has been depleted without considering the needs or opinions of the stakeholders. We are asked to “sell” a completed—and often inappropriate—program with our education and communication project.

For these situations, some of us are experimenting with tools from the field of cybernetics, or “general theory of systems,” which deal with the entire spectrum of complex systems. We have formulated a set of principles designed to help us quickly assess a new system and effectively apply what we know from other complex systems.

The concepts presented in this chapter have proven useful in describing, modeling, model testing, and then reaching policy conclusions and forming communications strategies.

BACKGROUND OF GENERAL THEORY OF SYSTEMS

Over the past few decades a number of scientific fields have made efforts to understand very com-

plex systems: the universe in physics, cell function in biology, atmospheric reactions involved in climate change in chemistry. As researchers began to describe and understand these complex systems, they realized that they might understand their systems better if they compared them with other—seemingly unrelated—systems. They discovered some general principles of complex systems that can help us more quickly understand a new system.

Because this set of principles is derived from a multitude of disciplines, it may seem hard to apply at first. This chapter tries to make the principles more concrete by applying them to a GreenCOM case study in environmental communications from El Salvador. We hope it will help stimulate you to apply this effective new tool for examining complex systems with complex problems, including those in environment and development.

Over the past 25 years much of the material in this chapter has been presented in other media by the authors; we hope that this shortened version will be helpful to those in environmental education and communications. GreenCOM hopes to develop this tool further to make it more helpful to practitioners.

APPLYING SYSTEMS THINKING IN EL SALVADOR

In the 1990s, El Salvador surfaced from years of civil war with practically no social infrastructure. The education system and the natural and built environments of El Salvador were in ruins. As USAID reentered the country it addressed many severe problems. Wisely, USAID understood that environmental education would help the population rebuild its natural resources including forests and fresh water that were the basis of the country’s economy.

USAID’s global Environmental Education and Communication Project, known as GreenCOM, began a five-year, multi-million dollar effort in this decimated country. We used the general theory of systems—including the 10 principles described below—as a guide to help determine how to begin work.

10 PRINCIPLES OF A GENERAL THEORY OF SYSTEMS

1. A concrete living system is made up of objects that as a population constitute the mass of the system.

The first step is to clarify the components of the system. Systems are composed of objects. A living system is made up of objects such as atoms, molecules, cells, organisms, people, groups, organizations and communities. In a living system, the “objects” are themselves decision-making systems. Our studies of living systems can begin with the demography, by examining age distributions, birth rates, death rates, and migration rates. Understanding, however, must go beyond demography to insights into the collective wisdom, mores, and decision-making processes.

In El Salvador, the system we were targeting was the entire population. Because of our focus on environmental behavior, we were more concerned with attitudes and behaviors than with ages or growth rates. Our first step in creating an environmental education (EE) campaign was to assess the population’s knowledge, attitudes and practices regarding the environment. We did so through surveys and interviews.

2. A system is part of a hierarchy of systems, made up of subsystems and supra-systems.

Systems are made up of subsystems. In turn, each system is also a subsystem of a larger system or supra-system. (Some people may relate more easily to the concept of “nested” systems.) Atoms are subsystems of molecules, which are subsystems of

cells. In society, institutions are subsystems of the community; communities are subsystems of states or provinces, which are subsystems of nations.

In the El Salvador case, we identified strategic subsystems of the population. We chose teachers, students, and journalists, all subgroups capable of influencing other subgroups at various levels within the system.

3. All living systems are defined as objects in coupled motion.

Every system has objects in coupled motion. Think of the predator—prey relationship in ecology. Or the image of dance partners. We can call them “teamed objects in balance.” Identifying these teamed objects and understanding what creates the balance between them is key to understanding the nature of the system. A system often contains many teamed objects.

The most salient example in El Salvador was the public-private partnership. In order to deliver information and materials to our target audiences as quickly and efficiently as possible, we paired our environmental knowledge with the national newspaper’s ability to print and disseminate to a large audience. As one result, the newspaper, El Diario de Hoy, created a multi-page, full color, once-a-month insert for children. The insert arrives with the Sunday paper, and each issue spotlights one environmental topic. The insert is named El Guanaquin, after a little armadillo turned into a spokes-mascot for EE; more than 60 issues have appeared so far.

4. Living systems receive energy inputs from outside. Thus they are open as opposed to closed systems.

A system’s objects must expend energy to survive. Living systems must import usable energy (originally from the sun). We were prompted by this idea to find the outside sources of “energy” that sustain our systems.

The GreenCOM project imported material and approaches, which were very useful to students and teachers alike, developed outside El Salvador and heavily adapted them to fit the culture and ecology of the country.

- 5. Each subsystem is defined by its capacities for matter-energy/information input, short-term storage, metabolism, long-term storage and output.**

In function, subsystems are processors with specific capabilities. They take in matter-energy or information, store it, convert it to other forms, and use it to do work. Each subsystem performs a specialized function necessary to the whole system (e.g. consumption, reproduction, transportation, or communications.)

As we address an environmental issue we must identify the capacities of each subsystem. What role do they play? How do they sustain themselves if the resource flows increase or decrease? Can the officials in office carry out a recommended new policy? Can local journalists interpret the new policy to those regulated by it? Can people understand the political, environmental or financial perspectives? Will special interests such as trade organizations advocate a course of action? Can the stakeholders stay active even if the battle is long?

The concepts of short- or long-term storage may be more easily thought of as the ability to withstand increases or decreases in resources—a buffering capacity. Are these subsystems flexible and adaptable? or are they fragile and at risk? Environmentally we often see the biological application of these concepts: fragile ecosystems can be damaged or obliterated by a severe storm but resilient ecosystems may spring back the next season. The social subsystems' ability to withstand fluctuations in information or financial flows are just as critical. Can a fledgling organization manage a big influx of funding? Can a corrupt government support a long-term commitment to sustainable forestry? Capacity development and sustainability are the ways we have come to think of these questions.

In El Salvador, each element of the strategy—printed materials, broadcast slogans, training strategies for journalists was pre-tested before scaling up. Pretesting is a way of testing the capacity of a subsystem to withstand change. Will new information given to teachers change the content of their lessons? Will information distributed to the media change the behavior of their readers and listeners? If the materials did not have the desired effects, how could we improve them before their general release? Pre-testing thus examines the system's capacity for information input, short-term storage, and metabolism (Day, 1997, Hough 1975b, 1996, and Kaplan & Kaplan, 1982).

- 6. The structure of a system is defined by the subsystems it can activate, by the supra-systems that may activate it, and by the linkages through which the activations take place. Subsystems are activated in response to changes in other subsystems.**

A system's structure is the total of all the relationships of its subsystems. These relationships are set by the capacity and connections of the channels among the subsystems through which matter-energy or information flows in and products flow out.

Any changes in information, energy, or resource flows activate various subsystems. For example, when the human body (a system) is exposed to a disease, our immune systems (subsystems) are activated to ward off the threat. Likewise in communities, when resources—natural or financial—increase or decrease, a whole set of actors respond to these opportunities or threats. In countries where GreenCOM has worked, we have seen a cascade of positive and negative reactions to the mere *presence* of the donor resources of money, training, technical assistance and potential contracts. These are all natural subsystem responses to a change in resource flows. We can not only understand these changes, but also plan our education and communications activities to address them. For example, donor resources can distort local salaries and create a new social structure. When these resources

are withdrawn the project can collapse. We need to consciously design programs that can continue without outside support by putting in place the knowledge, training, funding skills, and facilities to allow continuation.

In El Salvador, people needed information about what was being done by government, the private sector, and what they needed to do for themselves to protect the environment. To serve those needs, GreenCOM worked to train a cadre of reporters to cover the environment. The coverage of environmental issues not only increased peoples awareness, but also increased the relative importance that both individuals and political leaders gave the environment.

By providing additional capacity building resource—training to journalists—the relative relationship between a number of subsystems changes. The nature of coupled motion has been changed.

7. A system may use energy inputs to add more objects, to change the linkages or relationships among its subsystems, or to produce an output.

A system can choose to use its energy in any of these three ways. The choice is often determined by the systems stage of development. Before a system can grow or develop it must have the critical mass of objects. As it grows further it develops relationships with other subsystems (coupled motion). After growing larger it can produce more products. (Hough, 1975). When examining international development issues, many focus on increasing the production of products. But the strength of a society is its ability to sustain the relationships that provide its own continuity—the relationships between subsystems—developing the important coupled motion that allows for sustainability. Training, a form of capacity-building, is one way to improve the relationship between subsystems—of orchestrating the nature of coupled motion. A system that becomes more efficient in its use of energy and information may be able to produce more products without a great deal of growth.

An example of how an energy input changed the linkages among subsystems is an environmental education training workshop for 5,000 teachers in El Salvador. The workshop included demonstrations of interactive methods of teaching. These, methods, when put into practice in the classroom changed the relationships between teachers and students.

8. Growth creates form.

A system's form is its outward appearance. When a system grows, its form changes. If growth takes place as an increase in the population of objects, the system becomes larger and requires more energy inputs to sustain these objects. If growth comes from changes in the relationships among teamed objects, then the system may not become physically larger, but new subsystems are developed with new capacities and complexities. Growth and change in form can cause confusion among objects and subsystems until a new order is established. For instance, the growth of the Internet during the 1990s created some confusion among computer systems managers. Some managers thought their mainframes would be overwhelmed by the rapidly growing message flows. However, the growth took a different form. Rather than relying on centralized mainframes and dumb terminals, computer systems have become comprised of decentralized servers and intelligent terminals all of which interact with the Internet.

Another example of the second type of growth described above—in which growth comes from changes in relationships among subsystems, comes from El Salvador. When journalists were trained in environmental issues, they responded by creating a new institution: an association of environmental journalists. Hundreds of articles on the environment now appear in print and broadcast each year. The association holds a national awards ceremony for the best environmental articles published each year; the ceremony is attended by up to 800 people.

As the public became better informed by this increased press coverage, a popular movement

developed. The energy of this movement was focused in a “national encounter” for environmental education, bringing together 1,000 people from all walks of life to help set policy for a national environmental education strategy.

9. If a system’s energy exports exceed its energy imports the system is entropic.

While a system may operate on stored energy for a time, if less energy is coming in than going out, the long-term will see vital maintenance tasks ignored, with resulting losses of objects, links among the objects and/or coupled motion. The system becomes stressed by the loss of the channels through which matter-energy/information is received or by the inability of an internal subsystem to sustain its coupled motion. Most biodiversity concerns and non-renewable resource questions are concerns about entropy, or the death rate or use rate exceeding the birth rate of objects in the system.

Inputs provided by an international donor in the form of training, materials development, and organizational skills all serve to offset the tendency toward entropy. We also involved both public and private sectors, so that when the project ended, the processes and products will live on. Often involvement of the private sector will lead to the sustainability of a project because the firm has additional incentives to keep the project going. El Guanaquin, for example, is now free standing due to financial inputs from the private sector. The national environmental journalism awards, originally project-based, held a successful first annual event without direct project involvement.

10. Structure limits growth.

In centralized systems, the distribution of products depends on the processing capacity of a single, central object. In decentralized systems, distribution may be achieved in many ways without using any

single component of the system. Every structure comes with its own limits and needs for sustainability. Devising structures that can sustain systems is what we are all trying to do. Where can providing the right information in the form of education or communications support the system? This is what we are trying to learn.

To increase growth, the system must be decentralized, with many subsystems engaged. In El Salvador, we managed to enhance the effectiveness of the EE campaign by engaging multiple subsystems—media, teachers, students. Monitoring and evaluation steps told us how well this worked. We ran separate evaluations of effectiveness among schoolchildren, teachers, and the general public.

Using this set of principles requires one to back away from the details and see the broad view. It offers the potential to identify new windows of opportunity to improve environmental problems. As mentioned elsewhere in this book, human or social portions of environmental problems are often overlooked in the process of protecting a reef, a wetland, a watershed or an endangered population. Nearly all environmental problems are human behavior problems. As human beings ourselves, we need to back away from daily details to really understand why people behave as they do. People usually have very good reasons for why they do what they do. Often, a good systems analysis of the situation will offer surprising and effective options for solutions.

References

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- Day, B.A. (1997.) Keeping Resources from Collapse: Using a Systems Perspective for Strategic Communications, *Advances in Sociocybernetics and Human Development*, Vol. V. Canada.
- Hough, R.R. (1975.) “A Paradigm for the Application of a General Theory of Systems,” *General Systems and Organization Theory* in Arlyn Melcher (ed.), Kent State Univ. Press.
- Hough, R.R. (1996.) Doomsday, The Internet, Diversity and Sustainability, *Systems Research*, Vol. 13 No. 3, pp. 287–292.
- Kaplan, S. and Kaplan R. (1982.) *Cognition and Environment: Functioning in an Uncertain World*, Praeger New York, republished by Ulrich’s, Ann Arbor, 1989.