Environmental & Education Communication FOR A SUSTAINABLE World

Handbook for International Practitioners

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Environmental & Education & Communication FOR A SUSTAINABLE World

Handbook for International Practitioners

Brian A. Day and
Martha C. Monroe, Editors

This handbook of environmental communication strategies was created by GreenCOM, the Environmental Education and Communication Project of the United States Agency for International Development at the Academy for Educational Development, Washington D.C.

The cover photos represent people from three continents—Asia, South America, and Africa—who are working toward an environmentally sustainable world.

This publication was prepared by GreenCOM, the Environmental Education and Communication Project of the U.S. Agency for International Development (USAID) for USAID. The findings, conclusions and recommendations expressed in this document do not necessarily reflect the official viewpoint of USAID.

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This manual embodies the thinking and hard work of many authors, contributors, editors, and production people. All of these individuals deserve our utmost thanks and appreciation for sharing their skills.

Many of the authors were involved in the conceptualization of the activities that form GreenCOM's base of experience in 28 countries since 1993. Orlando Hernández, Mona Grieser, Rick Bossi, Irma Allen, Elizabeth Booth, Cheryl Groff, and José Ignacio Mata have helped our programs grow to encompass their specialties in behavior change, formative research, gender, and participation.

We would like to recognize former GreenCOM staff involved in both supporting this work and producing this manual: Mary Sebold, Barbara Rawlins, Reva Schwartz, Paulina Espinosa-Puig, Denise Mortimer, Matilda Macklin, Summer Gibbs, and many others.

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We would like to recognize Kate Barba and Mike Philley of the U.S. Agency for International Development for their review, comments, and support of this pioneering project from the beginning. USAID had the foresight to create and fund GreenCOM, and deserves credit for developing increased awareness and understanding of environmental issues, policies, and behaviors in many corners of the world.

This book would not have been published without the work of Mary Paden, who oversaw the final edits, design, and production. Maureen Daley groomed the final manuscript and worked with the designers and printer. The index was produced by Indexing Partners of Washington, D.C. The English edition was designed by The Magazine Group of Washington, D.C. and printed by Jarboe Printing of Washington, D.C. The Spanish edition was developed by Margot Aguliar of Grupo de Estudios Ambientales of Mexico D.F., Mexico.

We have been pleased and proud to be associated with the Academy for Educational Development during the life of this project, and thank them for their o0.027b5O-exin-mer Gro Agul W., Th youud andionreet valua

Foreword

Environmental Education & Communication for a Sustainable World: Handbook for International Practitioners reminds us that environmental problems cannot be resolved by technology alone. We must consider the socio-economic roots of environmental problems.

Pollution, waste of energy, the destruction of the environment—these problems have everything to do with behavior, and the roots of behavior lie within the beliefs and attitudes of our population. Today we suffer from the absence of a global ethic encompassing the world environment, an ethic that promotes attitudes and behaviors consonant with humanity's critical role in the biosphere.

There can be no hope of finding viable solutions to environmental problems unless and until education and communication at all levels is suitably modified to enable people from all walks of life to comprehend the fundamental interrelationships between humans and their environment.

This publication is particularly valuable in that it links cross-cultural theory with examples drawn from various regions of the world. It is noteworthy for its breadth and specificity.

I recommend this document for any organization or practitioner developing an environmental education or communication project nationally or internationally.

William B. Stapp
Ann Arbor, Michigan

Preface

Synergism is defined in Webster's Dictionary as "the interaction of discrete agents such that the total effect is greater than the sum of the individual effects."

Increasingly, USAID's global field support program in Environmental Education and Communication (GreenCOM) has been asked by our missions to assume the lead in using communication to create synergy between and among development activities. GreenCOM has worked in 28 countries, across sectors and with a wide range of partners, to demonstrate how a better understanding of human behavior can be the catalyst for change that not only protects the environment, but also creates economic opportunity and builds democratic governance.

By focusing on people—as individuals, in households and communities, as members of organizations and institutions—GreenCOM has helped diverse stakeholders discover common needs, overcome resistance to change, and act together to improve the quality of their lives.

The environmental education and communication strategies, methods, and tools described in this document have been forged in a rich medium of USAID field programs and activities. GreenCOM has worked in tandem with projects in biodiversity, forestry, water and coastal resources, urbanization, energy, and even climate change to bring people at all levels more fully into the process of visioning and creating a sustainable future. Many examples and case studies from this unparalleled experience are described in the pages that follow. I encourage readers to heed the lessons from GreenCOM and to reflect on the myriad ways that an exploration of human nature can be applied to the issues of international development.

It would be inappropriate to conclude these remarks without mentioning Bill Stapp. I have had the wonderful privilege over the years to observe his courage and his compassion. His life's work, and the changes that he has helped bring about that have benefited so many people, and the world which he loves, speak for themselves. They do not require witness or testimony. They do call forth, from me, as from many others, expressions of deep and sincere gratitude. Bill Stapp, friend, thank you so very much.

David Hales
Deputy Assistant Administrator
Global Environment Center
U.S. Agency for International Development

About this Book

This manual was designed for those who make policy and design programs that affect people and the environment. The staff of GreenCOM, the U.S. Agency for International Development's Environmental Education and Communication Project, have arranged the following chapters and case studies to share experiences, information, and models of working in education and communication.

Section One, *Fundamental Concepts in Environmental Education and Communication (EE&C)*, provides an orientation to four theoretical perspectives that have shaped GreenCOM's approach to environmental education and communication projects: behavior change, participation, gender, and systems thinking. Each has its own research framework and following, yet each contributes an important set of ideas to environmental education and communication activities.

In Section Two, *Planning EE&C Programs*, a variety of GreenCOM experiences illustrate the basic process of designing education and communication programs: needs assessment, formative research, pre-testing, and evaluation. Taken together they form a reliable and well-tested model for program development.

Section Three, *Conducting EE&C Activities,* looks at staff and participant training workshops, mass media campaigns, and how EE&C can affect public policy.

Section Four, *Putting It All Together*, highlights several successful countrywide strategies from GreenCOM's field experience. These cases illustrate some of the diverse approaches to building capacity and planning and implementing environmental education and communication. The projects involved training, policy initiatives, awards schemes, curriculum development, and multifaceted communication campaigns.

About GreenCOM

GreenCOM is the Environmental Education and Communication Project of the U.S. Agency for International Development. In 1993, the Agency launched GreenCOM to work in tandem with other projects, across sectors and regions, to help achieve a range of strategic environmental and education objectives.

GreenCOM goes beyond "raising awareness" to help individuals and groups acquire knowledge and skills to change behaviors around specific environmental issues. In many cases, people are already aware of the environmental issues that involve them. They may know they should protect a watershed, but they do not or cannot act on that knowledge. Policies, lack of access to technology, a lack of economic alternatives, and other factors may prevent them from engaging in environmentally positive practices.

GreenCOM is laying a broad foundation for critical problem solving and long-range resource planning through environmental education; it is promoting more rapid, targeted behavior change through communication and social marketing; it is working toward long-term sustainability through the integration of education and communication capacities within local institutions.

GreenCOM addresses the specific roles that men and women play in natural resource management. In some cultures, for example, women have an unrecognized wealth of indigenous knowledge about environmentally sustainable technologies and practices. Their work lies at the epicenter of change, where population growth, food, fuel, and the environment are linked. Appropriate EE&C audience segmentation strategies will ensure the full consideration of gender opportunities and prevent additional constraints for women.

GreenCOM achieves these goals through four program components:

FIELD SUPPORT

The most significant component of GreenCOM provides EE&C support to USAID field operations and projects, Regional Bureaus, and Missions as they carry out their environmental programs. GreenCOM has provided expertise to ongoing environmental projects in a total of 28 countries, including El Salvador, Egypt, The Gambia, Nicaragua, Nepal, Mali, Panama, Jordan, and the Philippines, among others.

APPLIED RESEARCH

Practical, field driven research is integral to the entire range of GreenCOM activities. In working with people, GreenCOM research emphasizes understanding the audience's knowledge, attitude, belief, and behavioral characteristics. Qualitative and quantitative research using a mix of methodologies is central to how the GreenCOM team helps program managers design, implement, and understand effective EE&C strategies.

INFORMATION EXCHANGE

Sharing state-of-the-art methodologies and materials with colleagues around the world is crucial in this time of diminishing resources. To bridge the gaps created by geography and uneven distribution of technical resources, GreenCOM established the EE&C Resource Center. It contains over 4,000 volumes of environmental education resource materials, newsletters, reports, videos, and curricula from around the

world, and is accessible on-line through GreenCOM's website at www.usaid.gov/environment/greencom. GreenCOM produces *Human Nature*, a newsletter primarily for practitioners, featuring EE&C activities around the world. *Human Nature* is published in three languages and is mailed to 4,000 subscribers. It is also available online.

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About AED

AED is an independent, nonprofit organization committed to solving critical social problems in the United States and throughout the world through education, social marketing, research, training, policy analysis and innovative program design. Currently more than 225 programs and projects are being conducted in the United States and 89 countries in Africa, Asia, Europe, Latin America and the Caribbean, the Middle East, Australia, and North America. Founded in 1961, AED focuses on HIV/AIDS prevention programs, disabilities services, child survival initiatives, education reform, water conservation and behavior change related to the problems of sustainable development and environmental protection. Our work is supported by a mix of foundations, government agencies, development banks and other governmental and nongovernmental organizations.

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

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 spe-Enta5000TD0.16j-6.t it urrent

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 ntal

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.

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

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 tech-

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 obtained 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.

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 el84he indrravousi into

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-sess 0.07*0.027is the mi1em a give0.0243 yw(peo,aassociated5of a skillrop-)]TJT*0.0on

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-turn eashardernge. Comple0.14011.5 91pers) oung, 1eterurnmental prob-A variee the chan adeachpturn sult avai Whshategte

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

“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.

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.

Everywhere in the developing world, women play crucial environmental roles: farmer, sylviculturalist, gatherer and distributor of water, fuel, fodder, and traditional medicines. Women not only use natural resources; they manage and protect them as

"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

(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

- 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 sub-group?

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

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

are withdrawn the project can collapse. We need to consciously design programs that can continue without outside support by putting in place the

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 nonrenewable 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 needs 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.

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Section 2

Planning EE&C Programs

Chapter 6

Conducting a Rapid EE&C Assessment

Richard Bossi

To design an environmental education or communication program, it is important to begin with a sense of the history of the environmental issue, knowledge of the key institutions and individuals, and an idea of which options are possible. While local program organizers may know this information very well, asking someone with a fresh perspective to provide an outsider's view of the situation. External donor institutions rely on this type of assessment before a project is conceived.

This chapter provides suggestions for situations in which an individual or team obtains a rapid assessment of a situation—a quick, clear snapshot of the existing state of environmental education and communication (EE&C) in a particular country, region, community, or a specific development project or institution. Resources—notably financial, personnel, and time—are usually limited (the typical rapid assessment is completed in 5–10 days).

Creating an accurate portrait can be challenging. But any information and recommendations stemming from a rapid assessment can prove invaluable in helping program managers identify both the obstacles to, and potential for, upgrading EE&C technical capacity. And, when projects are still on the drawing board, an assessment can be equally useful in integrating the fundamentals of effective EE&C processes with all project components.

In GreenCOM's experience, rapid assessments are conducted by USAID staff or consultants in the early stages of a project. In some cases, more lengthy assessments are part of an overall strategy to provide regional assistance and long-term planning, as in the case at the end of this chapter will elucidate.

Simply stated, successful EE&C projects seldom result from the preconceived notions of government planners, international donors, NGO representatives, or other influentials. Rather, successful and sustainable EE&C initiatives are usually built on a combination of inputs from these groups, as well as from project recipients, beneficiaries, and stakeholders.

However, words alone are not sufficient for assessing an environmental situation. People do not always do what they say they do. The assessors should carefully observe whether actions match words.

THE PROCESS IN A NUTSHELL

Whatever the subject, determining a scheme for rapidly collecting meaningful information from various sources—existing documents, in-depth interviews, focus groups, or direct observation—is fundamental to any assessment. Time and resources must be used efficiently to benefit all parties. Any individual or team conducting an EE&C assessment in an unfamiliar country for an unknown program or organization must be prepared to answer three questions:

1. What are the environmental priorities of an agency institution, group, or project?
2. Who is/will be the likely target audience or beneficiary group of any EE&C capacity-building efforts, interventions, or messages?
3. How are both of the above (environmental priorities and target audiences) being addressed now, how were they addressed in the pasr5up, or project?

Answers to these questions will enable assessors to determine and recommend:

- Appropriate EE&C implementation channels (e.g., formal, nonformal, or informal EE&C systems);
- The most suitable type of EE&C capacity-building activity (e.g., technical assistance, workshops or seminars, demonstrations, guided practice, experiential learning, among others); and
- The type and level of involvement of EE&C and other technical specialist(s) required to achieve institutional or project goals and objectives, as well as fit the actual situation, context (available budget, time frame, other resources, etc.) and, target audience (its environmental priorities, training needs, etc.).

GETTING STARTED: WHO TO TALK TO?

Identifying the root causes of an environmental problem will help you design a realistic and appropriate EE&C solution or response. At the outset, gaining an understanding of the situational context of all of the various stakeholders is imperative. Get respondents to discuss what they perceive as the real environmental priorities or issue. Set well-defined assumptions, ask probing questions, and develop mutually agreed-upon objectives and expectations of the assessment.

Limiting information-gathering efforts to only a single level, type, or class of stakeholder is probably one of the most common mistakes in conducting an assessment. Too frequently—usually because of time constraints—assessments focus on senior officials, high-level organizational representatives, or other prominent leaders, and influential citizens. This can result in a skewed view of a particular situation centering on an institution's outlook and perspective. To ensure a more complete picture, seek out representative comments and viewpoints at all levels of a given organization, as well as among stakeholders, beneficiaries, and groups that will be affected. It is equally important to elicit viewpoints and comments from both men and women, as gender differences can be significant (see Chapter 4). Interview roughly equal numbers of men and women across segments of the private, public, and NGO sectors, such as:

- Government policy and decision makers (at the national, regional, or community-level);
- Institutional/project managers, supervisors, and administrators;
- Influential leaders or opinion makers from the private sector, NGO community, and religious organizations;
- Technicians, instructors, teachers, extensionists;
- Farmers and low-skilled workers;
- Representatives of the national, regional, or local mass media (print, radio, and TV as appropriate);
- Community members, students, or well-defined groups;
- Institutional/project beneficiaries, recipients, or constituents.

Given time and budget constraints, interviewing all groups is probably not possible. To ensure a representative sample, select a number of people from each major category. Rather than relying on more people in fewer categories, cast a broad net and seek representative viewpoints from selected individuals across institutions and society to get a more balanced picture of the issue.

UNCOVERING THE FACTS

Getting people to open up and talk freely is often a challenge. Try to create a comfortable rapport with interviewees before the questioning. Naturally, this will be easier if you know local customs, language, greetings, and manners of social interaction. To facilitate entry into a new setting, have a local counterpart accompany the assessment team and handle all introductions, translate when necessary, and explain the team's reason for seeking their opinions and views.

In all instances, the old adage "honesty is the best policy," is an appropriate rule of thumb. There is no reason to trick an individual into talking. Questions or inquiries should be direct and candid, not imposing or intrusive. Interviewees should be told the exact purpose and objective of the line of

questioning and how the information will be used. Similarly, open-ended questions (where the respondent can freely answer) are more suited to assessment purposes than closed-ended questions (where answers are in categories, such as "yes" or "no"). Answers should never be put in an interviewee's mouth.

Before engaging an individual in conversation, the assessment team should be thoroughly familiar with the interview questions. This same set of questions should be asked of representatives from each of the key groups listed earlier, with vocabulary changes as necessary to ensure comprehension. All individuals interviewed should be thanked for their time and valuable insights.

VERIFICATION

When asked to explain their EE&C activity, most people run to get a set of products to demonstrate their accomplishments. Although these are reasonable indicators of a project's ability to communicate with a specific audience, they should be recognized as mere byproducts of planning efforts, and not confused with project outcomes. Therefore, to capture accurately the state of EE&C competence in an organization, ask organization representatives to do one or more of the following:

- Demonstrate the overall EE&C process that the institution or group uses.
- Demonstrate how programmers develop, test, use, and evaluate their EE&C materials. Ask how they use a particular EE&C product or material in a real-life training event, classroom setting, or in whatever channel or manner they are being used, promoted, distributed, etc.
- Sample the EE&C products and materials. Theses could include, but are not limited to: posters, brochures, curricula, training manuals, newspaper editorials or advertisements, or other print/graphic materials; radio spots/programs, videos television spots and programs or other mass media products and materials; games, puzzles, etc.; interpretative materials, and signage; administrative and technical reports, documents, memoranda, etc.

These steps are important because people do not always do what they say they do; nor does their explanation of a product, event, or process always match their actual execution. Consequently, it is imperative to observe or verify what organizations claim they are doing. This is especially useful as a quick and simple way to determine whether the EE&C materials, products or processes are serving their intended purpose of raising awareness or changing attitudes or behaviors of a target group. Simply reviewing actual EE&C products and processes in use will enable an assessor to identify both strengths and weaknesses. In addition, it will provide insights into what types of EE&C capacity-

Are the products suited to the learning characteristics of the intended audience? Are there different messages for men and women, boys and girls, urban and rural locations, or does "one size fit all?" Are there gender or other societal stereotypes? Do the messages contain the basic elements of well-designed educational or communication materials?

Has the institution employed an appropriate educational or communication medium to meet its intended objectives with the desired outcomes? Are the products available in sufficient quantities to cover a target audience? Is product quality adequate for the intended purpose and audience? Do products conflict with, or complement EE&C efforts of other institutions addressing similar development issues?

Do recipients like or dislike the materials? Are they used? Do recipients understand the intended EE&C message? Do the intended messages accurately reflect the environmental priorities and concerns of the implementing institution as well as the audience? Do the products contain clearly understandable actions that people can easily accomplish at no or low cost?

Monitoring and Evaluation

Is there a feedback mechanism to continuously revise, modify, or improve EE&C material? Are the materials monitored for effectiveness and impact?

With these questions in mind, an assessment team can enter into an unfamiliar situation and generate a fairly accurate picture of the institutional needs.

PUTTING IT TOGETHER

Field notes are not sufficient. Data gathered must be synthesized and distilled to reveal the essence of the assessment findings and observations. This refining stage is the natural precursor to developing a concise set of recommendations.

In developing these findings, another pair of questions could be helpful:

ities in each nation and synthesize these experiences into one document to provide program direction for these and similar nations. The USAID missions in The Gambia, Guinea, Madagascar, Namibia, and Uganda hosted the consultants who conducted the assessments, providing them with contacts, background, and field support.

The assessments involved four primary areas of inquiry:

- The extent and quality of EE&C work underway.
- The range, quality, and capacity of individuals and organizations involved in EE&C, including government agencies, indigenous and intermediary NGOs, and donor organizations.
- The capacity of communications agencies to provide services (such as printing, videotaping, evaluation research).
- The degree to which gender is incorporated in the design, implementation, and evaluation of current EE&C programs.

These assessments were not "rapid" in one sense—they lasted four weeks. Rather than focus on one environmental issue or potential development effort, the inventories were broad sweeps of existing programs, with suggestions and recommendations from both interviewees and consultants.

THE NAMIBIA EXAMPLE

Each consultant approached the task with different resources and background, but the basic approach to conducting an assessment was consistent. In Namibia, for example, the existing Namibian Environmental Network was eager to use the results of the assessment as its own inventory of EE&C programs and possibilities (Monroe, 1994). Individuals were interested in being represented in the document with their own visions of the challenges and future, as well as suggesting other people and programs that should be documented. When no new names were provided through this "scatter gun" technique, the assessment was deemed fairly complete. Below are some of the agencies contacted by phone or visited.

Government Agencies

Ministry of Education and Culture
  Ongwediva College of Education
  University of Namibia
  Adult and Continuing Education
  Technicon
Ministry of Environment and Tourism
Ministry of Youth and Sport
Ministry of Fisheries and Marine Resources
Ministry of Agriculture, Water, and Rural Development

Although it provides the program manager with basic information, a rapid assessment is only rarely sufficient for designing a program. Formative research comes next.

Formative research is conducted in the early stages of designing an environmental education or communication program to define: the target audience(s), the convincing messages for each audience, the packaging of the messages, the media mix, and the ideal frequency of exposure to the message. Participation of stakeholders in formative research

iors predicted by internal or external factors? In either case, which play a predictive role?

Quantitative research techniques can help explore and test the validity of "hunches" identified during a qualitative research phase. The statistical analysis will provide clarity and enable program managers to establish quantitative links between the behavioral determinants and the behaviors, as well as determine the magnitude of these relationships. This will help prioritize and select the determinants for use in the EE&C program. Consequently, results of this analysis are essential in identifying and developing message content.

pretesting in Chapter 8. A final evaluation should be conducted after the program is implemented.

SELECTING BEHAVIORS

Planners can use several methods to create a list of actions. GreenCOM has used two techniques: 1) consulting experts and 2) forming a team of stakeholders. Two cases illustrate the approaches.

Selecting Behaviors for a Multi-Media Campaign in El Salvador

In 1995, research was conducted in El Salvador to support the development of a multi-media campaign to increase environmental awareness among the general public. As part of this exercise, six major unifying topics under consideration were pretested. One of the first findings was that the target audience was interested not only in understanding the magnitude of typical environmental problems in El Salvador, but also in having a sense of what could be done to tackle them. As a result, public and private sector representatives with extensive environmental experience met to determine actions that the general public could perform that would have a positive effect on the environment.

The meeting generated a list of 46 actions, divided into three categories, that could be implemented by: 1) everyone 2) urban dwellers and 3) rural residents. To determine their viability, eight focus groups were conducted with men and women representing the rural, peri-urban and urban dwellers from three regions of the country (i.e., Western, Central and Eastern). Focus group participants were asked to rate the proposed actions into three categories: "easy to do," "not so easy," and "difficult." They were also asked to explain the reasoning behind their choices.

As a result of this exercise, 20 of the 46 actions were classified as feasible (see Table 7.1). Criteria used by study participants to determine feasibility were:

- Extent to which actions generate personal gains and easily become new habits.
- Time and effort required for implementation.
- Cultural acceptability and financial implications.

Selecting Behaviors in a Sustainable Land Use Program in Ecuador

An ecological reserve in northwest Ecuador, Cotachi-Coyapas covers more than 200,000 hectares and ranges from 100 to almost 5,000 meters above sea level, representing multiple ecosystems (Booth, 1996). USAID funded a sustainable land use pro-

gram, the SUBIR Project, with buffer zone residents in the southeast of the reserve. One program objective was to limit agricultural expansion in the reserve by promoting intensive use of existing agricultural plots. A multi-disciplinary team—project staff, local counterparts, representatives of community groups and local farmers—identified 27 ideal behaviors that farmers in the area should implement. However, after observing which behaviors have been adopted and the reasons for their adoption, the list was expanded to include a total of 30 behaviors. Many of the original ideal behaviors were fine-tuned to fit the local conditions. The final of list of behaviors negotiated with extension agents after the field observations of farmers appears below.

Through a series of workshops and meetings, the multi-disciplinary team defined the overall goal and five objectives of the project, as well as the ideal behaviors for each of the five objectives. Research was then conducted with the target audience to answer two questions:

- What difference exists between ideal and actual behaviors, if any?
- What factors have influenced farmers implementing the ideal behaviors to adopt them and what factors have prevented non-adopters from doing so?

Two research instruments were used: structured observation and in-depth interviews. Structured observations were done using an Ideal Behavior Observation List. Fortunately, most of the ideal behaviors—such as where and when to plant, and how pesticides were used—could be observed; only a few required verbal reporting. The Observation List was pretested in the field before final use. Members of the multi-disciplinary team, including farmers, collected the data. An in-depth interview guide was developed and researchers were trained in interviewing techniques. The training addressed issues such as how to begin and end an interview, questioning and probing techniques, and nonverbal communication.

The pre-test of the instruments demonstrated that it took more than one person to conduct an interview. Consequently, interviewers worked in pairs: one person was the interviewer and the other the note-taker. After each interview, the pair reviewedTw[(List wa Tw Tw(3r r

waters of the Nile through a pact with neighboring countries. The amount of water Egypt can release from the High Dam is now 55.5 BCM (billion cubic meters) per year. As a result, in the past 10 years Egypt has gone from having a water surplus to a water deficit. The nation now finds itself using more water than the treaty allows, necessitating the reuse of water that is not overly polluted.

MPWWR requested assistance from GreenCOM to develop a communication intervention based on the concept that Egypt had a fixed amount of water available and, as the population increased, each individual share would be more limited. This strategy was to serve as a base for future interventions directed at helping users conserve water. The basic assumption of the first campaign was that increased awareness about water scarcity would lead to the adoption of water use efficiency and conservation practices by farmers.

Formative research was conducted to guide decision-making for the first campaign. GreenCOM trained staff from the Water Communication Unit (WCU) of the MPWWR in qualitative research methods, data analysis, and interpretation. Data were analyzed and interpreted by staff with guidance from GreenCOM.

The research was conducted in three cities in different regions: Damietta, Al Fayyum, and Aswan, with each region having different levels of access to irrigation water. Data were obtained through focus groups and in-depth interviews with both male and female farmers interviewed separately in each region.

Prior to conducting the research, MPWWR technicians suggested that the communication intervention focus on the following topics:

- The Koran tells us that water should be used wisely
- Egypt has limited water sources, the Nile is the major source
- Past droughts have had negative consequences on agriculture in the Nile River
- Basin Water supply is fixed by treaty to 55.5 billion cubic meters per year
- Demand for water has increased over time, given a growing population in Egypt
- The increased demand comes from different sources: industry, farmers, and domestic users
- Per capita consumption of water in Egypt is different from that of neighboring countries
- Water scarcity in the past has been associated with wars in the region. Future regional conflicts could also be associated with water scarcity
- Several policies and projects have been implemented by the public sector to conserve water and prevent water pollution
- Irrigation water overuse may not increase productivity, yet it may reduce water availability and aggravate water scarcity

The formative research was designed to find out whether farmers were already engaged in water conservation practices, the role that awareness about water scarcity played in motivating farmers to perform those practices, and to identify what other psycho-social and contextual factors influenced farmers' decisions to conserve water.

The research indicated that farmers were already highly aware of national and local water scarcity problems and had established the connection between the two. Study participants were also acutely aware of how the water supply had changed in recent years, the problems around water pollution; and the impact of population growth on water resources and food security.

Research results also indicated that local issues about water scarcity had the strongest influence on decisions farmers made about water use. Furthermore, water conservation and water management practices were known and had been adopted. They included: irrigating at night to reduce evaporation, leveling the land to facilitate water flow, choosing crops that require less water, and cleaning irrigation canals to facilitate water flow.

According to the research results, the major motivations for the doers included taking care of growing family needs, self-sufficiency, and food security for family members. Farmers practiced these methods because they wanted to conserve water for the future to meet growing family needs. They valued self sufficiency in food and water for the family.

Consider these scenarios.

Before printing a new environmental education teaching guide, the organizers asked some teachers to test a few of the activities. The teachers' comments were thorough, (e.g. it is hard to find clear plastic boxes for the groundwater activity, it takes much longer than the specified 45 minutes for students to practice this play, the illustrations imply that all teachers are women, and it would help immensely if the materials provided suggestions for assessing student knowledge after completing each unit). Grateful for such specific suggestions, the organizers incorporated them into the final version of the guide before the production deadline...

The authors of a comic book on water pollution struggled to illustrate the concept of "pollution" without making the character overly negative. In focus groups, non-literate adults and teenagers commented on six potential characters: "This one looks sick; that one looks like a grandpa." After another round of testing, the authors settled on a pollution character who looked serious and sick rather than grandfatherly or mean...

As these scenarios illustrate, a critique of draft material by the intended audience—well before production deadlines—is a vital step. Equally important is asking the right questions so that audience feedback makes a helpful contribution.

The previous paragraph sounds so simple that it should be common sense. It is repeated often in this manual for good reason, however. Time and time again, materials production runs into writing delays and then production deadlines that squeeze out the crucial step of pre-testing. Deadlines are real: publications need to be distributed before the end of the school year, radio plays must be finished for World Environment Day. Sometimes a squeezed budget forces a decision to move the pre-testing money into production. Yet, despite the challenges, pre-testing all education and communications products is vitally important.

To repeat the obvious, high-quality environmental education and communication (EE&C) products result from pre-testing draft materials well before production deadlines. This chapter explores the type of information that pre-testing can provide, strategies for obtaining this information, important differences between using and reviewing the materials, and helpful tips for program managers.

WHAT PRE-TESTING PROVIDES

The process of asking the intended audience to review, comment, talk through, or try out an EE&C product enables the program manager to ask a variety of targeted questions. Some sample questions are provided below in Table 8.1.

Very different information is collected if users are asked to apply the materials in their work—conduct a workshop, teach students, facilitate a meeting—and respond to a series of questions from their experience. This procedure is in fact a much better test of the material. Are directions written clearly? Are the objectives really accomplished? Are the handouts and overheads sufficient? Can the participants follow the delivery? Do the mate-

Table 8.1 Pre-testing Questions

For a communications product, ask the intended audience...
♦ What do you think the main message of this poster/ad/radio spot/etc. is?
♦ To whom is this message directed?
♦ Could it be you? Why or why not?
♦ Does the main character remind you of someone you know? Why or why not (which may be prompted with specific questions about hairstyle, clothing, gender, etc.)?
♦ What would prevent you from doing the suggested behavior?
For an educational product, ask teachers or administrators...
♦ Is this activity/poster/filmstrip/booklet something you could use in your class?
♦ For what grade level is it most appropriate?
♦ For what subject is it most appropriate?
♦ Are the illustrations appropriate? Gender-free? Ethnically appropriate?
♦ Is the vocabulary appropriate?
♦ Will the activity help you meet your curriculum objectives?
♦ Would you use this? Why or why not?
♦ Would you need training to feel comfortable using this?
Rather than asking teachers questions about their student's reactions, ask teachers to conduct the activity and record students questions, comments, or activities. In addition, students could fill out a response sheet.
♦ Did you alter the activity from what was written? If so, how?
♦ Did boys and girls respond differently? If so, how?
♦ Please give some examples of the questions that students asked.
♦ Please give some examples of student reactions to the activity. Were they engaged? Did they stay on task? Were they confused?
♦ Did you achieve your objectives? Did your students gain knowledge or skill?
For any product, ask experts...
♦ Is the information conveyed here accurate?
♦ Is the message conveyed appropriate?
♦ If people adopted this behavior, could it make a difference in the problem?

provide critical information that the authors might miss. Distance has a way of providing a valuable perspective.

Drawn from the GreenCOM/Egypt experience, the following example illustrates the pre-testing process and underscores the value of this step in communication materials development.

PRE-TESTING A FARMER'S SURVEY IN EGYPT

In 1998 the GreenCOM/Egypt mesqa or irrigation canal project targeted farmers with a national, comprehensive survey of knowledge, attitudes and practices that included important questions previously unasked on a systematic basis.

GreenCOM designed a pre-test to check many elements of the survey design: the sample frame (a listing of farmers on 240 canals nationwide), the questionnaire, and fieldwork logistics. All would be modified based on the pre-test experience.

The research firm set up the pre-test sample using canals similar to but outside the main sample to avoid using any farmers targeted for the survey. Over 100 respondents were interviewed during the pre-test.

As a result of the questionnaire pre-test, we decided to:

- *Reduce the complexity of some questions*—The pre-test questionnaire tried to do too much, asking about both the farmer's practices on canal-side land, and about land holdings elsewhere. This was burdensome on the respondent, and certainly would have made analysis and report writing very taxing. The final questionnaire asked only about land owned on that particular canal.
- *Make the questionnaire more concise*—It is hard for any researcher to pass up the oppor-

This chapter provides guidance to EE&C project managers who work with evaluators. It will introduce you to some of the techniques and terms evaluators use, but most importantly it will show you how to design a project that can have meaningful evaluations, not only at the end of the project but throughout its life to keep it on course.

Most project managers make the mistake of not bringing in the evaluator until the end of a project and then not giving him/her a goal against which to evaluate performance. Asking an evaluator at this late stage, "What should we be evaluating?" is meaningless. The evaluator can only measure whether you have stayed on course—he/she cannot suggest destinations.

When involved in a project from the beginning, a good evaluator can regularly tell the manager whether the program is on course or, if not, in what direction it has strayed. With this information, the manager can decide how to get back on track (see Box 9.1).

A mantra for managers is: "Start with the results." If you don't have a precise vision from the outset of how things will look at the end of a successful project, you will have trouble with the evaluation.

Developing this vision is not easy. Indeed, it may be the most difficult part of management. The process should be participative, at least with a management team, sometimes with a wider group representing the target audience. It is usually a long, and sometimes exhausting, process at the end of which everyone commits to the vision and wants to be assessed in terms of it. Once agreed upon, the vision become the program's North Star.

Evaluation is usually categorized as *summative* evaluation, which measures the project success or failure by comparing outcomes with the original goals, or as *formative* evaluation, which measures project progress against ongoing benchmarks and allows the manager to make course corrections.

Formative esummative

A mantra for managers is: "Start with the results."

tive evaluation can be useful for people designing new projects.)

DEVELOPING DESIRED RESULTS

The statement of the project's vision—or more specifically its *desired results*—guide the evaluation process, just as they have driven the program development. By operationalizing desired results into measurable statements, the evaluator can reflect upon the degree to which the program achieves these results. Well-stated desired results for educational programs are specific to the situation and share these elements:

1. Each objective targets one and only one thing: a fact, an attitude, a skill. Limit the statement to only one measurement.
2. Each objective specifies an outcome that the participant will be able to perform. The objective is not written from the perspective of the leader (teach about turtles) or the program coordinator (host the workshop). Use appropriate action verbs to define the outcome.
3. Each objective spells out what will be measured in order to meet certain criteria (80% success, three out of five reasons).
4. Each objective is set in a context or a condition (when asked, when given a list of 10 items, where ascertained, which population...).

OBTAINING BASELINE MEASURES

Since the evaluation is designed to measure change, some technique to measure the "baseline" situation is necessary. The following activities may provide this initial information.

- Use the literature or existing data in the agency
- Survey people
- Observe people
- Interview people
- Use information from a comparable site or a former program
- If you didn't do a baseline study, at least ask people at the end of the study how they think they've changed

TOOLS FOR COLLECTING INFORMATION

Each information-collecting tool has a niche in evaluations, and just like an organism in a functional ecosystem, each is best suited to a particular condition. The program manager must match the tool to the need. A variety of equally good evaluation designs can use different tools. As a rule of thumb, choose the tool that is least expensive in time and resources. There are many ways to maximize the advantages and minimize the disadvantages of each option (see Table 9.1).

What is a Research Design?

To evaluate is to compare. Comparisons are needed to determine if an intervention had the desired impact. A research design tells the researcher how many measurements should be done to determine impact, and when those measurements should take

Table 9.1 Information Needs and Evaluation Tools

Data Collection	records, logs, journals, clicker counts
Program Quality	expert review, observation, staff self-analysis, staff performance
Participant Reaction	drawings, photographs, journals, logs, post-it boards, suggestion boxes, comment cards, testimonials, anecdotes, observation
Participant Knowledge and Behavior	surveys, interviews, concept maps, observation, artifacts, photographs, focus groups
Action Research	journals, tape-recorded sessions, observation, etc. to support participant reflection and analysis
Media Impact	phone or mail surveys, count calls, visits
Materials Quality	readability tests, pre-tests, observation
Participant Involvement	participatory rapid appraisal techniques such as discussion groups, engineering models, mapping, sorting photographs, calendars, time lines, trend lines, ranking, pie chart, matrix

place. The various comparisons needed to determine net effects of an intervention make up a research design. Designs also dictate whether or not comparisons will be limited to study groups exposed to the intervention or if they will also include groups not exposed to it (control groups).

Three Commonly Used Research Designs

GreenCOM has used three well-known research designs (listed below) to evaluate how education and communication programs changed the audiences' knowledge, attitude, skills, or beliefs. Each one of these designs has different advantages and disadvantages regarding the sources of error. Each can be used in formative or summative evaluation.

Design 1: Pre-Test and Post-Test (Before and After) Studies

This design compares the same type of study participants at two points in time, separated by a period of participation in a program. Differences in scores between one point in time to the other are taken as an estimate of the net effects of an intervention (Rossi and Freeman, 1988).

There are two versions of this design. One version known as the "one-group pre-test post-test design," uses the same group for both measurements. The other version, known as a "separate sample pre-test post-test design," tests people from different groups at each measurement point.

The one-group version is commonly used in education and in communication. It can be used when an intervention affects a specific target group. Despite its popularity, this design embodies several confounding factors that can jeopardize the validity of its results. For example, it does not clearly establish that the intervention caused the measured change in the population. Other variables may have caused any difference detected between the two measurement points. As Rossi and Freeman (1988) have concluded, "the main deficiency of such designs is that they ordinarily do not permit disentangling the effects of extraneous factors from the net effects of the intervention." See "Cautions to the Evaluator," below.

The "separate sample design" offers some improvement over "one-group pre-test post-test designs." If study participants are randomly selected for each measurement, the effect of testing is controlled for. *Maturation issues* (see below) are controlled if the distribution of age is the same in both samples. However, in a separate group pre-test/post-test design there is still a questions as to whether external events that affected all participants might have had an influence.

Design 2: Pre/Post-Test with Experimental and Control Groups

This design is similar to the pre-test/post-test design, but a control group has been added. Thus, the experimental and control groups are both measured before and after the intervention. If an external event influences all participants, it will show up in results from the control group as well as from the experimental group. As before, this design has two forms, one where study participants have been randomly assigned to the study group (the pre-test, post-test control group design) and one where they have not, (the non-equivalent control group design.) In both of these designs it is imperative that the same study participants take the pre-test and the post-test (Fisher, Laing, Stoeckel and Townsend, 1995).

Design 3: Post-Test Only Control Group Design

Post-test only designs are appropriate when baseline data have not been collected, are lost, or are inaccurate, or when the introduction of new subject areas makes pre-testing impossible. This design requires that two study groups be researched after an intervention has ended. The experimental group is exposed to the EE&C intervention and the control group is not.

There are two types of post-test only designs that differ in how study participants are chosen. When there is no random assignment of participants to each study group, the design is called a "static-group" comparison. When participants are randomly assigned to the study group, the design is called the "post-test only control group."

Campbell and Stanley (1966) argue that under the static-group comparison there must be a method of assuring that the two groups would be equivalent had it not been for the treatment. The randomization element added to the post-test only control group design corrects that deficiency. Campbell and Stanley (1966) also argue that randomization can suffice without the pretest in the case of the post-test only control group design.

Rossi and Freeman (1988) define randomization as the chance assignment of potential targets in order to obtain equivalent treated and comparison groups. Randomization requires that every unit in a target population has the same chance to be selected for either the experimental or the control group. An important aspect of randomization is the elimination of the possibility of self-selection. Randomization is different from random sampling. Random sampling allows the selection of units in an unbiased manner to form a sample from a population. Random sampling can be used to choose individuals to participate in a study. Randomizalection.r to ob5ewS-1.e that under the

Evaluation is difficult because it involves a great deal of thinking, planning, and imagining the future.

ing the test for a second time, or taking an alternate form of the test, usually do better than those taking the test for the first time. These effects, occur without any instruction as to scores or items missed on the first test."

Modifications of Evaluation Instruments and Increased Experience of Evaluators

Evaluation instruments may be refined or modified between measurements either by accident or intention. From one measurement to the next, an original question such as "Can you mention the days when waste is collected in this neighborhood?" can be changed to "Are you aware when waste is collected in this neighborhood?" The changes observed between measurements may be due to the way in which the question was asked each time and not the result of an awareness-related intervention. The experience of evaluators, interviewers and observers can also have a great impact on results. Observers may differ in their accuracy and severity. Both factors can affect results and invalidate findings.

CONCLUSION

Evaluation is difficult because it involves a great deal of thinking, planning, and imagining the future. At the beginning stages of program design, it is often challenging to identify measures of success for each activity. Each of these measures could become a desired result that will guide the development of the program and determine how the program is evaluated.

The broadest definition of the evaluation process begins with program planning. As needs are assessed and formative research conducted to determine initial knowledge, attitudes, and behaviors, a type of evaluation is in progress. Baseline data, collected before the intervention, will help measure changes that can be attributed to the project.

As the project evolves, pretesting is critical for keeping activities on track, by testing elements, making revisions, trying new techniques, and reorganizing activities to best meet the desired results. Observations and interviews help record information about the experiences of the participants.

At the conclusion of the project, a summative evaluation can measure its merit.

Remember, start planning by imagining the results you want.

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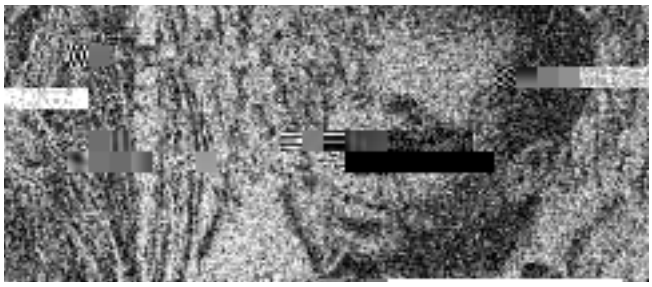
Section 3



Conducting EE&C Activities

Training is a key element of many GreenCOM projects. The trainees may vary from teachers to policymakers to project staff. But in every case, training involves some type of professional development to support a change in practice. Changing practices imply a change in behavior. As stated in Chapter 2, behavior change is more likely in a supportive environment. Successful training programs, therefore, include ways to change the culture, climate, and reward system. They also provide positive reinforcement for the new behavior.

A good training program can be a key element in larger efforts to share information or change behavior. Teacher training can lead to the acceptance and use of a new curriculum about the environment. Journalist training can result in more articles in the public media on environmental issues. Training in desktop publishing can lead to the publication of regular newsletters and attractive materials. In every case the training provides a supportive foundation for new behaviors that are instrumental in achieving societal change.

TRAINING AND PROFESSIONAL DEVELOPMENT

Although any educational activity that passes information from one to another may constitute "training," the workplace context of professional skill training developed when master craftsmen trained apprentices in the skills of their trade. By

Training provides a supportive foundation for new behaviors that are instrumental in achieving societal change.

- ♦ Can reflect on, analyze, and share their own experiences
- ♦ Can be motivated by the possibility of fulfilling their personal needs and aspirations
- ♦ Are capable of making their own decisions and taking charge of their own development.

Trainers should expect their participants to be competent, interested, motivated individuals who may have as much to say as the leaders. Furthermore, not only are the participants skilled and knowledgeable, they may want to share their experiences and learn from the experiences of their colleagues. This exchange of information can be a key part of a training program. Creating an atmosphere that is conducive to helpful, informative, equitable exchange is the responsibility of the trainer.

Cognition

From a different professional perspective, cognitive psychologists might approach the task of professional development by considering how the human brain processes information. Their training program might be designed with the following principles in mind:

- ♦ People learn new information as it relates to what they already know.
- ♦ Practicing, applying, and discussing information helps create flexible mental models.
- ♦ Stories, examples, and role models help bridge the unknown.

The presentation of new information should be carefully orchestrated to resonate with learners and remind them of related concepts they already know. Establishing effective relationships helps insure the new information will be stored and recalled appropriately. One easy way to accomplish this feat is to make sure participants talk about their experiences and what they know.

New information can be presented through examples, models, case studies, analogies, stories, and other teaching methods that help learners build appropriate and functional mental models. By considering these techniques, the initial doctrine of "let people talk" is farther refined into "engage people" in considering the real application of the new information. Such activities allow participants to work with and use the information, arriving at a more thorough and complete understanding of the concepts through this process.

Behavior Change

And finally, social psychologists who study behavior change would remind us that professional development is really behavior change—a process of suggesting and encouraging professionals to use new or adapted skills in their work. The following ideas may be important for a training program to consider from this perspective:

- ♦ Behaviors are based, in part, on the knowledge people have about the issue, about how to perform the new skill or behavior, and about the consequences of performing this behavior.
- ♦ People have relevant attitudes about the importance of this behavior in solving the problem, their ability to perform the behavior adequately, and the likelihood of their action in making a difference.
- ♦ A host of real and perceived barriers may stand in the way of the performance of this behavior.
- ♦ A variety of extrinsic motivators (policies, resources, legal threats, time inconvenience, etc.) and intrinsic motivators (building community, self-assurance, feeling frugal, etc.) may work to prevent or encourage this behavior.
- ♦ People care about what others think about the issue, the behavior, and their performance of this behavior; social norms are important.

Most training programs include knowledge and deliver that information in a way that motivates and through which positive attitudes are shared. But good training programs are designed to affect more components of the affective domain. Attitudes about competence, the ability to perform skills, and the perceptions of barriers to this behavior can also be shaped. Educators should consider

ries of inquiry and discovery learning, when people of any age have an opportunity to physically work with the information or practice a skill, and particularly when the activity is designed so that they discover or reinforce concepts, learning occurs and the training is successful. We all remember much better what we have discovered and said ourselves than what others have told us (Hope and Timmel, 1984).

It is common to ask teachers in teacher-training workshops to participate in activities designed for students. This technique increases the teachers' familiarity with the new materials; it also engages the group and gives it shared experience. If the teachers also critique the activity, discuss how they

and programs to their proposed facility. The experience engaged them in thinking broadly about the possibilities for the physical facility, the program, the operation, and the long-term funding. The "road trip" helped strengthen friendships and give them a common experience as well (see Box 10.5).

Offer Choices

Although it is helpful to conduct a thorough needs assessment of participants prior to a training program, it is difficult meet everyone's needs. By offering concurrent sessions, independent workstations, and choices in the program, two things happen: The participant is empowered to determine his/her own course of action, and the likelihood that something will appeal to everyone is increased.

If the program cannot accommodate concurrent sessions, it may be possible to offer the group a series of simple choices. For example, the time of the first break, the location of the bus pick-up, and the order of the group reports, are decisions that do not affect the program, but give participants a role in shaping the training to meet their needs (see Box 10.6).

3. What suggestions do you have for the next training program; what changes should be made?

These questions can be used at the mid-point in the training to enable trainers to make corrections

Such a technique insured participation from the trainees and support from the media outlets. In Tanzania, an ongoing system of training programs offered an opportunity for the same people to reconvene several times over a year to exchange successes and concerns, using each other as a support network. Since many international development programs finish up and close down, they should try to leave behind a skilled base of program participants to carry on the changes (see Box 10.7).

teachers will be able to overcome the forces resisting change and may even endanger their job status by pushing for it.

Ministerial approval, administrative support, release time from work, projects relevant to the job site, and funding for supplies and resources are certainly components of a supportive system that can be used to remind participants that their new skills will be rewarded. Training programs that can do more, however, are more likely to be successful. In El Salvador, for example, a training program for journalists was followed by a national award for the top environmental reporter (see Chapter 13).

SUMMARY

A variety of resources have been developed to help educators, communicators, environmentalists, and others design and conduct training programs. UNESCO's International Environmental Education Programme publishes several manuals for educators, and other international agencies produce guides and technical documents.

A good training program is a targeted professional development experience for the participants.

It builds a climate of trust and encouragement through engaging activities and discussions. It allows participants to explore new concepts and practice skills relevant to their work. It allows participants to make choices about the structure of the program or which skills they will practice. It establishes a supportive network of colleagues who can provide assistance after the training program has concluded and seeks ways to obtain administrative support as well. It is evaluated.

Professional development activities such as training are practical and results-oriented. They fail when they are extremely long-term, when they are not job-related, when they are not specific in their outcomes, when they are not evaluated, or when they do not take into account strong workplace forces to maintain the status quo.

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special lecture, a government hearing, the first showing of an important documentary, or a major announcement of a scientific finding. By themselves, these events can begin to increase awareness. Launched in conjunction with brochures, programs, and other activities, they can be part of a campaign.

Entertainment and Celebrities

The entertainment industry offers highly effective opportunities. GreenCOM worked with a local television producer in the Philippines to adapt a series of daytime drama episodes where popular characters discussed issues. Many advocacy groups, from animal rights to ocean protection, use prominent actors as spokespersons for their causes in newspaper articles, paid advertising, entertainment, and public service announcements. Actress Meryl Streep's concern about pesticides on apples was orchestrated by the Natural Resources Defense Council in a campaign called "Mothers and Others" that focused attention on pesticide residues on food and the inane but widely shown "Naked Gun 33 1/3," a movie about government policies for alternative energy sources, was created with support from well-respected environmental policy groups.

A communications campaign may involve a variety of these strategies, or only one. The design of a campaign depends upon the financial resources available to create, field test, and implement the campaign, the goal of the campaign, and to a certain extent, the existing awareness and controversy associated with the issue. Some of the many possibilities for communication channels are listed in Table 11.1).

DEVELOPING A CAMPAIGN

When a decision has been made to use a media campaign to advance an environmental cause, it may seem natural for those closest to the situation to define the main message of the campaign. "One less car," or "Don't litter" may come to mind. This is a temptation that must be overcome. Premature efforts to identify the message may lead to missing the needs of the audience. Experts on the issue often know little about the audience. It is crucial to know the audience—to know what they already know about the issue, what they associate it with, how they feel about it—in order to design an effective message. In Egypt for example, officials of the Ministry of Public Works and Water Resource told GreenCOM that they know what messages would get farmers to conserve water. But in a pretest of only 40 people, 39 did not even understand the ministry's message—let alone find it persuasive.

As with an educational effort or a training program (Chapter 10), the development of a communications campaign should follow a basic process that involves carefully developing a realistic goal, assessing the audience, developing a strategy that uses appropriate media, and, finally, crafting a message that pre-tests successfully with the audience (Chapters 6–8). All of these elements: the goal, the audience, the media, the strategy, and the message, interact with each other to create a successful campaign.

After the campaign is launched, it can be evaluated in several ways: by recording the exposure (number of ads in number of magazines with a circulation of so many people); by surveying people asking them to recall the message; and by observing changes in behavior or the environment that could be attributed, in part, to the campaign (see Chapter 9).

Table 11.1 Sample Communication Channels

Media events	Media releases	Interview shows
Editorials	TV shows	Topical theater
Advertisements	Posters, signs, and banners	Radio soap operas
Flyers and brochures	Comic Books	Pencils
Public service announcements	Manuals	Hats

To select the most effective behaviors, it is necessary to explore what people already know, believe, and care about.

Think of a communications campaign as having four stages (see Box 11.1). In the first stage formative research helps define the goals and the target audiences, as well as the "media diets" of the audiences. In the second stage, the audiences' the campaign strategy is developed, messages are developed and pre-tested. Third, the campaign is implemented. Finally, the results are evaluated and used to further refine the strategy.

Stage 1: Goal, Audience and Medium

In the first stage, formative research helps define which behaviors the campaign will attempt to change to achieve its broad goals. To select the most effective behaviors it is necessary to explore what people already know, believe, and care about (see Chapter 6). You must understand the difference between those who already perform the desired behavior ("doers") and those who do not ("non-doers"). Finally, formative research for a communications campaign should explore the media "diet" of our audience. Are they literate? Do they listen to radio? If so, which station(s) and at what time(s)? Do they read any publications regularly? Do they have access to TV, Internet, or other media and do they use it regularly? This information, along with your budget, will help define the strategy and choice of media.

With the goal in mind and information about the "media diet" of the audience in hand, strategic decisions can be made about selecting markets, media, sequence, frequency, and times. These factors form the essence of the campaign. Critical information about funding and how to obtain access to a variety of media opportunities will be needed at this time. Is the effort blessed with a charismatic spokesperson? Is free radio time available? How many newspapers cover the target region and is it possible to advertise in them? Does the audience travel along a particular route frequently, making road signs an option? How often should the message be repeated to achieve your goal? Is it necessary for the campaign to generate more resources to enable you to achieve the goal?

BOX 11.1

Formative Research Changes Campaign Focus

In GreenCOM's work in Egypt, the Ministry expected us to create a campaign that discussed how farmers could save water. Initial research made clear, however, that some farmers already used conservation techniques, and that others did not believe water needed to be conserved. A carefully crafted initial campaign began by explaining the treaty that limits the amount of water that is available and continued by acknowledging the fine efforts that some farmers employ. A later campaign was more specific and directed toward additional conservation strategies. In this case, formative research indicated that people would not respond well to being told what to do, but first needed to hear support for the positive behaviors already in place.

Stage 2: Message

Finally, the main message of the campaign can be crafted, along with the design of all the media products—comic books, posters, story booklets, radio spots, billboards, etc. A team of creative people should work with the content experts and rely upon the results of the formative research for guidance. The process often requires several revisions before everyone on the team is pleased with the type of illustrations, the flow of the storyline, the wording, the gender implications of the message, and the ultimate action.

The experts are, of course, not the audience, so every element of the campaign should be pretested with the intended audience. This can be done through focus groups, interviews, classrooms, meetings, and other existing networks. But pretesting must be done. There are many examples of media products that were distributed broadly before the organizers realized they were not com-

Why not just provide the information in the first place? Because the audience wasn't interested in it then. Now they are.

state—since in reality of course, there is no link. The new car did not make us rich and powerful. Brushing with Crest or Pepsodent did not get us a date. Lifesavers or Certs did not save our social life. Social researchers call this state "cognitive dis-

uncomfortable cognitive dissonance they feel at performing a behavior for a not-very-good reason.

Sandman cites research done at the Ann Arbor, Michigan recycling station (in the days before curbside recycling) to explain how this works. Recyclers had to separate their trash and then drop the recyclables off at a recycling station in town—a considerable investment of time. At the station, Recyclers were interviewed about what made them come and how much they knew about recycling. New Recyclers didn't know much and were there for basically irrelevant reasons (e.g., their child nagged them to do it, they wanted neighbors to think well of them in this progressive community, they wanted to meet people like themselves). Long-term Recyclers however, could tell interviewers how many trees were saved by a month's worth of newspapers and how much energy was conserved by recycling glass bottles. They had replaced the irrelevant motivators with relevant reasons to continue the behavior. The Recyclers who did not make this transition to finding good reasons, stopped recycling. The original motivator was not enough to sustain the behavior of recycling. Thus information, delivered at the correct time and in a targeted manner, is crucial to maintaining environmentally friendly behaviors. The best place for Recyclers to get this information would be at the recycling station itself.

This research suggests that creating and maintaining recycling behavior requires two messages to two audiences. The first message contains an irrelevant motivator (or partially relevant) and is aimed at the Ann Arbor population. It might be something like "You meet the nicest people at the Ann Arbor Recycling Station" or show a child reminding a parent, "But Mom, You could recycle that!" The goal of the message is to get people to the recycling station once.

The second message is designed to reinforce the behavior of people who have made the trip to the recycling station. It contains the reasons why they are doing a good thing and builds on the behavioral commitment.

A national recycling campaign in the United States used Sandman's model. First, it encouraged people to call a toll-free number. The initial advertisements ended with the tagline, "If you are not recycling, you are throwing it all away," and an image of a crumpled Earth tossed into a waste bin. The message appeals to Americans' positive attitudes toward the environment and their ethic about not wasting things. The 200,000 people who called received additional information about why recycling was important, where they could take recyclable materials, how to package them, and how to a start recycling program by finding local markets. The campaign didn't spend its own resources putting this detailed information out to people who weren't paying attention. The first ad got their attention (based on an emotional motivator) and convinced them to take a simple action. As a result of that action they were given factual information that would support a longer-term behavior change.

Positive attitudes support long-term behavior (see Figure 11.1). Information alone is not enough to support behavior, but information can lead to a change in attitude that can lead to behavior—just as educators have told us it would. But, without a motivator and an initial action to create cognitive dissonance and start the information seeking process, there is nothing to trigger the uptake of the information.

By combining the models of advertisers and educators, environmental communicators can have a bigger impact.

Good policies are the product of effective policy formulation, articulation, and implementation. As they are implemented policies should be monitored and readjusted to stay on target. Each component can be enhanced with a quality communication program that engages stakeholders, fosters partnerships, and mobilizes a common vision.

Policymakers throughout the world are coming to terms with a new agenda—one that pragmatically brings together concerns about environmental protection with those of economic growth. At issue is how to achieve environmentally sustainable development by meeting today's human needs without compromising the Earth's natural resource base upon which all life depends. But often policy makers focus on only the natural, political, and economic *systems* and leave out the primary actors—the people.

Environmentally sustainable development requires:

- A healthy political environment, characterized by environmentally aware leaders and greater popular participation in decision making
- Effective policies, laws, and regulations that empower citizens to make environmentally beneficial choices
- Capable institutions to implement policy, advocate reform, and educate both the people and their leaders

Ultimately, environmentally sustainable development is about more than sound policies, politics, and institutions: it is about people. People conserve resources or destroy them through their everyday actions. And people can serve as catalysts for the development of equitable and just policies.

Environmental education and communication (EE&C) can help bring people into the policy process in a meaningful and effective way. When people see the link between policies, their livelihoods, and their children's futures, they become stakeholders in the policy process. As stakeholders, people catalyze policy change. They can organize, advocate, educate, and elevate local issues and concerns to national policy fora. And they are more apt to see that policies are understood by others and enforced.

As the complexity of achieving environmentally sustainable development is increasingly appreciated, the involvement of multiple stakeholders becomes a factor. Increasingly broader groups of people need to become engaged. In addition to natural resource consumers and managers at the grassroots level, stakeholders may include specialists (e.g., economists, sociologists, business leaders, farmers, foresters, engineers, lawyers, educators, health professionals, communicators, and many others). Environmentally sustainable development also calls for building bridges between groups, such as industry and environmental organizations that sometimes find themselves in adversarial positions. And it calls for building cross-sectoral coalitions to integrate all sectors—donors, industry, grassroots groups, etc.—that affect social and economic development.

grams. Although most have yet to represent all stakeholders, these preparatory processes have attempted to involve a cross-section of society.

On paper, most plans recognize the importance of EE&C. For example, almost all NEAPs attest to the need to include education and public awareness in their environmental strategic objectives. In practice, however, these plans succeed only if the government can raise or allocate appropriate resources; if the plans receive high-level support; and if the people understand and are committed to the process. Therefore, effective communication is crucial. For example, when Madagascar first formulated its Environmental Action Plan, most support came from external advocacy groups. No internal constituency developed, partly because the benefits of sound natural resource management were not effectively communicated to the Malagasy people. Over time, a backlash resulted, setting back efforts to act on the nation's environmental agenda. On the other hand, when GreenCOM worked in Malawi and El Salvador on National Environmental Education Strategies, it began with broadly inclusive workshops that articulated the stakeholders needs in a policy. Both countries now have popular environmental education strategies.

FOSTERING POLICY DIALOGUE

EE&C facilitates policy dialogue between government and people, national and local levels, and among multiple stakeholders. For example, in the Philippines where national policy encourages greater sharing of power by communities and public agencies in forest management, field offices of the environmental ministry may not know how to make this policy work locally. EE&C can provide the needed training and materials. With the trend toward increasing decentralization and greater autonomy for regions and provinces, EE&C can help local governments, NGOs, and citizens work together.

In addition to fostering dialogue between people and their government, EE&C strengthens connections among other groups. For example, it can provide the tools to bring multiple stakeholders like corporations and environmental groups together by identifying common ground and facilitating productive dialogue. Some corporations, for example, have instituted environmental changes in their policies as a result of listening to their customers, their employees, and/or the people who live near their facilities. Others have set up citizen advisory groups to help shape workable environmental reforms in corporate practice.

PUBLIC AWARENESS

Public awareness programs may be targeted to specific, local audiences, such as taxi drivers, to maintain their vehicles, thus reducing air pollution. Conversely, public awareness campaigns are typically conducted on a national, or even international, scale. For example, the World Wide Fund for Nature (WWF) mounted international campaigns to protect tropical rainforests and wetlands through coordinated national action of its member countries worldwide. These and other campaigns use mass media; advertising; special events; exhibitions; conferences, seminars and workshops; school-based programs; merchandising; and other activities. The Gambia's National Environmental Awards Scheme, developed by GreenCOM, is a good example of a public awareness program that engages people from a variety of walks of life (see Chapter 14).

PUBLIC PARTICIPATION

Communication can also play an important role in linking the public to policymakers to establish direct lines of communication. New communication tools, as well as new ways of using those tools, have made these links easier to forge. Community groups have become more sophisticated about use of, and access to, communication media. Simplified technologies, such as the portability of video and editing equipment, desktop publishing, Internet communication and a host of others, have equipped regular citizens with new ways of influencing policy undreamed of even ten years ago.

Political upheavals, such as the overthrow of the Shah in Iran and the collapse of the Soviet Union, owe much to the tools their proponents were using, such as fax and the Internet. Advocacy, one of the recent strategies to emerge from the new role of civic participation, puts promotion of environmental issues into the hands of civic groups. To support the democracy and governance initiatives of USAID and other donors, communication plays a vital capacity-building role in the training and mobilization of advocacy groups.

Section 4

Putting It All Together

When GreenCOM was invited to El Salvador in 1994, the country had no environmental education in the schools, virtually no environmental information in the media, and no government agency charged with the environment. The situation was urgent in this small, war-torn country with a heavily damaged environment and a rapidly expanding population.

In what became one of the most comprehensive and ambitious programs, GreenCOM was brought in to promote environmental awareness and management throughout the nation. We undertook a five-year, multi-million dollar campaign, at the end of which, El Salvador possessed:

- A national environmental education (EE) strategy
- EE as a major theme of K–12 schooling
-
-

ment of student materials, and developing

We followed two guidelines in introducing environmental themes to schools. First these themes must be integrated throughout the curricula, not added as a separate course. Second, good environmental education goes beyond learning facts about nature to understanding how to solve practical environmental problems.

Integrating Throughout the Curriculum

Environment can, and should be, associated with all subjects of the curriculum. For example, a physical education class can explore air quality and the effects of environmental contamination on the performance of the athletes; a geometry class can study the angles of a slope that is subject to severe soil erosion resulting from intensive agriculture. By

- Two video series with a total of 11 programs approximately 12 minutes each addressed environmental themes for different educational levels. The 5 programs from "Our Home, the Environment" explained about water, soils, forests, biodiversity, and urban environmental problems for secondary students. The 6 programs in the series, "The House of Water" address themes related to water for primary students.
- A series of booklets for schoolchildren. Each booklet was created in collaboration with an NGO, with the goal of reinforcing the capacity of these organizations in environmental education. Booklets were about birds, sea turtles, forests, air and water. To develop the booklets, a local consultant contracted by GreenCOM and the specialists from the NGO prepared the contents of the booklet. Subsequently, the GreenCOM team reviewed the contents and adapted them to the educational level of school children to which they are directed (6th to 9th grades). Later, the concept and presentation of the contents was developed with an illustrator, who created explanatory games, jokes, and pictures that made the lesson fun and simple. Thus, the booklets became something very different from textbooks but they complement their contents. Of the 10,000 copies of each booklet printed, 3,000 were submitted to the Ministry of Education to be sent to schools as part of didactic packages, another 3,000 were turned over to the NGO that participated in the development, 2,000 were given to the Executive Secretariat of the Environment to be distributed to NGOs and students that request them, and 1,000 were distributed directly by GreenCOM.

School Environmental Projects

Through community projects, students can apply knowledge acquired in the classroom as well as develop values and skills for improving environmental conditions. Projects can be part of the social service activities required for graduation or can be conducted by a classroom working with their community.

and economics departments. A third option is to establish a seminar in environmental issues as a mandatory course for all students. Finally, some universities have begun to design environmental degree programs, such as the Universidad Centroamericana José Simeon Canas (UCA) which will soon offer a Masters degree in environment and natural resources.

NONFORMAL ENVIRONMENTAL EDUCATION

Our objective in El Salvador was to enable technicians from public and private institutions to provide environmental education and help implement the national environmental education strategy. To do this we:

- Formed environmental education units in institutions related to the environment and education
- Trained technicians, mayors, legislators, and decision-makers about the environmental reality of the nation based on the diagnostic content of the National Environmental Education Strategy and updated studies
- Trained technicians in the design, formation, execution and evaluation of environmental projects
- Developed national parks as educational opportunities for visitors, by building interpretative trails, interpretation centers, and training guides and park guards as environmental educators

Nonformal environmental education encompasses the vast variety of educational opportunities, such as programs and exhibits at zoos, museums, nature centers, and parks; workforce training and education; civic and religious programs; extension activities; programs with leaders, decision-makers, and elected officials; and work with NGOs.

GreenCOM's approach to nonformal education was to encourage a massive training effort, focusing on technical staff of a variety of relevant institutions, interpretation training for parks, and agricultural extension workers.

Formation of Technical Staff of the Involved Institutions

At the beginning of its operations in El Salvador, GreenCOM created a multi-disciplinary team of technicians from different institutions related to the activities of the national environmental education strategy. These institutions were both public and non-governmental; representatives of public relations firms and the media were invited to participate.

A first task of this multi-disciplinary team was to learn the environmental issues in El Salvador through a series of seminars named "immersion workdays," in which the group analyzed environmental themes with the assistance of the best national experts in the subject. The team members later planted the seeds for creating environmental education units within their own institutions, which eventually multiplied the training to other groups of people.

Training of NGO Technical Staff

Training key staff in environmental NGOs or lead agencies ensures that the environmental education later offered to the public has a common focus and methodology. This training should stress the methodology for developing environmental projects in communities or neighborhoods, such as:

- Participatory techniques for environmental assessments of the community
- Design and planning of environmental education programs
- Design, testing and production of EE materials
- Monitoring and evaluation of EE programs

GreenCOM developed a training program for NGO technical staff about the steps to follow for the design, execution, and evaluation of EE projects. This training program was theoretical and practical; after each workshop the participants completed an assignment, the results of which were the basis for the development of the following workshop and the following activity. For example, the first workshop dealt with techniques for conducting a community assessment for an EE project. The participants were given two months to carry

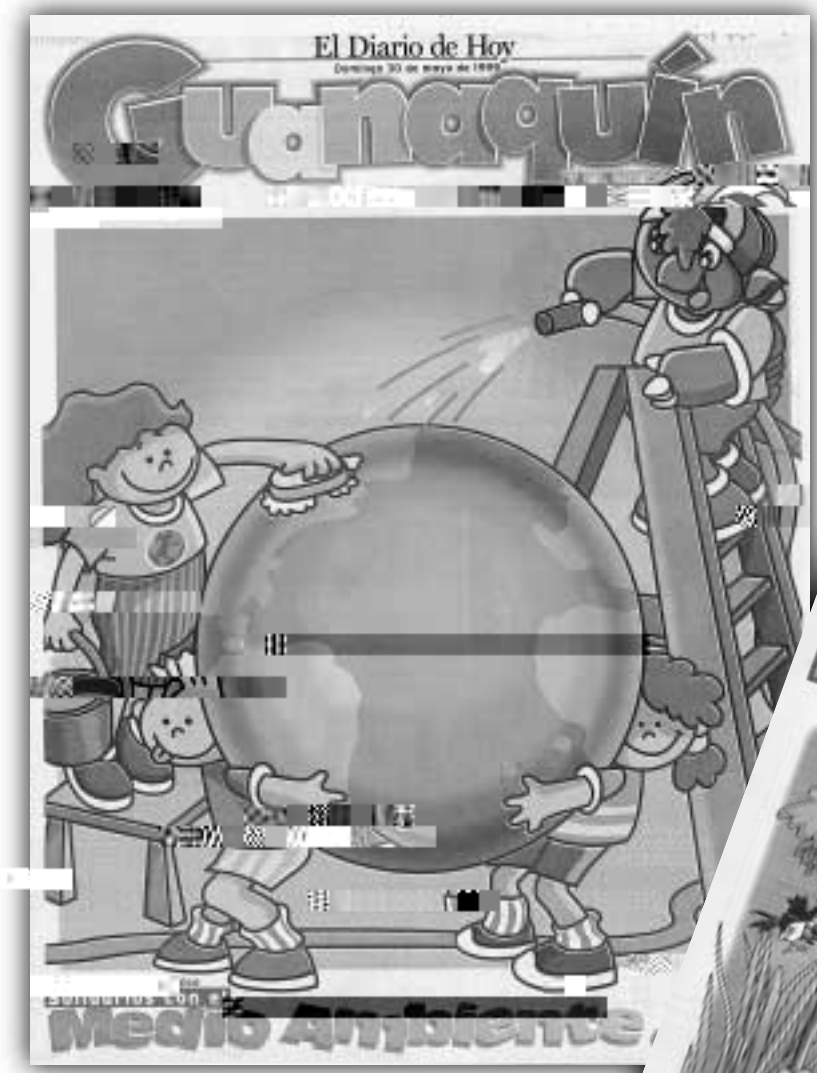
out their assessment. The results of these assessments were used in a second workshop where participants learned to plan an EE project. As part of the planning, participants discovered training needs in graphic and radio materials production. A final workshop at the end of the process provided tools for evaluating their EE projects.

As a result of the training process, a number of the NGOs submitted requests for project funding to the Initiatives Fund of the Americas for El Salvador. Many of these requests were approved and resulted in successful educational projects.

Training Environmental Interpretation Specialists in National Parks

the channel by systematically informing journalists about relevant environmental topics.

"If you live in this country, help save it," was the slogan of the GreenCOM sponsored National Environmental Education Encounter held in San Salvador in 1996, shortly after the end of the country's devastating war. The two hands in the poster show people of different politics coming together to mold a new country—pictured as a piece of clay—in peace (left). Other environmental education materials included teachers' guides, videos, audio cassettes, and books (above).



El Guanaquín, a weekly children's supplement to the newspaper *El Diario de Hoy,* carried environmental activities to homes and schools.

In El Salvador, more than 1,000 people gathered for a national conference, or "Encounter," to develop a national strategy that would lead to specific policies implementing environmental education. Even the opposition party showed up at the event, which was opened by the nation's President. One year later

This support-building method guaranteed the adoption of the national environmental education strategy by the institutions involved and built political support for the policy.

SUMMARY

By working closely with the decisionmakers in the Ministry of the Environment and the Ministry of Education, and by involving professionals in the process of designing and extending training programs, GreenCOM enhanced an entire EE community across the country. The capacity to continue this work has been established within organizations and agencies through the development of offices, procedures, policies, and materials. A framework has been constructed for others to prosper.

In 1995, the National Environment Agency in The Gambia launched an Environmental Award Scheme. In a brief period, with limited financial resources, and in a climate of political uncertainty, the awards competition captured the imagination of the country. Eight awards categories engaged a wide range of groups at both regional and national levels.

The competition created an organizational infrastructure throughout the country that is being used in follow-up environmental planning and projects. The meetings, media coverage, posters, and other dissemination methods that were an integral part of the awards scheme became the springboard for broader discussions on environmental problems and solutions, involving many more people than those who formally entered the competition. All this was accomplished with extremely limited financial resources

NATIONAL AWARD SCHEME

To begin to address this shortcoming in public

- *Political mobilization* wins political and policy commitment for a goal; the targets are national decision makers
- *Government mobilization* informs and enlists the cooperation and help of government organizations which can provide direct or indirect support
- *Community mobilization* informs and gains the commitment of local political, religious, social, and traditional leaders, NGOs, women's groups, and others
- *Corporate mobilization* secures the support of national or international companies in promoting appropriate goals
- *Beneficiary mobilization* informs and motivates the program beneficiaries through training, establishment of groups, etc

By most accounts, social-mobilization programs attempt to build national consensus. To do so, programs carry out a national education campaign through all possible channels, gearing up quickly and spreading the word. There is an assumption that by energizing more people to pay attention to a problem, good things will happen. Critics claim that accelerated programs are unsustainable approaches to long-term problems. Social mobilizers respond that these campaigns are merely the peaks in a continuous process of working toward the goal; that publicizing one event or program can have a positive impact on other programs; and that involving the community in the energy of this process will have far-reaching benefits that are not easily gained through other avenues. The National Environmental Awards Scheme is an example of social mobilization. The ways in which it used each of the five strategies listed above is told in the following pages.

Setting Objectives

Table 14.1 Eight Categories for Gambian Environmental Awards Scheme

	Category	Eligible Participants	Eligible Activities
1.	Clean Schools, Clean Surroundings	Schools and other educational institutions	Clean-ups on school grounds or the surrounding community
2.	Clean Ward	Groups, associations, the public at large	Clean-ups within the ward or surrounding community
3.	Women and Environment	Women's groups and associations	Environmentally sustainable projects, e.g., tree planting or cooperative vegetable gardens
4.	Community Sustainable Development	Individuals, groups, and associations	Environmentally sound innovations that improve the quality of life
5.	Appropriate Technology	Individuals	Environmentally friendly technology that facilitates work
6.	Clean Business and/or Industry	Companies and industries	Clean technology, appropriate waste disposal, clean premises
7.	Clean Enterprise	Businessmen and businesswomen	Clean technology, appropriate waste disposal, clean and safe premises
8.	Advocacy and Promotion	Individuals not employed in the environment sector	Projects that promote environmental issues locally, regionally, or nationally

NEA introduced a logo, entry forms, and posters in Banjul and in the Divisions.

The NEA Executive Director and Environmental Education Officer visited all Division Commissioners to enlist their participation and assistance and to plan how to publicize the Scheme regionally. These visits proved fruitful. In each case, the Commissioner decided to form and chair a task force to implement the Scheme in his division.

NEA also embarked on two major publicity activities at the national level: a multi-media outreach program and a media campaign. NEA worked with the Agriculture Communication Unit on the outreach program. Using the Communication Unit's vehicle and a portable generator, a team visited 35 villages and held meetings, displayed posters, and played films and cassette tapes with environmental themes. More than 6,000 people attended the various meetings, more than 25 percent of whom were women and about 10 percent of whom were youth. These meetings provided general information on environmental topics and then introduced the Awards Scheme. The team reported lively question-and-answer sessions, many with community members who had never before had a discussion about the environment with a government official.

As part of a media campaign, NEA regularly provided articles to the newspapers. In addition, the agency, with the assistance of a local consultant, developed a series of interactive radio programs broadcast through Radio One FM, a popular private radio station. A team from NEA, including the Executive Director, answered questions phoned in by listeners in a format that proved highly successful.

Each Divisional Environmental Task Force planned the publicity in its own Division. This meant that each plan responded to local audiences and local media channels. Below are some examples:

Promoting to Farmers

The Upper River Division Task Force held meetings for farmers about the impact of agriculture, livestock, and forestry on natural resources and about the Scheme. In addition to interest in the competition, the meetings resulted in specific vil-

lage requests for follow-up meetings on environmental protection.

Working through Community Leaders

The MacCarthy Island Division Commissioner invited community leaders to a special meeting to discuss the Scheme. Guests included religious leaders, local officials, and representatives of youth and women's groups. The Commissioner explained the Scheme and asked these key individuals to support the Scheme through their channels.

Appealing to User Groups

The Western Division invited NEA to set up an exhibit at the National Livestock Show to display logos, posters, and other information. The NEA staff answered questions on the Scheme and distributed entry forms.

Focusing on School Administrators

In the North Bank Division, the Commissioner convened a meeting for primary and middle school headmasters to introduce them to the scheme and encourage them to initiate activities in their schools.

Multiplying Efforts through Teachers

In Greater Banjul, a meeting was held with teachers about the Awards Scheme, where the discussion turned to the role that teachers play in helping students acquire the concepts, skills, and attitudes needed to interact wisely with the environment. Teachers also asked about the role of the NEA.

Word spread beyond the people actually attending the meetings, listening to the radio, or otherwise participating in publicity activities. For example, students in several schools organized clubs and initiated school-wide activities. Indeed, at the end of April, when a NEA team made follow-up visits to all five divisions, they found that most traditional and religious leaders, *alkalos* (mayors), women's groups, youth groups, and others knew about the Awards Scheme and its objectives.

ASSESSMENT

Assessment consisted of two steps: verification to ensure that what was reported on the entry form actually took place; and judging, to determine which activities merited prizes.

Designing an Assessment Strategy

NEA developed a verification procedure and judging criteria for the Steering Committee. The Committee decided that the Divisional Task Forces should judge the entries, using common criteria (see Box 14.2), rather than forwarding the entries to national decision-makers. NEA produced uniform judging forms and met with each task force to train for the assessment process and begin making plans for prize presentations.

Each meeting followed a similar pattern:

- Review of the progress of the Scheme
- Discussion of how to carry out field visits to verify and judge each entry
- Distribution of judging forms and training on how to use them
- Schedule the assessment
- Discussion of the prize-giving
- Discussion of a general time frame

Each Divisional Task Force then carried out its assessment using its own resources. Again, perhaps because the task forces had ownership in the process, and were given real decision-making authority, they were willing to spend their own money on travel and other expenses.

Each Division carried out the assessment slightly differently. The MacCarthy Island Task Force divided up the entries among the group. For example, the Education Officer was primarily responsible for visiting schools, interviewing the participants, observing the impact of the environmental activities on the school, and completing the judging form. In the Western Division, the entire task force created a grid to judge each entry as a group. In the

BOX 14.1

Four Major Criteria

- Degree of participation: for a group, the percentage that participated. For an individual, the level of committment and motivation exhibited.
- Cleanliness: did appropriate solid waste disposal, reuse, recycling take place?
- Magnitude: did it cover a large area or poulation, or deal with several environmental issues?
- Sustainability: has this, or will this, become an ongoing activity?

Greater Banjul Area, an assessment team spent an average of four hours visiting each entry. Interestingly, while the committee members visiting schools reported some difficulty in differentiating among the many school clean-up activities, they had no hesitation in selecting the winners, which went far and beyond clean-up and beautification activities.

Each Division selected first-place winners in each category and, if there were sufficient high-quality entries, second and third places. The names of the top three overall winners (regardless of category) were then submitted to the National Steering Committee as candidates for the national prizes. A subcommittee was constituted to visit each of the finalists' projects to observe the activity, interview participants, and seek opinions from others in the community about the impact of the activity. The National Steering Committee reviewed the subcommittee's findings and selected the three national winners.

The Steering Committee decided that the prizes should be appropriate tools or other equipment to allow the winners to continue with their work—prizes included wheelbarrows, watering cans, gardening tools, and the like. The winners also received certificates, and each entrant received a letter of appreciation for having participated. Funds for prizes ($25,000) were provided by the U.S. Agency for International Development and the United Nations Development Programme.

THE WINNERS

In total, there were 210 entries. Of these, 94 were prizewinners that received certificates and tangible, useful prizes; the rest received letters of appreciation for their participation.

Each Division submitted their three top entries, regardless of category to the national competition. From these, the National Environmental Awards Steering Committee selected three national winners through actual visits to each of these projects. The prizes were determined through consultation with the recipients to ensure the prize would be valuable to them. The First prize winner was given a borehole (well). Second prize was $5,000 to be spent according to a participatory rural appraisal study. Third prize was fencing materials requested by the recipients. In addition, each of them was nominated for UNEP's Global 500 Award.

The National Winners

First Prize

Tahir Ahmaddiyya Muslim High School—A Model of Environmental Management

The students in this Lower River Division school have turned their school into a model of environmental management. They planted drought-tolerant trees, plants, and an orchard; collected rain water for use during the dry season; made compost and used organic fertilizers in the gardens; and established a waste-disposal system with recycling measures. In addition, they established an Environment Club, which produces drama on environmental issues for neighboring schools and communities. This has been so successful that other schools in the area are copying the idea. The school is relatively small, with 450 students.

by a committee led by the Imam, thousands of Muslims filled in a cliff face with boulders and

cer telephoned a report to radio and newspapers in Banjul at the end of each ceremony. However, the agency could not provide funds for the ceremonies themselves.

These ceremonies provided a way for different groups to come together to support a common cause. For example, the event in the Western Division brought together all the Division's chiefs for the first time since the District Commissioner had taken office.

The participants included regional authorities, traditional and religious leaders, prizewinners, friends, school children, and music and drumming groups. The regional leaders were involved in presenting the prizes and making the presentations. There was much rejoicing, dancing, and drumming, and the prizes were well appreciated. As the truck loaded with the prizes went along the road, or stopped to wait at a ferry crossing, people would approach it, cheer, and clap.

The National Awards Ceremony took place jointly with the opening of a workshop to launch the National Environmental Education Strategy. The Minister of Agriculture served as master of ceremonies, and the Minister of Education read a message on behalf of the Head of State. Two other cabinet Ministers also attended. The country representatives of both USAID and UNDP made presentations. Most of the Divisional Commissioners were present, and so were many dignitaries and members of the business community and NGOs. At this event, the prizes for the Greater Banjul winners and for the three national winners were presented.

A broad cross-section of people engaged both in formal and non-formal environmental education, including the members of the National Environmental Awards Steering Committee, remained at the site for a two-day workshop to review and approve the proposed National Environmental Education Strategy.

WRAPPING IT UP: LESSONS LEARNED

As noted earlier, several factors contributed meaningfully to the success of the National Environmental Awards Scheme: widespread mobilization, decentralization of decision making and authority, feasibility in terms of expectations and resources, open communication, and sufficient time.

Additional strong points include the following:

- *The planning and steering of the Scheme was done collaboratively.* Through the National Steering Committee, representatives from government (the Ministries of Education, Health, Natural Resources, Agriculture, and Interior) and non-governmental organizations helped plan, steer, and monitor the Scheme.
- *There was strong support from the public media.* The newspapers and radio reported the process. A series of interactive radio programs provided information and maintained public interest during the implementation phase of the Scheme.
- *There was full involvement of the National Environment Agency.* From the Director to the typists, the entire staff had a stake in the success of the Scheme. All had different roles to play; each performed his or her role with a high level of commitment and enthusiasm.
- *NEA played a facilitating and coordinating role.* The Agency has good credibility, and the various Ministries, NGOs, and Division authorities fully accepted NEA's role as the facilitator and coordinator of the Scheme.

Each Division organized and conducted a large, public celebration to award the prizes to winners, with people often traveling long distances to take part.

- *Divisional Task Forces had the responsibility for implementing the Award Scheme regionally.* These Task Forces, headed by the Divisional Commissioner, were composed of government extension officers, regional representatives of NGOs, and traditional leaders. Because these people live and work in the regions, they knew the specific environmental problems and were in positions to influence others.
- *There was strong cooperation and support from government, donor agencies, and the community.* The members of the Divisional Task Forces, in particular, gave of their time, voluntarily, adding arduous tasks to an already full schedule. In addition, they shared other limited resources. NEA, as noted, supported the process, and USAID and UNDP funded purchases of prizes.
- *Winners received in-kind prizes.* Providing wheelbarrows, tools, equipment, fencing, and even a well for the top prizewinner was better than giving cash prizes. It resulted in the distribution of vital tools and equipment to groups that could use them, and it provided visual incentive to others to enter future competitions.

A Few Difficulties

There were several challenges in the development of this particular awards scheme. Though not all would be present in other situations, other concerns will need to be overcome.

- *Coup d'état:* Without a doubt, the greatest problem encountered was the coup d'état which took place about four months into the development of the awards program. An attempted counter-coup took place immediately after. This transition caused great political uncertainty and, therefore, a delay of several months as some donor-funded projects closed. Funds and equipment that were to come through USAID's GreenCOM Project were no longer available. In addition, the Divisional Commissioners (the heads of the Divisional Task Forces) were replaced. It was thus necessary to repeat the process of consultations with the Commissioners to gain their support and commitment to continue to lead their Task Force.
- *Transportation:* Although The Gambia is a small country, transportation is difficult. The roads are very poor in places, and ferry crossings are inevitable. Crossing small rivers and creeks was arduous at best, and sometimes dangerous, particularly when carrying prizes to the recipients.
- *Limited regional facilities*: The Divisional Headquarters had very limited facilities. Thus, entry forms, certificates, assessment forms, etc. had to be produced in Banjul at the National Environment Agency and taken to the Divisions. Every opportunity was taken to "catch" people who were going "up-country" and use them as messengers.
- *Limited financial resources:* Although the aim was to implement the campaign through existing infrastructure and resources, funds to assist with transportation and pay for more radio time would have increased publicity. The Divisions placed a great deal of importance on the prize-giving ceremonies, but no funds were available through the secretariat. In spite of this, the Task Forces went ahead, utilizing existing resources and events, and organized large ceremonies with full representation of the people and dignitaries in each region. These ceremonies became important support-building occasions, which in the future should be included in the budget.

Spin-offs and Extensions

- Several additional programs and projects have resulted from the Awards Scheme.
- An infrastructure (the Environmental Task Forces) was created at the regional level, which is now being used for the decentralization of environmental management.

At the podium, USAID and The Gambian officials launch the awards scheme in April 1995 (above). Members of The Gambian National Environmental Agency's Award Scheme Task Force, Lower River Divison, were proud to participate (right).

Chapter 15

Water Conservation in Jordan: A Novel Approach to Curriculum Development

Mona Grieser, Barbara Rawlins, and Khulood Tubaishat

Paramount among Jordan's national concerns is the scarcity of water. Water scarcity is so serious that the peace treaty between Israel and Jordan, signed in 1994, included Jordanian water rights. This landmark initiative addressed longstanding political tensions between the two countries, and the terms of the water section are still being argued today. Extensive mass-media coverage highlighting the agreement served to further focus the nation's attention on the water-shortage issue. Water is scarce across all of Jordan. The whole country is arid, or semi-arid, with a dearth of water for farming, grass, and even trees.

Like other tropical countries, Jordan has only two seasons, a rainy season and a dry season. The rainy season from October through April produces 85 percent of the nation's total annual rainfall. Precipitation is the predominant source of fresh water, feeding the Jordan and Zarqa Rivers and replenishing natural springs and underground pockets of water.

All known sources of water across the country are already being utilized, and those are drastically reduced by four factors. First, 92 percent of the rainfall is lost to evaporation. Second, Jordan's neighbors, Syria and Israel, have diminished water flow by building hydroelectric dams further upstream on the Jordan River. Subsequently, Jordan has become highly dependent on these countries for its water needs. Third, Jordan's population has expanded enormously due in part to successive waves of refugees from Israel and Palestine and to the fact that Jordan has one of the highest population-growth rates in the world (3.3 percent); the increased population increases demand for agricultural water as well as domestic water. Fourth, modernization and increasing expectations about quality of life have also changed domestic water behaviors.

Because the supply of water no longer meets the demand for water, conservation has become Jordan's focus. Rationing of water has become a way of life. Recently, legislation was passed that requires newly constructed homes and apartment buildings to have water-storage tanks fed by runoff rainwater in addition to piped water. But regulation and municipal management alone will not suffice to resolve Jordan's water deficit. Individual citizens need to do their part, and although Jordanians are now fairly efficient water users, additional voluntary reductions of water use are needed at the household level.

This chapter describes how GreenCOM worked with a Jordanian NGO to address this need through a tailored curriculum within Jordan's schools. The starting point was to understand, through research, popular perceptions about water scarcity: how do Jordanians perceive the water problem? Next came the design of an educational curriculum targeted on knowledge gaps revealed by this research. Importantly, the design of this strategy was carried out in an interactive way, in contrast to what most Jordanian educators had experienced before, and it was this participation that significantly contributed to increased environmental learning. Key to the strategy as well was gender sensitivity—the curriculum addressed boys and girls differently based on what the research told us about their varying perceptions about water scarcity and their different roles in domestic water use. The result has been a major increase in environmental knowledge and the development of a research-based, interactive, and gender-sensitive

process that can be used throughout Jordan and the Middle East.

HOW DO JORDANIANS PERCEIVE THE WATER PROBLEM?

To answer this question, the Royal Society for the Conservation of Nature (RSCN), a local non-profit environmental organization supported with technical assistance from the GreenCOM Project, held a series of discussions with students, teachers, and school principals in 1994. RSCN found that both boys and girls were well aware that water was an issue in the country. However, there was relatively little understanding that water scarcity was not a new issue, indeed had been a problem for centuries. In addition, there was remarkably little understanding that water scarcity was an

work of secondary-school environmental youth clubs (eco-clubs) with assistance from GreenCOM.

RSCN had started its loosely structured school-based eco-club system several years before, and it the system had grown to include over 300 clubs. Although the clubs' initial focus was on biodiversity, RSCN became increasingly concerned about the growing urgency of the water-scarcity problem in Jordan. RSCN further recognized that its eco-club system provided a good avenue for testing new approaches to environmental education. Schools, which are single-sex in Jordan, volunteer to join the eco-club system and most students volunteer to participate in the club's activities. As a result, eco-club students and teachers are generally highly motivated, and consistently express strong interest in improving their clubs. Most participating schools are girls' schools, further highlighting the link between environment and gender by reflecting the traditionally greater interest and involvement of women and girls in environmental issues.

The curriculum RSCN developed for its eco-clubs focused on persuading students and, through the students, their family members about the need to conserve water at home. The curriculum provided examples of specific actions that households could take to reduce their personal water use. On the basis of the earlier discussions with boys and girls and their teachers, RSCN made a particular effort to highlight things that boys and men could do to perstude wat thir clubsommit of wer-r use.erve wan.focucurriculum provistentlydthe watefollg urgef-stud1.

The new curriculum had a significant impact on students' knowledge, attitudes, beliefs, and behaviors regarding conserving water at home.

The content of the curriculum was based on information gathered from original interviews with students, teachers, and administrators, as well as from existing curricula from the United States and elsewhere that incorporated interactive teaching techniques. In particular, the curriculum drew on activities used in science curricula in Arizona and New Mexico, which are similar in climate and topology to Jordan.

During the curriculum-development workshop, teachers demonstrated the activities they expected students to be able to perform. In this way organizers monitored the availability of materials for the exercises, how long a given task would take, the ability of teachers to understand the curriculum concepts, and the ability of the students to perform these tasks at their grade level.

The degree of academic difficulty was pitched to a 9th grade level so that younger students would not find it too difficult nor would older students find it boring. Students in grades 8–11 could participate in the clubs.

Sensitivity to the different gender roles was emphasized throughout the design process. For example, a deliberate effort was made to include exercises and activities that would affect both genders. When advocating behavior change in the home, the curriculum included illustrations of men closing faucets while they shaved, men using drip irrigation instead of hoses in family gardens, and men washing cars with buckets rather than a hose—in addition to women washing dishes and clothing. To tailor the curriculum to both rural and urban schools, we included activities that addressed both home garden watering (urban or rural) and irrigation of agricultural land (rural).

During this same two-week curriculum-development period, all the materials, exercises, and teacher's guides were pretested with eco-clubs and their teachers. Revisions made were again pretested. Next, at two-day workshops held in January 1995, RSCN and other curriculum-development-team members trained eco-club teachers on how to use the curriculum. At the training, we gave teachers the new curriculum and a self-instructional teachers' manual that stressed the new interactive teaching methods. The participants "walked through" the teachers' manual, following the instructions step-by-step to ensure a thorough understanding of the lesson.

The Curriculum Worked!

At semester's end, we compared students and teachers from a sample of eco-clubs using the new curriculum with a sample of eco-clubs not using the new curriculum. The results: the new curriculum had a significant impact on students' knowledge, attitudes, beliefs, and behaviors regarding conserving water at home. Of particular interest is the stronger effect the curriculum had on boys than on girls; boys made more suggestions to their parents about ways to reduce water consumption, such as shutting off the tap while brushing their teeth. This finding suggests that when the practice of water conservation is presented as an issue within the male domain, boys are receptive to the subject matter and can become advocates for change.

And, in general, students appear to have served as effective conduits for changing their family's water-conservation behaviors at home as well. They reported influencing the clothes-washing behavior of their mothers as well as their households' garden-watering practices.

The curriculum also appears to have influenced teachers. We found that teachers changed how they conducted their eco-clubs in terms of the content and format of the activities they carried out. Most teachers who were provided with the curriculum (60 percent) implemented a majority of the recommended activities. The curriculum seemed to motivate female teachers more strongly than male teachers: they increased both the total number of activities on water and the number of *interactive* water activities (e.g., field trips, experiments, drama presentations) used in their eco-clubs. Male teachers who got the curriculum also increased the number of *interactive* water activities they used, but did not devote more activities in their eco-clubs to water issues overall.

BOX 15.1

Curriculum Summary

Unit 1-The Water Cycle
This unit highlights the importance of water in nature, its role in the Koran, and its many uses. Background information is provided about water sources in Jordan, the water cycle, dams, and the concept of water as a publicly owned commodity. Collection and use of water over time is outlined. The impact of population growth and urbanization on the water supply is described.

Activity 1: Exploring How Water Evaporates
Summary: Put equal amounts of water in two bowls or glasses and cover. Place one bowl in the sun and another in the shade and compare what happens.

Activity 2: Constructing a Small Replica of the Water Cycle
Summary: Put soil, water, and seeds into a covered jar to see if and how the plants grow. In each case, first write down what you expect to see, then perform the experiment and record and discuss what you actually observed.

Unit 2-Household Water Use
This unit reinforces the importance of water and its scarcity in Jordan and throughout the Middle East. These concepts are then brought into the home environment by presenting several ideas for saving water in the bathroom, kitchen, and elsewhere in the house.

Activity 1: Water-Use Survey
Summary: Conduct a survey at home with your parents to measure how much water your family uses. Record how much water you and your family use for brushing teeth and bathing. Next, determine how much water is used for "female" household tasks such as washing the dishes and the clothes. Determine the amount of water used for "male" tasks such as washing the car and shaving. Discuss with your family ways they could decrease water consumption.

Activity 2: Water-Meter Reading
Summary: Observe the teacher's demonstration of how to read a water meter. Next, check your water meter at home, or look at your family's water bills if they purchase water, to calculate the cost of water to the family each month. Compare and contrast the water bill from the month prior to implementing the water-saving measures you have learned at home, and the month after implementing these measures.

Activity 3: Saving Water When Brushing Your Teeth
Summary: Calculate how much water can be saved when the tap is not left running while you brush your teeth. Multiply this amount by the number of people in your family to determine the total savings for your household.

Unit 3-Aquifers and Surface Water
This unit introduces the concept of underground (aquifer)

and surface water. Student discussion centers on the issues raised by a hypothetical conversation between two friends—Hamid and Hamed—from different parts of Jordan. They talk about their surrounding areas, both of which have become drier in recent years, and how they have seen birds and wildlife disappear. They talk about their fears that water might not be available in the future and discuss the difference between renewable and non-renewable water sources. The importance of ground cover is also stressed in this exercise. In Jordan, ground cover is often removed through gleaning activities, which allows water to evaporate faster and removes habitats of small animals.

Activity 1: Function of Ground Cover in Retaining Moisture
Summary: Put seeds and wood chips in a nylon sock, place it on a wet plate, and observe what happens over the course of two days.

Unit 4-Pollution
This unit addresses surface-water and aquifer pollution: the role that humans play in causing pollution and ways to stop it. Particular emphasis is placed on pollution in the Gulf of Aqaba and its effect on coral reefs. Six suggestions to decrease water pollution, such as minimizing the use of chemical fertilizer and controlling garbage disposal, are offered.

Activity 1: Simulating Water Pollution
Summary: Fill a glass with water, sand, and pebbles. Put ink, red dye, and oil into the glass and observe what happens.

Unit 5-Home Gardens and Irrigation
This unit explores ways to reduce water use in home gardens. Water-efficient plants that can be used in gardens are identified, how compost can slow evaporation of water is demonstrated, and the effects of fertilizer on evaporation levels is examined. The unit shows how to collect rainwater at home for use in home gardens. The advantages of drip-versus canal-irrigation methods for agriculture are also covered.

Activity 1: Comparing Water Use by Three Different Plants
Summary: Obtain three different plants with different-size leaves. Observe how much water is used by each plant over time.

Activity 2: Comparing Waxy Versus Non-waxy Leaves
Summary: Identify two plants, one with waxy and one with non-waxy leaves. Compare transpiration between the two plants over time.

Activity 3: Simulating Canal and Drip Irrigation Techniques
Summary: Water one group of plants with a pitcher of water (canal method) and another group of plants with a water dropper (drip method). Observe over two weeks to see how much water is used by each. Take notes and present your final results.

GreenCOM's approach to curriculum design promoted interactive discussions, hands on experiments. Jordan's Royal Society for the Conservation of Nature developed secondary school environmental youth clubs (eco-clubs) with the help of GreenCOM to introduce students to environmental activities.


The Royal Society For The Conservation of Nature
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