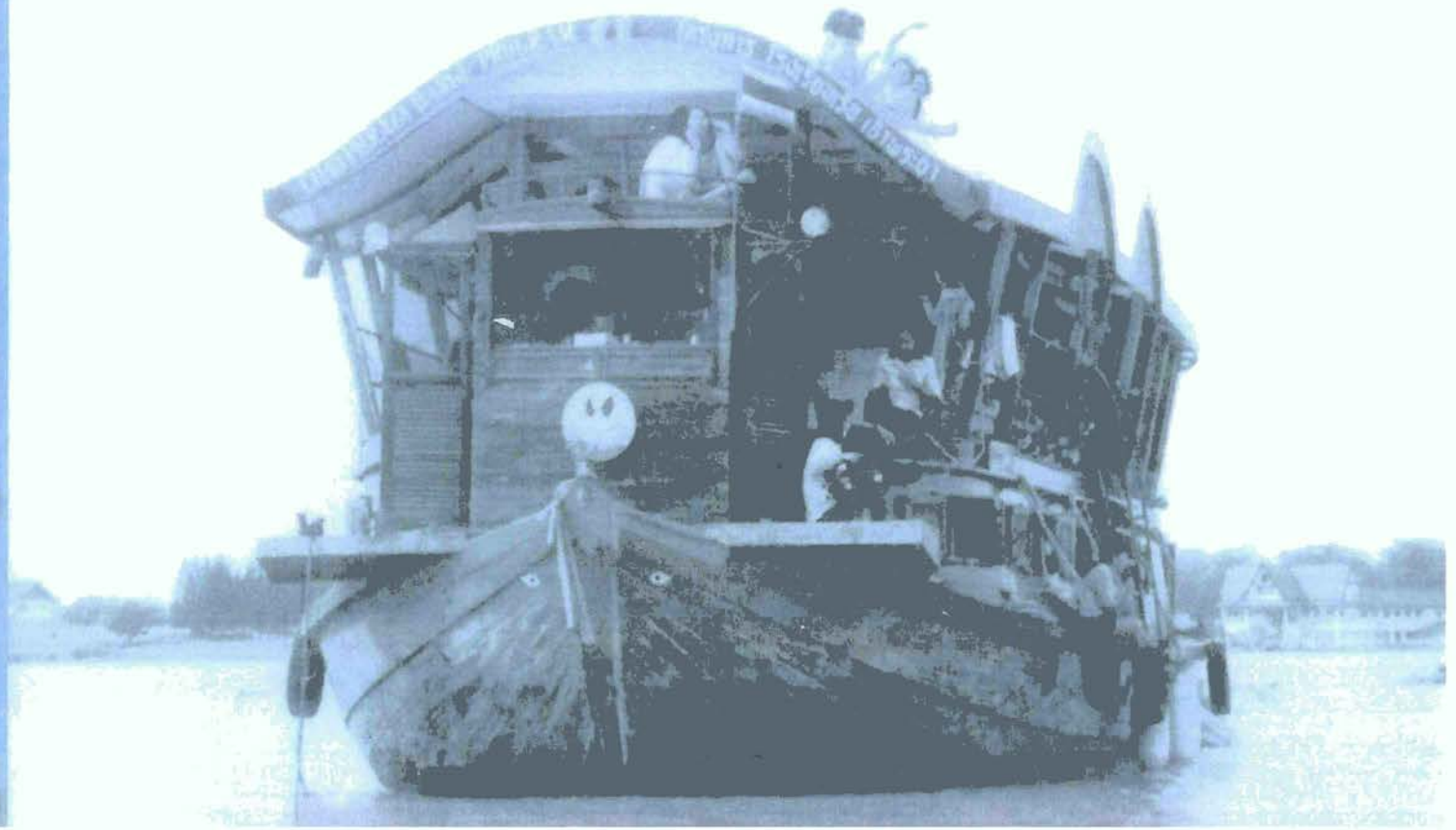
UNEP

Community-based Environmental Education in Asia-Pacific

Proceedings from a Regional Workshop: Bangkok, May 20-24, 2002

A Sourcebook for Educators



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Regional Office for Asia and the Pacific
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Preface

The United Nations Environment Programme facilitated a Regional Workshop for Community-based Environmental Educators, from May 20-24, 2002.

Funding for the workshop was provided by Gaiax Inc of Japan, as part of its support for the Environmental Education, Awareness and Training in Asia and Pacific (EEATAP) Programme, designed to showcase and replicate leading examples of environmental education in the region.

The project also enabled UNEP to continue its capacity building work to support environment education action plans and strategies that are being developed within the region.

This workshop focused on the discovery learning environmental education methods developed by the Thailand Education and Community Development Association, popularly known as Magic Eyes.

The workshop took place largely on a converted teak rice barge, used by the Magic Eyes Chao Phraya Barge Programme, on a journey from Bangkok to waterways around the ancient Siam capital of Ayutthaya.

Along with discovery learning drawing on the natural environs and communities of the river, the workshop examined UNEP's newly released Global Environmental Outlook–3 report and The Accelerator sustainability training tools developed by AtKisson, Inc.

The workshop also provided a forum for participants to share their own experiences and techniques drawn from a wide range of cultural backgrounds. Lesson plans chosen by each participant have also been included in this publication, which is intended as a source book for other educators of the region.

This allowed the integration of three maxims for successful environmental education: "Think Global, Act Local" and "Make Connections".

The publication has been edited by Punjanit Leagnavar, who completed an internship at UNEP's Regional Office for Asia and the Pacific, from May-August 2002.

Special thanks must also go to Magic Eyes educators Robert Steele and Gonthong Thanabodee for the enthusiasm and insights they brought to the workshop, and to UNEP staff members Tim Higham and Mahesh Pradhan who conceived the project, setting the stage for many such interesting and engaging activities in the future.

Nirmal Andrews
Regional Director, July 2002

Contents

Thinking Globally

The United Nations Environment Programme was established in 1972 as the environmental conscience of the UN system.

Global Environment Outlook 3 is UNEP's flagship report on the state of the global environment. It tracks and analyses important environmental issues over the period 1972-2002 and explains the major trends that have shaped our environmental inheritance. It shows:

- we have set up an impressive institutional and legal framework for implementing the environmental agenda
- we have devised an array of policies that work
- but we have not done enough to halt or prevent large scale environmental damage
- and we have become more vulnerable as a result - in terms of health, food security, economic loss and other aspects of human well-being

An outlook section of the report, spanning the next 30 years is presented though scenarios. It shows:

- different decisions can lead us towards very different futures
- today's policy decisions will have a long impact into the future
- the future is very much in our hands

www.unep.org/geo/geo3

Global Environment Outlook 3

We need a map to show us where we are and the road we need to take. We must think global, act local.

What are the pressures on the planet?

Overpopulation

Over the last 30 years the world population has risen by 60%.
- increasing demands on the environment for water, food and energy
- extending built-up areas and transport networks
- creating more pollution and waste

The richest 20% of people consumer well over half of the resources. The poorest 20% consume a maximum of 5% This is an unsustainable pattern.

Global irrigated water and freshwater withdrawals

- Since 1970 freshwater use has increased by more than 50%
- Agriculture has been expanding in most regions and accounts for more than 70% of water withdrawals.

Global Energy Consumption

- Global energy consumption grew by 60% between 1972 and 1999

How does this footprint reflect on the environment?

Our daily demands are increasing. We are leaving an ever larger and more destructive footprint of human activity on the world.

Freshwater

Water is an essential part of human life as well as the source for healthy ecosystems. In the last thirty years increasing population pressures and development have forced accelerating freshwater shortages. By the mid- 1990s 80 countries were suffering severe water shortages and the numbers are still growing presently.

Limited supplies of freshwater is one of the leading causes of diseases related to environmental health. More than 5 million deaths are attributed to water-related diseases, with populations in Africa and Asia unequally sharing the burden.

Policy makers and managers are increasingly trying to enforce water resource management using price mechanisms, water efficiencies and privatization.

Some nations have worked to improve with their freshwater scarcity. For example, in West Africa improvements in irrigation in the Jordan Valley has gained more crop per drop, especially for vegetables. Also, Mashriq countries have increased the

amount of wastewater recycling from zero in 1973 to over 50 million cubic meters a year in 1991.

Land Degradation

Land is being farmed more intensively than it was thirty years ago. The results are development with short-term gains with little regard to the long-term effects. Around 2000 million hectares are presently degraded, equivalent to a size larger than the United States and Canada combined.

Increased food production through the use of unsustainable agricultural practices, poor irrigation techniques, poor water and resource management are just a few factors that are contributed to rising land degradation.

For the developed world, subsidies and consumer demand continue to promote intensive land use.

On a more positive note, greater emphasis is placed on conservation and unharmful farming techniques, including less use of fertilizers and pesticides.

Atmosphere

The threat of global warming is considered the largest environmental problem today. It not only delivers a direct environmental impact but also makes humans more vulnerable in their environments as they are unable to adapt to the forced changes. We are now aware that burning fossil fuels leads to a build up of carbon dioxide in the atmosphere, which causes climatic variability. There has been a 12% increase in carbon dioxide levels since 1970.

Increased natural catastrophes such as floods and droughts have been related to global climate change. The global economic loss in 1999 from natural disasters were estimated to be over US$100 billion.

The depleting quality of air has also led to increased human vulnerability. Approximately 5% of all deaths can be linked with poor air quality and air pollution.

Some countries have made improvements in reducing the levels of carbon in our atmosphere. In Eastern and Central Europe, sulphur compounds have been cut by a third; and in Western Europe, by two thirds.

Forests and Biodiversity

Forest and biodiversity loss is due to pressures of forest conversion to agricultural land, population growth, consumer demand for timber, and industrial development. Human health is also affected by coastal pollution. 250 million cases of gastroenteritis from bathing in seawater is reported each year.

Each year in the 1990s, an area of 16 million hectares of forest, roughly the two-thirds the size of the UK, were lost. In the Asia region, Southeast Asia had the highest deforestation rates at 1%.

There is a high social cost in biodiversity loss as animal and plant species hold many medicinal values yet undiscovered. Pharmaceuticals from genetic resources is estimated at US$75 billion and $150 billion a year.

Many countries have begun to develop afforestation programs. For example, forest coverage in China has increased between 1993 and 2000 from 13.9% to 17.5%. Civil society interests have also forced governments to preserve biodiversity and protect forests.

Coastal and Marine Areas

Natural fisheries are under the threat of being overexploited. Presently, three quarters of fish stocks are fully exploited and many have already collapsed.

Rapid coastal development, tourism, and increased development are all factors that have led to the degradation of coastal and marine areas and poor water quality. These elements have reduced marine resources and damaged coastal and marine ecosystems.

Human health is also affected by coastal pollution. 250 million cases of gastroenteritis from bathing in seawater is reported each year.

Concerned about the health of the shared oceans, governments have drawn up a large number of agreements and action plans covering land-based pollution, oil spills, waste dumping, fisheries, coral reefs, marine mammals and exploitation of the sea bed.

What of the future?

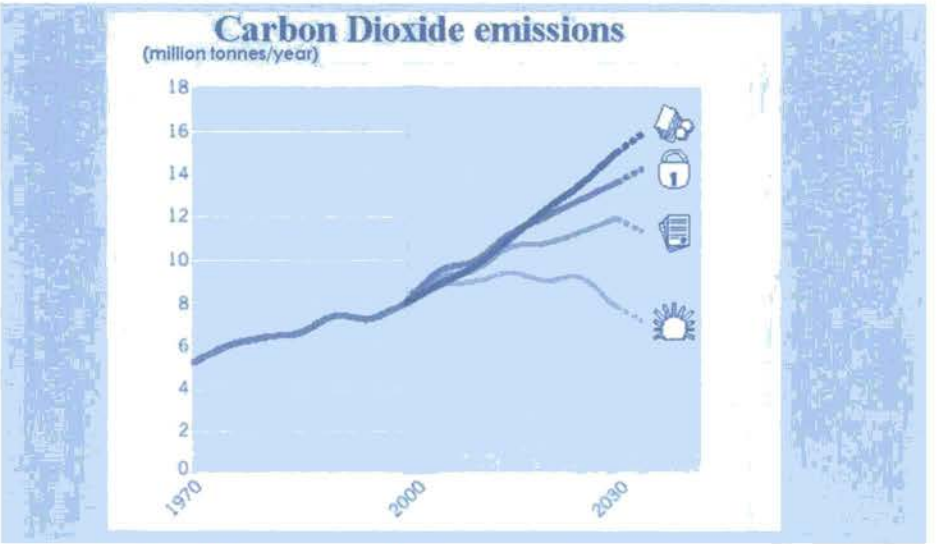
The future of the environment, its progress or depletion, largely depend on the choices society makes in the next thirty years. GEO3 approaches these avenues for the future in four scenarios that predict the ways society might develop in the next 30 years and its consequences for the environment.

The Markets First scenario envisages a future in which most of the world adopts the values and expectations prevailing in today's industrialized countries. Trust is placed in economic approaches to fix social and environmental problems.

In **the Policy First** scenario, strong, top-down actions are taken by governments to try and reach specific social and environmental goals.

The Security First scenario assumes a world of great disparities, where inequality and conflict escalate because of socio-economic and environmental stresses.

The Sustainability First scenario predicts a world with much closer collaboration between governments, citizens and other stakeholder groups. Radical shifts in values and new institutions support sustainable policy measures.



Two contrasting scenarios

Under 'Markets First' :

CO2 emissions double over the next 30 years, as transport and other activities increase.

Driven by resource exploitation, over 70 percent of the earth's surface could be affected by infrastructure expansion by 2032

The total number of people living with hunger changes very little over the next 30 years, and even becomes worse in some regions, such as Africa.

Under 'Sustainability First' :

Improved production and conversion efficiencies, plus changes in behaviour, result in a rapid leveling off of CO2 emissions and a decline by the mid 2020s.

Infrastructure impacts could stabilise over the next 30 years with better planning, more compact settlements and the enforcement of land-use policies.

Hunger reduction is a major goal and there is more balanced development between regions. Dramatic reductions in hunger levels are achieved.

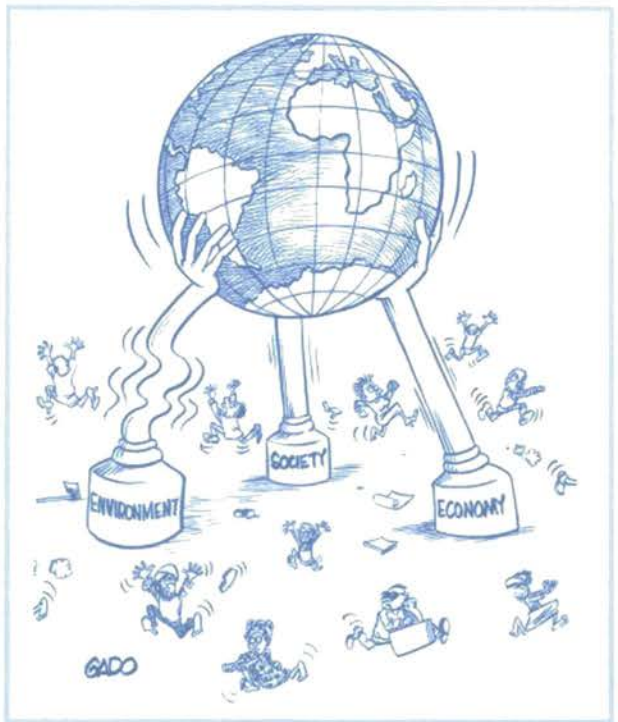
The planet is ours- the choice is ours

GEO-3 makes it clear that our march across more and more areas of the planet is unsustainable. Unless we alter our course now, we will be left with little of value.

GEO-3 scenarios clearly indicate the responsible decisions for the future. It would be irresponsible to sit back and ignore the picture painted.

Fundamental changes in our pattern of consumption are required. It is clear that our actions, or lack of action will shape the environment, and the inhabitants of this extraordinary blue planet.

All must answer the question. Is the path we are taking sustainable?



A view of the present? World at risk - the weak pillar of sustainable development.

Day Three
Global Environmental Outlook

Looking over all this data is very overwhelming. After a while the facts just seem to jumble up and don't make sense anymore; it is too easy to disassociate yourself. The numbers are too big; global economic costs, forest cover, hectares, pesticides, toxics. It just leaves this uneasy feeling of lost causes and regrets. Once I think I have all the energy and optimism in the world, just thinking about these phenomenal changes makes me feel at a loss. Am I going to see a degree of change in my lifetime? Can I even alter the scenarios? The figures?....

But maybe in this workshop what I have found is that building a community is the most effective thing to combat 'social change lethargy'. It is encouraging, and empowering. It kind of gives you this nice thought that Atlas has a group of people reaching their hands out in case the Earth might fall.

Acting Locally

Established in Thailand in 1997, the Magic Eyes Chao Phraya Barge Program created a mission to enhance education through hands-on activities and discovery learning. The environmental education program is set on an old converted rice barge that serves as a "classroom" for students. The barge takes students on a trip along the Chao Phraya River to explore the culture and ecology surrounding the river and in the process, forming a deeper connection with themselves and their relationship to the environment.

The activities used on the Magic Eyes Chao Phraya Barge in the workshop were Water Quality Monitoring, Ko Kret, Pathum Thani Investigation, and Water Hyacinth Investigation. These discovery learning exercises on the barge allowed participants to look at local Thai environments and through thought stimulating activities, create links with the rest of the world. Each can be integrated into any curriculum and was chosen because they demonstrate:

- Constructive approaches to environmental education
- Involving learners in investigation and hands-on discovery learning
- Innovative outdoor experiential learning
- Experiences that guide participants to form a deeper understanding of the connections between the environment and people
- Developing skills through team-work and communication
- Activities that explore sustainability

www.magiceyes.or.th/barge

Water Quality Monitoring

Effective environmental education not only combines hands-on activities, but keeps children making connections after the lesson is through. How can we make the lessons we teach relevant to their world?

Water quality monitoring introduces the issue of water quality and pollution in river systems through a hands-on scientific investigation using 9-10 different chemical, biological and physical water quality indicators. Students must use observation, questioning, analysis and synthesis skills in the process of developing research questions and testable hypotheses. Then learners will carry out a cooperative field research investigation of water quality in the river or stream, with number of sites, dependent upon length and focus of the program, to prove the validity of their hypotheses. Once, they have found the water quality index of their site(s), they share their findings with each other and draw conclusions and recommendations as to how to work to improve water quality.

Background information:

With 30% of all available water not suitable for most human activities, water availability and water pollution are two of Thailand's most critical environmental issues. Water quality monitoring of major river basins and lakes in Thailand has shown a steady rise in pollution levels over the last decade. Surface water quality varies widely in the different regions of Thailand. The Central region (which includes the Chao Phraya and Bangkok) has the poorest water quality, due to dense populations, and intense economic activity. Lower reaches of the Chao Phraya and middle and lower reaches of the Tha Chin (Nakhorn Pathom) rivers are almost biologically dead, and is a major cause of public health concern. Water pollution causes damage to human health, fisheries, and agriculture, and results in associated health and economic costs.

Thailand ranks 14th in the world in terms of industrial organic water pollution, discharging nearly 0.4 million kilograms of effluent per day. Almost a third of the country's total available water is unsuitable for human consumption, which puts Thailand among countries whose water availability is projected as "under stress" for 2000-2025. Despite a worldwide trend of declining organic water pollution between 1980 and 1997, Thailand witnessed an increase of more than 60 % over the same period of time. It has also been estimated that Thailand ranks ninth in the world in terms of biochemical oxygen demand (BOD) effluent per square kilometer of the country's surface area. Agricultural runoff, domestic waste water and industrial effluent are responsible for the poor water quality in Thailand. At the regional level, the bulk of industrial effluent occurs in the Central and Eastern regions, where over 50,000 firms contribute significantly to the country's total organic pollution. The dominant source of organic pollution, however, is domestic wastewater, which is responsible for 54% of total national generation and an average of 60% across regions. Sectors such as pulp and paper, industrial chemicals, food & beverages (i.e. sugar, spirits, dairy, fish, fruits & vegetables) are high generators of BOD, while iron & steel, pulp & paper and nonferrous metals tend to be associated with larger contributions to total suspended solids (TSS).

Activity Introduction

Engage:

Getting the students' attention can be done in many ways, either doing a short skit or role-play (i.e. playing Filthy Phil the water salesman). This involves having them

guess which of three plastic bottles of water is clean enough to drink from (e.g. one contains tap water, one filtered bottled water, and the third contains untreated, but filtered Chao Phraya River water). "Filthy Phil" asks for a volunteer to come up and using just his/her sense of sight and smell, the student must guess which one to drink. This can create a lot of laughs among the student's peers and apprehension on the part of the student volunteer as they try to determine which bottle is safe to drink from. However, do not allow them to actually drink from the bottle they choose. Students will find it difficult to differentiate between the 3 water samples. Ask all of the students how we can really know the quality of water if we cannot rely only on our senses to give us the correct answer.

Explore :

Have all of the students give a rating of the Chao Phraya River from 10 (being pristine clean) to 0 (being biologically dead and highly polluted) and record the number of people who vote for each number. Another way to find out students' perception of the river is to ask them, if they were to write a letter to a friend in another country who had no idea about the Chao Phraya River, how would they describe it to them? Either method will get you a response that you can proceed from. Afterwards, you can point out how within a small group like this there is no general consensus to how clean or how polluted a water system is just from using our senses. It is only through combined chemical, physical and biological monitoring that we can we come up with quantitative data that will give us a result that everyone can understand and agree with. Ask the students what are the reasons that the Chao Phraya is polluted in their opinion. Who is to blame? Is there anything that can be done about it?

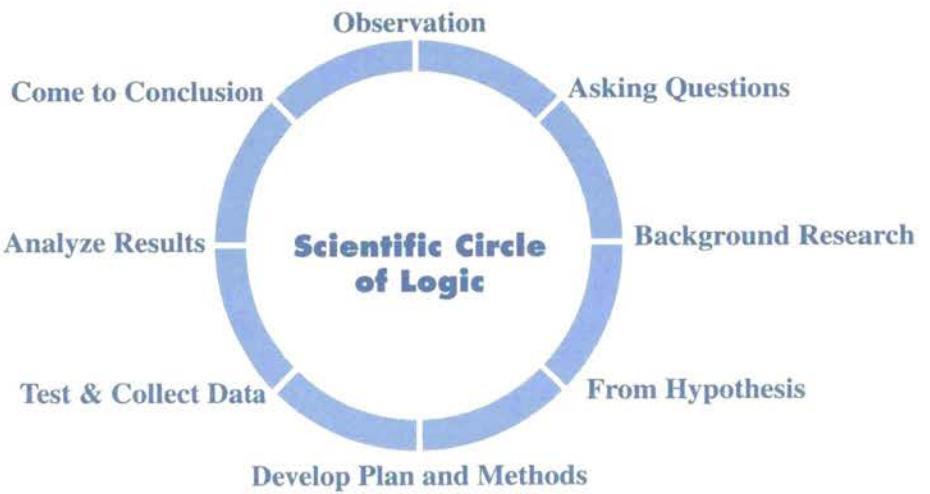
Explain

During the time on the barge students will be taking water samples from different locations along the river, starting in Bangkok and moving north. They will conduct various chemical, biological and physical tests on the water, and then analyze the results to come up with an overall "Water Quality Index" value for that particular location. Each site will then be compared with other sites to determine the extent, factors and causes of pollution in the river system. There are nine parameters that we look at when we determine water quality. They include Dissolved Oxygen (DO), Fecal Coliform, Temperature, Phosphates, Nitrates, Turbidity, Total Dissolved Solids (TDS), pH, and Biochemical Oxygen Demand (BOD).

Instructors should first make sure that students understand what the different tests are and how pollution actually enters into a water system. This can be done in several ways depending on the age of the students. With younger students you can have them develop a "pollution river soup", and they must identify ingredients and where they come from. With older students you can develop a table or chart and using a Socratic form of questioning: get them to identify and trace the types of pollution entering the river, where they come from, and what their affects are upon the river ecosystem. During this time instructors should introduce terms such as: point and non-point source pollution, cultural euthrophication, etc.

Instructors should then delve into the relationships between the various parameters so that the students understand how each of the parameters that they will be testing influences and is influenced by the others. This will reinforce the need to communicate between expert groups and for them working cooperatively in a field research simulation. The different expert groups will be forming different tests and must pool their data with other groups to get an overall water quality index value.

With older students only, using simple and humorous analogies that they will understand and follow, go through the "Scientific Circle of Logic" with them, so that the process of developing their hypotheses and then testing and analyzing them is logically sound.



Finally, instructors should explain that the system we use comes from William Strapp's book on Low Cost Water Quality Monitoring, for determining water quality index values for each of the 9 testable parameters as well as the overall "Water Quality Index" (WQI) value for each site, using the graphs developed for each test, Q-value and weighting factors.

Activity Outline

Divide the group into three expert groups – Biological (Fecal, BOD, DO), Chemical (pH, Phosphate, Nitrate) and Physical (Temperature, TDS, Turbidity). One Instructor should be with each expert group to help them develop group and individual hypotheses as well as to explain the nature of each test that they will perform in more detail. Once the group has come up with a hypothesis, they should fill out the "River and Land-use" observation table, taking into account vegetation, water color and smell, current direction, and human actions both on the river as well as along both banks of the river.

In each expert group, instructors and students should determine roles (who will do what test as well as the different duties associated with the testing procedures – i.e. going out in the dinghy to collect water samples). Students should then carry out the test and determine the water quality index for each. They should record this in their journals as well as on a large white board table that will serve all groups.

Evaluate

Once all of the tests are completed, have the students meet back with their expert groups to analyze their results with respect to their group and individual hypotheses, particularly looking at the various human and natural factors that have influenced what they have found and why, or why their hypothesis has not been supported. Students should also discuss amongst themselves aspects of their testing and data collection methods to understand how they would make it better and more reliable next time. Finally, each group will present their findings and analysis to the other two expert groups, focusing in on trends they have noticed, causes they have identified, as well as explaining how they conducted the various tests.

Elaborate

During the presentations and also afterwards, instructors should facilitate discussion amongst the students, encourage questions (sometimes by providing good examples of questions to ask) and have students then apply what they have learned from this "hands-on" activity to their own lives. Questions should follow that have students explore their feelings about the river, their connections to it, and what their responsibility is in protecting it.

The Global Perspective: Freshwater

One-third of the world's population is living under moderate to severe access to safe water supply. Global demand for water not only causes water stress, but untreated water and poor sanitation practices is one of the largest environmental health in the world, with Asia and Africa suffering most of the burden. An estimated 1.1 billion people lack access to clean water and 2.4 billion to proper sanitation. (GEO3-UNEP)

Participant Debrief Comments

Perceptions are not always right. We are conditioned to accept the source of pollution is always factory discharges.

"Children don't relate to textbooks. The toughest thing on the barge is to keep it challenging."

Look beyond the obvious. Look at the relationships surrounding the river that can be detected by indicators.

What is the threshold of change that an ecosystem can absorb without overwhelming the stability of the system?

Day One
Water Quality Monitoring

We have been on the barge for nearly two hours now and are slowly moving upstream. I am noticing the houses and temples along the river and the people that come out to greet us as we float by. I have some sort of connection to the Chao Phraya, even though I grew up thousands of miles away. My family is still here. Their house is built on one of the klongs that flow into the river. Traveling there for the first time, a whole other culture is revealed around the banks. River communities have such a unique way of life. It seems very slow, and unchanging. But at the same time they are perhaps the most vulnerable to change, as everything they depend on is in this river. They bathe in it, brush their teeth in it, fish in it, use it as their transportation system, and it even provides a kind of shelter. I can't imagine myself being so dependent on something that is in constant change and so vulnerable to everyone else's behaviors. In one aspect the river can be their life source and in another, it can also be their enemy. The water can harbor invisible diseases, become prone to floods and over time even the fish caught for food can become scare. Poverty is high in these communities, and that makes them so much more susceptible to these changes because they have such limited capacity to cope. I was told that these changes have not gone unnoticed, they pass through generations and people adapt. My family no longer relies on fishing as their source of income like they used to. Instead, groves of fruit were planted years ago to substitute the loss. It is amazing to me how the attachment to the river is stronger then the forces that change it. They will remain there just like most of these communities through the challenges of adapting to change, just like they have done many generations before.

Ko Kret Investigation

Patterns, Pieces, and Processes

Pieces, Patterns and Processes is a community investigation activity in which participants develop investigative questions based on some background knowledge as well as their own interests within three parameters; Environment, Economy and Society/Culture. They then go into the community to investigate and try to find the answers to their questions using observation, interviewing, map making, and if possible, hands-on experience in the process. This activity gives participants the opportunity to discover things about the lives and livelihood of the community, its people and their relationship to their environment. The primary objective of this activity is to have participants discover the connections and relationships that exist between the three sectors above and then to examine their own lives and communities within this context.

Background Information

Pieces, Patterns and Processes (PPP) is adapted from the various needs assessment techniques (participatory rural appraisal (PRA), rapid rural appraisal (RRA) and other similar approaches) used by NGOs and others to learn more about a particular place in a way that directly involves the local community development stakeholders. PPP asks participants to develop preliminary questions that will enable them to more effectively go into a community to collect information (the pieces) through a variety of methods, including: observation, interviewing, mapping, etc. The pieces of information will at times seem quite isolated in nature, but as more pieces are collected, trends and patterns that illustrate the connections, linkages and relationships within the community should start to become obvious.

Activity Introduction

Engage

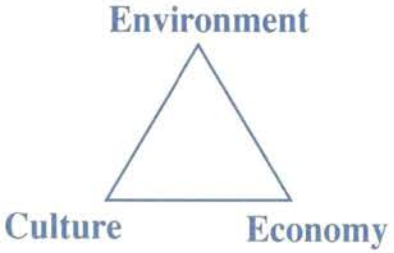
As this activity relies a lot on observation (more than just on the surface). An effective introduction to get the participants thinking about what things color our "observational lenses" (i.e. culture, language, past experience, education, etc.) is to have them sit at one end of the barge/room then show them a photo or picture that you have pre-selected. With a quick view, it will be difficult for them to determine what it is right away. Show the picture from about 4-5 meters away and for only a short time (3-10 seconds). Ask the participants what they saw. Invariably you will receive several different answers. Come closer to the participants and show them the photo once again for the same amount of time. Ask them if they now see the same thing. Finally when you are close enough they will be able to see what it is. Discuss with them why, looking at the same picture, they had different interpretations of what it represented. Invariably, their answers will be related to language, culture and past experience and how these things influence our interpretation and superficial analysis of outside stimulus. Ask them how our individual subjective lenses in tandem with surface observation can lead to misinterpreting a community, its issues and the processes taking place. This has the potential to lead to incorrect judgments and prescriptions to solve the issues present.

Explore

Provide the participants with some background information on the community that they will be investigating, incorporating as much info as possible about the history, culture and other aspects that will help them form their own more penetrating questions. If you have a map of the community, sometimes this helps them visualize some of the issues that they may want to ask questions about and investigate more closely.

Explain

Explain to the participants that they will go into the community and will investigate it from three different angles: Environment, Economy and Culture. Show them the PPP triangle (below) and have them brainstorm what is meant by environment, economics and society. The buzzwords that they come up with will provide a good basis for them to develop investigative questions.



Ko Kret Community Background:

Up until the mid 1700's the tiny island of Ko Kret was peopled by Siamese living mostly in the interior where farming was the best. In 1757, Hongsawadi (Pegu), the capital of what used to be Mon country (now central and southern Myanmar) was sacked by the Burmese and many thousands of Mon people fled to Thailand. King Taksin welcomed the Mon as refugees in the country, and permitted them to settle in areas along the Chao Phraya River including Ko Kret, and the area just across from it, Pak Kret (Kret meaning 'where the rivers join').

Due to laws banning foreigners from certain professions including farming, the Mon people of Ko Kret needed to find another way to earn a living. Using the good clay found in abundance on the island at that time and employing techniques passed between generations of Mon families over thousands of years, the Mons built their pottery making enterprises.

Today, the people of Mon heritage simply consider themselves Thai, but there are still cultural differences that endure. For example, the architecture of a Mon Buddhist temple always has a pole out front topped by a figure of a swan representing their home country. This arises from the belief that the Buddha spotted a swan while walking one day and predicted that at that location a city would be born. Thus, Hongsawadi (Pegu), the capital city of the Mons came to be.

Activity Outline

1) First divide the large group into three expert groups to form their own discovery questions. Have them sit together and discuss what they want to find out as well as coming up with 5 – 10 questions that will focus their investigation. Some times one instructor per expert group is needed to help facilitate the group's discussion and question formulation depending on the age of the participants. Have the participants start with easy questions that begin with "what" then add some "how" and "why" questions. Expert group members must also agree on a symbol for each of the common features they think that they will encounter in the community to go on their map (e.g. the economy group may want to draw a small bag or soda bottle to represent a shop selling goods).

2) After each "expert" group has agreed on their investigative questions, divide the expert group members into 2-3 new groups so that each new group has 1-3 rep resentatives from each of the "expert" groups

3) Students go into the community, accompanied by an instructor, seeking the an swers to their self-generated questions, while mapping the features they see that relate to their focus. Time should be given for participants to stop and interview local people (interviewing a diverse mix of people, ages, different gender, work, etc. is preferred to just talking to one person or several people from the same place)

4) At times there may be opportunity for participants to have hands-on experiences in the community (e.g. making pottery, planting rice, making mud bricks, etc.)

The Global Perspective: Concepts for Educators

How exponential growth can catch you unawares….

If 1 lilly doubled in size each day to fill a pond in 30 days. On the 29th day how full was the pond?

(answer - half full and half empty)

How complacency may be your undoing…

We find it difficult to detect long term, deadly trends.
Many natural processes are complex and there are long feedback times in detecting problems, finding solutions, and seeing results.

A frog placed in gradually warming water, won't jump out before it is too late and it is boiled alive – the boiled frog syndrome.

Evaluate

Once the groups return from the community, expert groups should meet back together to discuss what they found and organize their information. Place the large master map on the floor. Write Environment, Economy, Society/Culture on the paper around the map. Leave space for participants to write down their facts. In their walking groups students come to the map and record their observations. They will also create a legend with all their symbols, and may write 3-4 additional facts (pieces) that they discovered while in the community.

After the map is complete, have each expert group sit together around the map. Each one will make a short presentation of what they found out. Instructors should encourage the other groups to listen and to ask questions after each presentation. Instructors should then facilitate a discussion around the connections and linkages that exist between the three sectors, asking questions about the meaning, causes, consequences, processes occurring, etc.

In Ko Kret Community the workshop participants developed an indepth look at the island:

Environment:

1/3 of the island is residential; 2/3 agricultural
To clean up rubbish, Ko Kret has a waste management program for 35 baht a month

Economics:

Average income is 5,000-8,000 baht/month
The major industry on the island is clay pottery

Culture:

Mon community still present on the island
Buddhism is the predominate religion in Ko Kret

Elaborate

Finally, the participants should be challenged to apply lessons learned from this activity to their own lives and communities and the implications for the preservation of a healthy environment as well as cultural preservation and economic prosperity.

Participant Debrief Comments

"Well the dogs look healthy." – on whether or not there was an indicator of health conditions

We can use Pieces, Patterns, and Processes in our own communities to access their sustainability.

"Experience in education is about trying and risking."

True sustainability is about making sure the entire triangle is addressed.

Day One
Ko Kret Investigation

The groups have all split up on the island along different paths. I have decided to tag along with the Economy group. We have focused on a list of discovery questions to ask such as: What kinds of occupations do people on the island have? What is imported or exported? Is there tax? What is it used for?

Our first stop is at a clay pottery factory and warehouse in the middle of the town. It smells damp and old. An older woman is sitting at the wheel, and next to her are lines of unfinished pots and vases. I watch as she carves and molds each piece like she has thousands of times before. It is like she is playing an old and familiar instrument and the notes of her song are sculpted into the curves of the clay. "Do you make enough money to keep and save?" Someone asks her. She tells us she makes enough for her day. For every 2 pots she makes, she gets 1 baht. In a whole day's work she will make roughly 400 baht, an equivalent to about 5 dollars. She proceeds to tell us how important the clay industry is to Ko Kret and her family. It brings sources of income, jobs, and money to the island. Recently, the island has been attracting more tourists, therefore, the market for the clay pottery has become even larger. But I can't help but wonder how much profit this industry is actually generating? Is industry and economy even a good measure of sustainability? Is sustainability a good measure of happiness? What does sustainability mean to this woman? Will it alter her life; make it any easier?

My thoughts continue as the woman looks at me and smiles, her hands still plucking away at the wet clay.

Pathum Thani Market

What simple changes can we individually make to move in a sustainable direction?

The Pathum Thani Market activity, or "Shopper's Choice", is an activity that allows learners to have a hands-on experience in shopping for food and budgeting money in a local fresh market. Through one on one interaction with the market and communicating with vendors, students discover the relationships between economics, the lifestyle of the people who use local Thai markets, and environmental considerations. It is an activity also designed to help participants discover their food source, where it comes from, how we get it, how much it costs, and how it is packaged.

Background Information

The "fresh market" had considerable meaning for Thai people, past and present. In the past, people used the barter system to exchange what they needed from others. This was before money was used to price things. Going to the market was an opportunity for people from outlying villages and households to come together for socializing and exchanging information. The markets were always the place that people could buy not only food, but also other necessities of life, such as clothes, household products, medicine, and even slaves during the slave period. Markets were also a place where men met women and started their love story; because people didn't allow young men to see women easily. They had to pretend that they went to the market and bought something, while they sent secret love notes and poems via food, clothes, etc. Even government officers used the market as a place where they could make announcements or inform people of the latest news. Citizens used the market as a place to exchange news, gossip, or just hang out.

Nowadays, the market is still acting as the place to exchange food products but using money. The idea of a "market", is also changing from that of an outdoor, fresh market, to the indoor and air conditioned supermarket. The traditional style market is still seen in the countryside, while the latter is increasing in numbers, selling new brand name products, especially in the city. The prices of food in the supermarket are higher than normal because there are many more steps in the process of getting it and keeping it there: a/c charge, refrigerator machine, worker's salary, transportation from the site to town, packaging, and so on. This will be a good chance for students to come and see what we used to be in the past, and also know how to use money effectively to buy necessary things.

Activity Introduction

Engage:

The first part of the activity should engage the learners by simulating that no more food was left on the barge. Their task is to plan one dish each for 25 people and find all the ingredients at the market, but keep a budget of 500 baht (US$12).

Explore:

These questions are asked to introduce the activity:

- Who can tell me where their family usually shops? Why do you shop there? Can someone describe a typical shopping experience in the place where their family shops? What sort of things can you buy there?
- How much do you usually spend for lunch at school, or dinner with your family?
- Who can tell me where exactly their food comes from? How did it get to the market or supermarket where you shop?

Explain:

Each group will buy things for cooking one dish with the limited money for 25 people on the barge. Each of the groups should plan their menu together, using a menu description that we have on the barge to help them estimate the amount of each thing. In a journal they should record the answers for these questions:

- Where does the food come from? (farm, natural forest, river, etc.)
- Who sold the food to these merchants? (farmer, company, etc.)
- Which group of people come to buy food in this market? (housewife, food vendors, third agent, etc.)
- What kind of things do they use for wrapping or packaging food for their customers? (plastic, Styrofoam, banana leaf, others)
- What is the most environmentally friendly vendor in the market? What things did you notice about this vendor that indicate that he/she is environmentally friendly?
- Find two examples of recycling/reusing of resources in the market. What are they?

Activity Outline

Activity:

At Pathum Thani Market, the activity will take around 1 hour to buy food and interview the merchants. Instructors should go along with each group, but should be less involved in the conversation between students and local people. Ask the students to carry Tupperware, cloth bags, and other containers to take back to the barge.

Evaluate:

The students come back to the barge and share with each of the other groups about what they bought from the market, how much it cost, where it came from and other things about their market experience. Instructors should encourage the group to present all materials and data they have found to show the relationships between the different foods. Are they first level (plants)? Second level (herbivores)? Are they considered producers or consumers? How much energy went into producing the food and getting it to the market? What, if any, are the environmental impacts of things they bought and how they bought them?

Elaborate:

Using questions and discussion, have students compare their experience at the fresh market with the places where their families normally shop. Will it cost you more money than in the local market? Why? Answers from the students is better than we tell them, then we can conclude or guide them to the reasons beyond that, such as transportation, maintenance cost, mark up the price by the supermarket, and so on. The package of the product is also the reason of higher cost, ask the students if they can think what we can use instead of plastic and Styrofoam. What is the environmental impact of such packaging? Let everyone find at least one way to wrap or pack an item by using natural products.

Day Two
Pathum Thani Market Investigation

I had never seen a 'fresh market' until I came to Thailand. In the States, the idea of local usually means buying food from the closest supermarket. I never realized before the energy costs that go into making the simplest things. They say the cost of convenience is high; and looking at the convenience of a supermarket, with aisles packed with variety: fifty flavors of ice cream to chose from like dark chocolate, chunky chocolate, chocolate chip, chocolate crunch, the list goes on, the future effects of this air conditioned, frozen fresh, market, is the least bit 'convenient'. This accommodating lifestyle causes an unbelievable demand for resources and brings them to the brink of overexploitation. The cost of this convenience and variety is a key contributor to the ecological pressures on this planet.

Who do we point the finger at but ourselves? This power we have to choose our own lifestyles and be consumers should ultimately be consistent with sustainability. We should all make changes in our lifestyle for the benefit of the environment and posterity. It is really just the simplest behavioral changes that can do so much.

Participant Debrief Comments

Consumption patterns must be equal to biological productive capacity for a sustainable society.

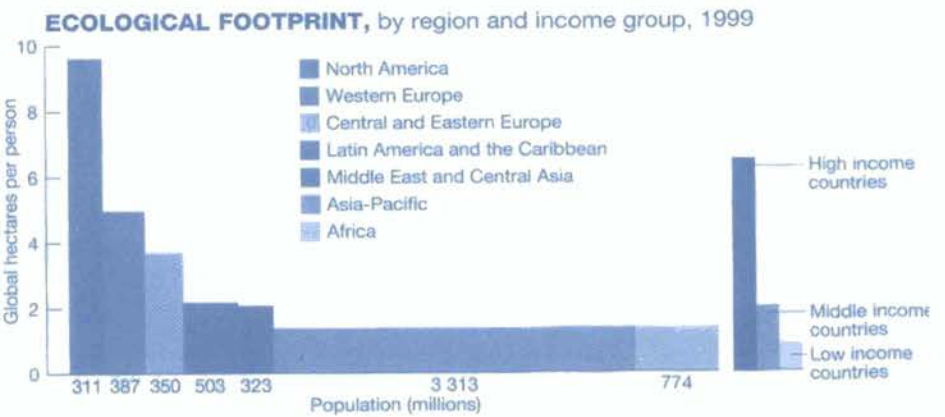
Students are often so unaware of the origins of what they eat that they don't see the effects of these choices.

"In EE you have to incorporate the idea that 'I am a part of the environment'."

The Global Perspective:

Ecological Footprint Analysis

The total land area needed to sustain the current amount of resource consumption and waste generation is an individual's ecological footprint, this includes land needed for food consumption, energy needs, waste disposal, etc. On average, 2.3 global hectares is used per person. The divide between regions' consumption patterns are illustrated below. North America and Europe on average had consumption patterns that were over six times that of low-income countries. You can measure the size of your own footprint using the calculator at www.earthday.net/footprint/index.asp



From:
WWF Living Planet Report 2002 (www.panda.org/livingplanet/lpr02)

Water Hyacinth Activity

Turning the bend on the Chao Phraya River, the barge gets confronted with masses of green water hyacinth that looks as though it swallowed the water whole and became the river itself. How did this plant come to dominate the river ways of Thailand?

In this activity, participants use their imagination and creativity to recreate the story of how water hyacinth (Pak Top Chawa) came to be in Thailand and why it has been so successful. Individually or in pairs, participants are given objects that relate in some way to this story. Students have to find a relationship between their object and the water hyacinth plant. They will then share their ideas with everyone, to see how close they come to the truth! Afterwards, participants will conduct a "hands on" investigation of the plant, looking closely at its "special" adaptations as well as the creatures (macro invertebrates) that make their homes within the roots. Finally, using an identification chart developed by Green World Foundation, students calculate the results of their macro invert sampling to arrive at an index correlating to water quality. Students can continue their observation skills by recording their finding as drawings in their journal.

Background Information:

Water hyacinth (or Pak Top Chawa in Thai language) is frequently seen along the Chao Phraya River. Most people regard it as a nuisance since it often forms a thick blanket of impenetrable vegetation in the main river, its tributaries, connecting klongs and even lakes and ponds. Originating from the Amazon River Basin of what is now Brazil, it came to Thailand via Indonesia when King Chulalongkorn (Rama V) brought it over to place in the Palace gardens and ponds from the island of Java (what is now Indonesia). During the annual flooding of the Chao Phraya, it escaped into the river and established a new place (niche) in the Chao Phraya River ecosystem. Without any natural predators or other co-evolved organisms to keep it in check it spreads and grows exponentially, especially in areas where there is a large nutrient load entering the water system, such as high organic pollution from sewage and agricultural runoff. Though it is seen as an exotic pest, it also now fills a critical ecological role by providing habitat for many small animals and macro invertebrates that make-up the base of the food web of this riverine ecosystem. The variety of life found in the roots can also be used as a low-cost and easy to understand indicator of general water quality.

Activity Introduction

Engage

Ask what the students have seen floating on the River since they have been on the Barge or have a covered up tub of water hyacinth and get the students to feel it through the cover and try to guess what it is. Reveal after 2 or 3 guesses.

Explore

Ask what the students already know about the plant. Where have they seen it before?

Explain

Tell the students you would like them to think about the water hyacinth in a special way. Tell them that you will give each pair an object. They must work together to think of a reason / story that links the object they have to some aspect of the water hyacinth. After 3 - 5 minutes thinking time the students will share their ideas.

Activity Outline

Hand out objects. Students have a short preparation time and then share their ideas with the rest of the group. Facilitate the session by commending the students on their stories and revealing facts about the water hyacinth.

Filter paper: Roots filter the algae out of the water so can be used to clean ponds
Boat: Leaf is like the sail of a boat to propel it along in the breeze (This helps with dispersal to reduce competition)
House: The plant is the home of many macro – invertebrates
Basket: Many crafts / household products can be made from the fibres of the water hyacinth
Styrofoam: Light and floats , like the plant, similar structure to the stalk
Soccer Ball: Many people think of Brazil when they think of the best Soccer team in the world. Water Hyacinth came originally from the Amazon Basin which is now Brazil
Mask: Come from Indonesia, as did the water hyacinth before it reached Thailand

Explain

Tell the students they will investigate the plant for macro invertebrates. Through interactive questioning, make sure that
all students know what they should be looking for. Remind the students to keep the plant on the big wooden trays. During the course of the activity students will be involved in the following:

1) Students investigate the water hyacinth plant by carefully pulling the roots apart and placing all macro invertebrates into small dishes with water in.
2) Students use magnifying glasses to observe the animals closely.
3) Students draw the animals in their journal
4) Students record the number and type of animal found in their journal and use the chart and accompanying index to indicate water quality.

Evaluate

Ask the students about the value of the Water hyacinth. Is it the nuisance it is often quoted as being? What can it contribute to the Chao Phraya? What is its role in the ecosystem? What adaptations does it possess that has made it so successful in Thailand and other tropical countries? Completion of journal questions

Elaborate

Mention Royal Projects promoting craftwork with water hyacinth.
Link back to any previous discussions on plant / animal adaptation.

Day Five
Water Hyacinth Investigation

The water hyacinth activity has made me think about the contrasts in education in Thailand with that of the US. A couple months ago I taught English at a secondary school along the outskirts of Bangkok. The differences in the teaching structure were so striking to me. The classroom is built around textbooks and facts. The communication between the teacher and students is one way, as students are not very encouraged to ask questions or speak when they don't understand. The students told me they felt their learning was just memorization. Is that a good basis for forming connections? In terms of environmental education or education in itself, ideas such as discovery learning and experiential learning are not very available in Thailand. It is still a new concept that has only been introduced in schools not through the school educators, but outside organizations. EE is hard to bring into the classroom, but I think kids embrace it so easy because it gives them that availability to use imagination and creativity.

The Global Perspective: Biodiversity

Biodiversity refers to the variability among living organisms from all sources, including terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are part (UNEP-GEO3). Conservation and protection areas are a way for governments to curb the effects of habitat loss and biodiversity loss. In the Asia and Pacific Region 8.28% or 287 million ha are under protected areas.

Making Connections

AtKisson, Inc. is an international network of sustainability consultants that design and produce training tools to empower organizations, companies, and people to understand the logistics of sustainability and give them concrete direction on how this ideal can be achieved.

The Accelerator, developed by AtKisson, is an educational toolkit for organizations to understand the processes and concepts of sustainability. This workshop was the first time the training exercises called 'Building the Pyramid' and 'AMOEBA: The Innovation Diffusion Game' have been used in Asia.

www.atkisson.com

Building the Pyramid

Sustainable development is development that "meets the needs of the present without compromising the ability of future generations to meet their own needs" World Commision on Environment and Development, "The Brundtland Commission" – 1987.

Building the Pyramid represents a map and tool that can be used to discover avenues for sustainable development, or as a framework for planning. It is used to develop concrete step-by-step strategies to explore, accelerate and diffuse sustainable innovations. The activity has been used all over the world for communities and groups to accelerate sustainability. Environmental educators can use this tool for discovering ways to sustainability in their own communities, and as an effective teaching strategy to build skills such as teamwork, problem solving and communication.

The basis of Building the Pyramid is exploring four separate sectors that have direct influences on sustainable development. Each sector -- Nature, Economy, Society, and Well-being -- is placed together to form a compass to serve as a symbol of sustainability. The pyramid is physically built level by level on top of the compass. It is a blueprint for the sustainable development process.

These are the Compass Points of Sustainability:

N -- Nature:
Natural resource use, environmental quality, indoor/outdoor environment,ecosystems

W-- Well-Being:
Health, happiness quotients, living/working conditions, personal fulfillment

E -- Economy:
Trade, business, production of goods and services, transportation, technology

S -- Society:
Community, social institutions, government, culture

Like Patterns, Pieces, and Processes, Building the Pyramid focuses to connect and decipher the complex relationships between all four elements that make a sustainable society. It allows educators to understand economists, institutions to connect with individual well-being. It integrates the positions of different stakeholders and forces cooperation between them.

Each of the five levels of the pyramid has a process of discovering pathways to sustainable development:

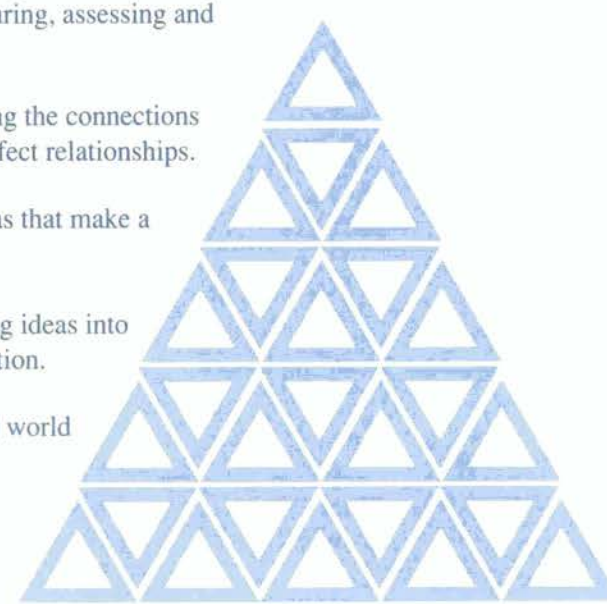
Pyramid Level 1: **Indicators:** Measuring, assessing and linking trends.

Pyramid Level 2: **Systems:** Analyzing the connections between elements that have cause-effect relationships.

Pyramid Level 3: **Innovations:** Ideas that make a difference.

Pyramid Level 4: **Strategies:** Turning ideas into reality; how to implement an innovation.

Pyramid Level 5: **Agreements:** Real world commitments.



A fictional community called Sabai Sabai was created for this workshop designed to represent typical Asian concerns and issues. Participants were asked to role play as if they are citizens of this fictional province throughout the exercise.

General Description

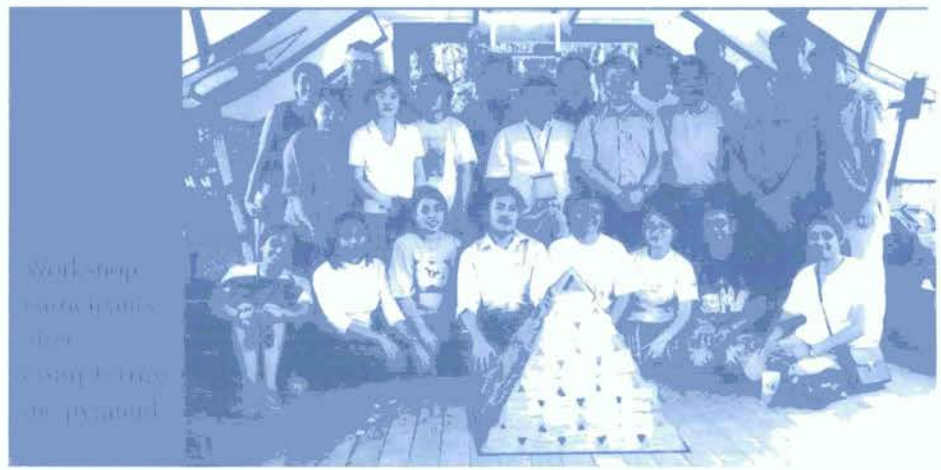
The province of Sabai-Sabai is the smallest province in its country, and it also has a relatively low population density. It lies at the border of a neighboring country.

Most of the people of Sabai-Sabai live in a very fertile valley surrounded by limestone and granite mountains. The mountains and valley were once part of a vast tropical forest that covered three of the region's present countries. Now, there is only a remnant piece of forest left in this country, up in the mountains. This piece of forest straddles the border with the neighboring country. (In the neighboring country, the forest is still fairly intact.) Within the province of Sabai-Sabai, there are 9 villages and one fast growing town of around 100,000 people. In four of those villages, the people are members of two different ethnic minority groups, often grouped together and called "hill tribe" people by the ethnic majority. These four villages lie within the boundary of a newly established national park that was created to protect the remaining forest and its biodiversity. The park also contains the headwaters of many of the streams that flow into the valley to create the major water course in the region: the Sabai River. The large town, called Sabai, is populated primarily by the majority ethnic group. They were traditionally lowland rice farmers, but that is not the case for those living in this rapidly urbanizing town. A large number of those living in town having been here one generation or less. Mostly they are employed in the service sector, manufacturing and in trade/business. The other five villages are home to the traditional lowland rice farmers of the major ethnic group. These five villages are located in the valley close to the main river. Two villages lie up river, just above the confluence of the two main tributaries.

After the participants familiarized themselves with the Sabai Sabai model, they separated into four groups representing each side of the compass—Nature, Economy, Society, and Well-being.

In their respective groups, the participants complete four steps for each level of the pyramid:

- **Brainstorming and Labeling:** During the start of each level, group members will brainstorm individually and then caucus to collaborate their ideas onto the labels. At this stage their triangles were connected into one piece.
- **Presentation and Assembly:** After the groups have all completed their section with the labels attached, each group presents what they have come up with to the whole group, then connected it to the pyramid.
- **Making Linkages:** The teams assembl into linkage groups with one member of each compass group together, forming four teams. Each member must bring to the linkage group his/her compass group's list and identify links between each compass point.
- **Completion:** When the linkage teams were ready, each team presents their link ages to the entire group, and then physically link the elements together from one compass point to another using string.



Pyramid Levels

Level One: Indicators

"Like on T.V. shows you have laugh meters."

Indicators are measurements that explain trends or conditions. They assess complex information and translate it into simple terms. For this exercise the participants are asked to explore nine indicators on each of their compass points, and build the first level of the pyramid. Below are the indicators each group discovered for Sabai Sabai:

Nature
- Area of forest cover
- Water Quality
- Area of slash and burn farmland
- Water Quantity
- Population of Sabai Sabai monkeys
- Population of endemic plants
- Population of growth trends
- Soil quality
- Number of tourists and visitors

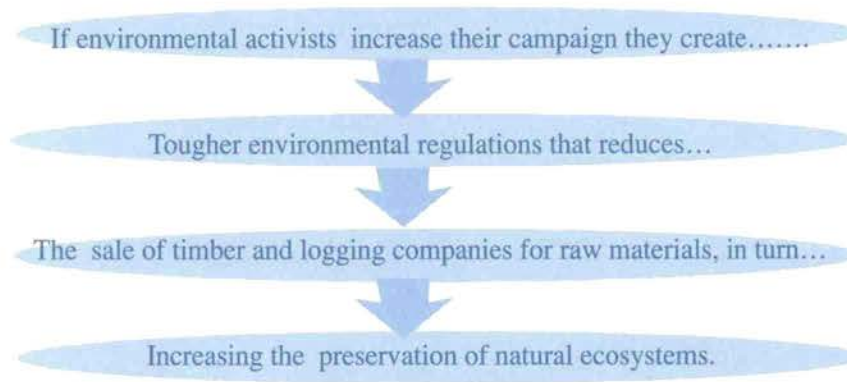
Well-being
- Density of population
- Number of schools
- Education levels
- Participatory Community Development
- Crime Rate
- Infant Mortality
- Price of health care
- Welfare system
- Number of births and deaths

Economy
- Number of tourists and visitors
- Number of roads
- Number of markets
- Water consumption
- Tax payment
- Electricity consumption
- Number of tourists
- Fertilizer consumption
- Number of hotels

Society
- % of solid waste
- Number of crime incidents
- Number of community councils
- % of enrolled students
- Number of government clinics
- Number of serious tribal conflicts
- Media sources
- Number of voter turnout
- % population growth

Level Two: Systems:

This level helps participants to recognize systems on their compass points. Systems are elements that have cause-effect relationships. The elements used are drawn from the indicators identified in level one. A system could be mapped showing linking relationships between ecosystems, raw materials, environmental activist groups, and environmental regulations.



Seven systems were then agreed upon in each Compass group. Here are the each Compass point's linkage results:

Nature:
Forest land degradation water sabai monkey endemic plants soil tourists

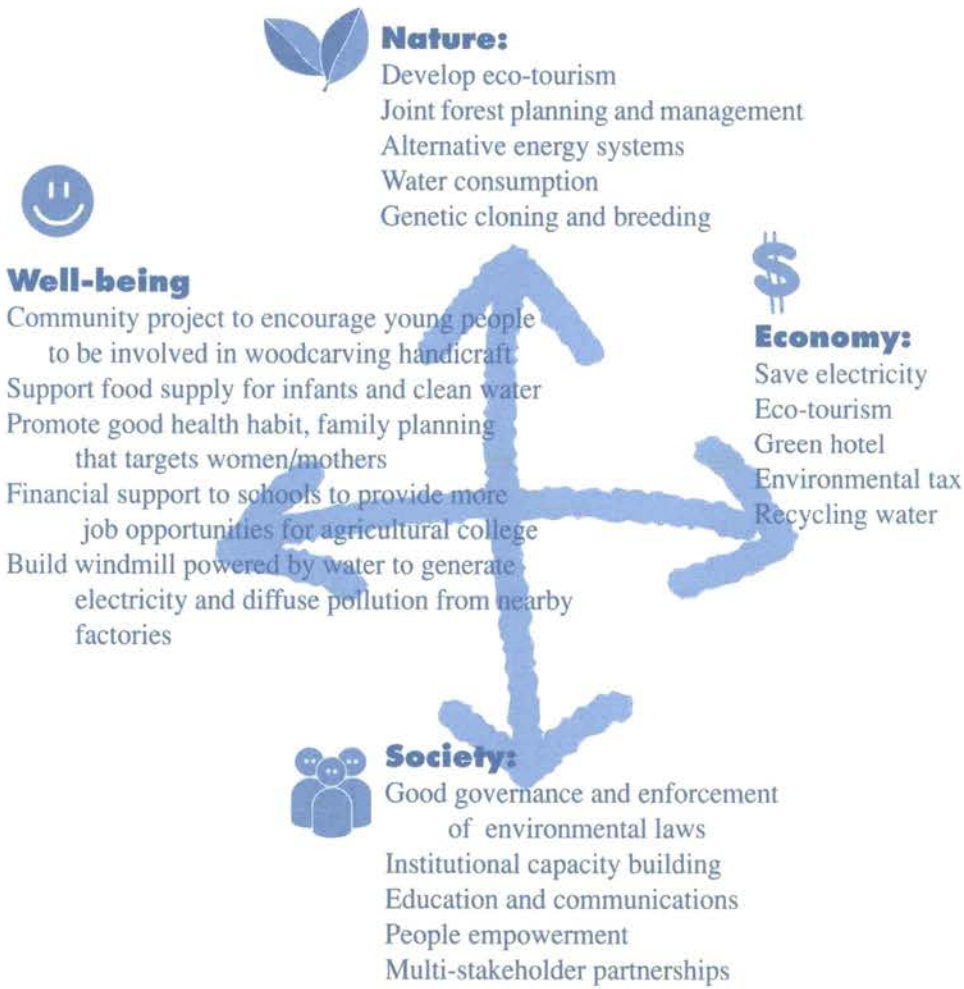
Economy:
Tax electricity water market road hotel tourists

Society:
Health care information consumption students voters population government

Well-being:
Infant population welfare education crime health participatory community development

Level Three: Innovations

This level helps to assess, using the information from the previous steps, what needs to be done in Sabai-Sabai. Looking at the systems in the previous step, what innovations, ideas, initiatives, etc. need to be introduced to move toward sustainability? Each compass point introduced five innovations that will make Sabai Sabai more sustainable.



Level Four: Strategies

Strategies can also be called avenues for action. How do we promote the innovation? For this level the Compass teams developed three ways to diffuse their innovations from the previous step. It is important in this level to understand the concepts of the Amoeba of Culture, Innovation Diffusion, and the Gilman Equation. The Gilman equation helps to explain how change happens. It states that:

The per ceived value of the new way *minus--*

The perceived value of the old way *must be greater than* >

The perceived cost of change

Therefore, for change to occur, the Gilman Equation suggests we should demote the old value, promote the new, and reduce the perception of cost of this change.

N – O > CC

The strategies that were suggested were:

Nature:

Develop eco-tourism by education, benefit sharing, self-subsistence working with business
Involvement of government and local people as well as the business sector
Promote eco-tourism in Sabai Sabai by getting financial support for development

Economy:

Retain/reserve cultural values
Improve living conditions with respect to environment
Protect natural reservoir

Society:

Policy for equal participation
Capacity building with individuals and organizations
Community based projects

Well-being:

Workshops or trainings to transfer skills
Educate community
Form a community center

Level Five: Capstone Agreement

The Capstone Agreement is a solid commitment that ensures action will be carried out in the real word. It is a written promise drafted by the participants of the workshop.

A capstone agreement was created on the apex of the pyramid after twelve exhausting hours of deliberation.

We the people of Sabai Sabai,

Recognizing, that a range of indicators in our community suggest our current situation is unsustainable
Mindful, of the complex systems which bind together our elements of Nature, Society, Well-being, and Economy
Aware, of the potential for innovation in our communities and having carefully considered strategies to bring them into effect,
Hereby agree to,
Manage human and natural resources sustainably. Particularly by:
Developing community and nature based eco tourism, as an initial strategy for com munity development.
Setting up open and life long community learning processes to build the capacity of individuals and institutions that develop new and alternative pathways for sustainability.
Establishing a people's forum to meet regularly in the future.

Day Four
Building the Pyramid

I am writing this after eleven hours of the Building the Pyramid. The participants can't seem to come up with a final resolution or capstone agreement because of conflicting sides. The idea of eco-tourism promotion as a 'save all' for Sabai Sabai and the means to sustainable development was the conclusion for more than one compass group; however, it was brought up that this idea is constantly pushed in Asia and that leaves no room for further alternatives. The feeling I am getting is that half of the group is willing to just accept anything that comes out of the capstone, while the other half is vehemently pushing their opinions. If this activity is modeled after real life situations and decisions, how many times has frustration clouded the process of change?

Participant Debrief Comments

"I know exactly what my computer felt like when it crashed last week."
- About the process

"People stay in their sectors and this is the problem with sustainable development. 'The economy must grow' makes perfect sense when you look at their models."
-An EE acting in the role as an economist.

Does an indicator really point to the problem?

"You could learn some kind of techniques of how to diffuse your opinion to related sides, how to negotiate with local people, businessmen and related institutions, and how to develop a common interesting agreement."- Debrief reflection on what the activity taught the participants.

"The activity shows clearly that the pyramid will crumble if there are no linkages."

AMOEBA: The Innovation Diffusion Game

Progress towards sustainability begins with ideas. Whether this idea be improving education, fuel-efficient cars, or recycling, the progression an idea makes into society is called innovation diffusion. How does innovation diffusion happen?

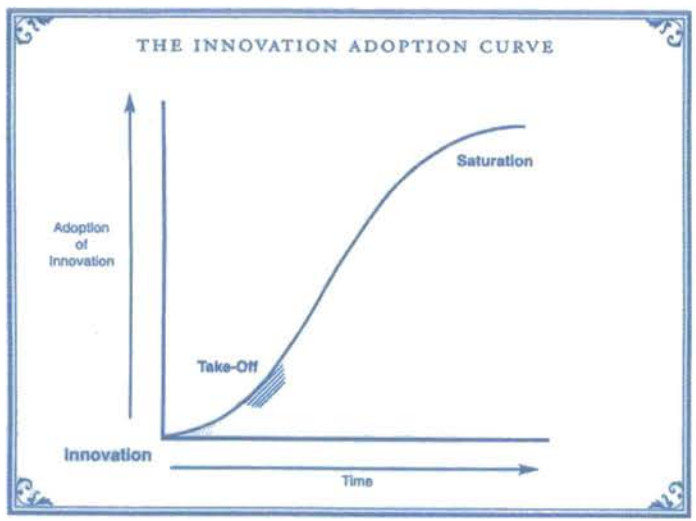
The process in which ideas are diffused through culture can be modeled by the Innovation Diffusion Game.

For an innovation to be adapted into culture it follows a pattern known as the Innovation Adoption Curve. Each innovation curve moves through five characteristics:

Starting point: The Innovator begins with an idea

Promotion: The innovation is gradually promoted to small groups or change agents

Acceleration with early adapters: The promoters with the innovation come to key people or groups that push the idea into a larger audience



Take off: The innovation has a life of its own and at this point is already adopted by 5-15% of society

Saturation: After the mainstream of culture has adapted the change it reaches a saturation point and is fully integrated.

The take off point on the curve is the crucial moment in which the innovation has a life of its own and takes off into society. In order for it to be successful, the speed of diffusion largely depends on these characteristics :

Finding a relative advantage: The innovation is perceived as better than the old or the status quo.

Complexity: Innovations spread well when it is both efficient and useful.

Observability: Can change and adaptation be observed? If members of a society see an innovation that has been adapted by other members it will be much more ready to take off.

Trialability: If individuals can trial the innovation first before fully committing themselves to it, it is adapted easier into the majority of society.

Compatibility: The innovation must be needed and compatible with previous cultural experiences. When individuals don't need to alter much of their daily routines and values, the innovation will be accepted faster into culture.

The Amoeba of Culture

Innovation Diffusion Theory and the process of cultural change can be demonstrated more in depth by The Amoeba of Culture.

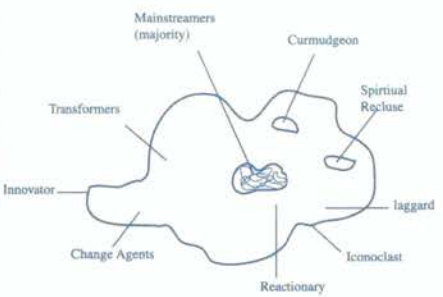
Imagine culture is a living creature. Alive, moving and growing like a giant amoeba. Like an amoeba society sloshes around with different parts that make it move forward, retract it backwards, or hold it still. If society is an amoeba, then an innovation or idea can be its food. Whether or not the amoeba feasts depends on the rest of its body.

In order to further demonstrate how an amoeba's movements model after culture, the group performs an activity to "be the amoeba".

This simulated exercise helps participants to the phenomenon of the lagging center. If the psuedopod of the amoeba moves too fast, the organism will break apart. When there is a good communication between all parts society, the amoeba (culture) will move faster and smoother. Change will happen.

The Anatomy of the Amoeba

Under the microscope, culture and society are comprised of many different players moving around with many different motivations. In culture, or the amoeba, these characters move in different directions and either push it towards the innovation, pull it back, or keep society as it is.



Innovation Diffusion

The Amoeba Game is a role-playing activity that is used as a tool to illustrate how an innovation is diffused in culture. Role cards are given to the participants explaining who they are in society and what motivations they have in the role of cultural change. The activity is to track the process of the innovation through the group of the role-playing participants.

Debriefing the experience can highlight the following characteristics of change:

A - Adapt the Innovation:
Figuring out how it is going to fit into culture. Tweaking the Innovation.

M - Motivate the Change Agents:
Keep the enthusiasm and innovation alive in yourself and other Change Agents

O - Organize the Transformers:
Find the Transformers early and create interest in the innovation

E - Easy Does it for the Mainstreamers:
Slowly work the idea into the mainstream. If the innovation isn't fully ready, don't force the change to happen. Work with the Transformers and Innovator to perfect the idea first. Then launch it.

B - Build Momentum:
Keep everyone involved in the change process engaged in its progression. This builds levels of connection and personal fulfillment to the innovation.

A - Avoid the Reactionaries:
Keep the Innovation far from the grasp of Reactionaries so that there is as little resistance as possible.

Day Five
Innovation Diffusion

I am in the role-playing activity. From where I am standing I can already see some of the roles in the amoeba. From one corner of the room someone has started a petition to save the natural areas in Sabai Sabai, persuading her audience that they need to manage the forest. In another corner, our loud innovator has brought together a group of people to listen to his idea of an Eco-Forestry initiative. The room is a complete jumble of noise and gibbering. The curmudgeons have found each other on one side and go about the activity sipping on their coffee and hiding away from the rest of the group. The mainstreamers don't seem to be convinced. Toward the end of the exercise three people have begun to start a chant to the innovator "don't believe him" don't believe him"! The game ends and the innovation is stuck; our innovator can't find his change agents.

Participant Debrief Comments

Environmental educators are change agents.

Get the amoeba to communicate. The innovators must find the change agents. The change agents must find the transformers

Each player in the amoeba (in culture) has an effect on the process of cultural change.

"You always know those people exist. So now I will look at people and say, 'Oh, you're a laggard, I can't waste my time on you'." - EE workshop participant on bringing the activity into the real world.

Sharing Knowledge

"Never doubt that a small group of thoughtful committed citizens can change the world; indeed, it's the only thing that ever has" – Margaret Mead.

The workshop brought together 20 educators from Cambodia, China, India, Indonesia, Republic of Korea, Laos, Malaysia, Pakistan, Thailand and Vietnam

Finding them wasn't easy and involved several planning meetings between UNEP and Magic Eyes staff, to share networks, and establish lines of enquiry which would lead to a group of people able to meet the following criteria:

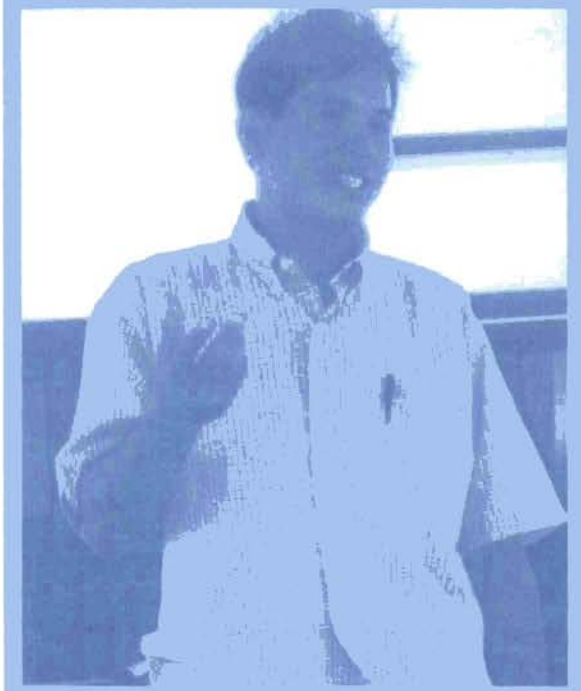
- Actively involved in community environmental education activities
- Potential to be a leader in his/her community and/or institution
- Mid stage of vocational development
- Involved in or likely to move into training roles with other educators
- Confidence and ability to run an interactive environmental education exercise during the course
- Fluency in English language

We asked participants to bring to the workshop an environmental education exercise they had developed and used successfully in the environment and community where they work.

We encouraged them to demonstrate this in the form of an interactive exercise, involving other participants and the environment around the river.

They were also asked to describe their exercise in the form of a lesson plan that could be published for use and adaptation by other educators of the region.

This is the result.



Mr. Sovannora Ieng,
Senior Advisor to Minister, Ministry of Environment Cambodia, emphasizing the role of educators on a community-based scale.

Solid Litter Waste Management

Time required for activity completion:
Approximately 90 minutes

Age of target audience/ type of group:
All age groups; local authorities, monks, teachers, students, villagers and local business (vendors)

Objective:
- To encourage all levels of people (stakeholders) to be involved in the participation of the Cleanup Day event for a better world, in particular clean up their own pagoda, tourist attraction and public areas;
- To provide further understanding of cleanliness as better for health and business potential;
- To educate people about dangerous wastes and explain to them how to deal with these wastes with proper management;
- To strengthen the cooperation between the people in communities, local authorities in each level and concerned institutions;
- To further enhance waste management around their area, in particular, area of selling food and goods for children and tourists; and
- To realize that a clean environment does not belong to anyone except ourselves.

Material/ Equipment needed:
Brochure
Posters (The poster used in this activity illustrates the difference between a clean and dirty environment by showing a split screen. One side has a place that looks littered with trash while the other shows citizens happy in throwing their trash away in a receptacle, leaving their environment healthy.)
Leaflets

Demonstrated equipment:

Plastic, tin and glass bottles, plastic bag, broken glasses, newspapers and death leaf, decomposed fruit, spray bottle, etc.

Activity Description:

The session will be prepared and conducted in non-formal lessons with stakeholders of approximately 80-100 people; from local vendors, monks, teachers, primary and secondary students and local authorities, as an additional activity to the World Cleanup Day event. Four resource persons will be presenting in this session. The details of preparation for the activity are as follows:

- Select an appropriate location for the activity in the pagoda hall, school, or under a big tree;
- Set up the area with posters, a white board, preparation of an appropriate seat such as a mat or a chair, drinking water, and with preparation of materials/leaflet/books for handing out;
- Conduct lessons by four resource persons on waste; and
- Distribute materials/leaflets/books and allow for questions.

Activity Debrief Description:

Because of the community-based level, we must promote the non-formal lesson in action either showing a video, photo, poster or objects of which they can feel, see and smell. So not only should a set of questions be prepared, but we must also use as many simple items as possible (as listed in previous materials list).

A set of questions must be simple and easily understandable at their level. Some examples of questions that might be asked about the posters are:

What is in the poster below?
Who can tell the difference?
Why is it different?
Which side is preferable?
What is missing?
Practically, is it possible?

From both pictures we can point out many things that are related to environmental education and how important it is to have their environment clean and sound. Also, discuss what affects to their health and daily life a dirty environment has.

In addition, we can illustrate some items mentioned on the materials list and ask the audience to explain which items belong to a group of rubbish, then explain what they are and do some demonstration when we burn them. Raise some of the following questions:

Can this item burn? (Such as plastics, paper, fruit, tin, etc.) Yes/ No
If yes, what would happen?
If no, what would we do about it?
As they are waste, would they be still useful? (Unworn newspaper, carton, unbroken bottle, decomposed fruit, etc.)
If yes, what would we do with it?
If no, what should we do with it?

Variations of Activity:

This non-formal activity can be adapted at any event in order to promote waste/toxic waste management; particularly among those people who deal daily with waste issues at school, pagoda, coastal zones, historical areas, national parks, home, etc.

The waste issue is a serious issue nationally and internationally. Activities for Waste Management Promotion is essential to attract not only those who deal with waste daily, but also the attention of those who do not understand the cause of littering, creation of more waste, and recycling solutions.

A successful idea for the local vendors on EE promotion is to initiate a proverb such as "Clean environment generates more tourists/customers and more tourists/customers will provide good business."

Recommendations:

It is very vital and imperative when dealing on a community level to think slow and repetitive. It might be tedious for some participants, but it will be a memorable experience and lesson for the community when they explain it to their children and generation. It is also important to prepare non-formal materials in a simple manner. When practicing community education, try to avoid using a lot of words or literate materials. Use photos, slides, and items that can easily be seen, touched, and smelled; therefore making the lessons more effective and successful.

Non-Formal Environmental Education and Community-Based Natural Resource Management through Buddhist Monks in Svay Rieng Province

Mr. Yean Ly,
President of The Association for Protection and Development for Cambodia's Environment, brainstorming for Building the Pyramid

Time required for activity completion:
One day; Three weeks

Age of target audience/ type of group:
- Participants from government institutions
- Buddhist monk head of each pagoda (15 Trainers)
- Buddhist monks in each pagoda
- People surrounding each pagoda
- Students of 56 primary schools

Objective:
Training Goals: The 15 Buddhist monk Trainers are fully able to provide further training on Environmental Management and Community-based Natural Resource Management to the villagers and school children in an effective way.
Training Objectives:
- The previous practices of Lord Buddha during his life are reviewed and made aware to Trainees
- The Trainers are better qualified on facilitation and management of a community project.
- Concepts of environmental issues in modern countries, Buddhism, and developing countries are reviewed.
- A common curriculum for the villagers and school children are validated in the participatory manners.
- A testing training for the villagers in a selected place is provided by monk's trainers.

Material/ Equipment need:
Resource book: "Cry from the Forest" (a book on buddhism and ecology)

Activity Description:

Step 1:
- Brainstorming the definition of 'environment' with strong a emphasis on natural resources.
- Review the roles and functions of pagoda in the past in relation with natural resources and environment (NRE)
- Brainstorm the environmental crisis at the present
  Participants develop their vision of reaching their environmental future.

Step 2:
- Daily life of Lord Buddha in relation with natural environment
- Awareness raising of NRE in Cry From the Forest book
- Identify NRE meaning and questioning what to be done capably to prove that you practice the way of life of Buddha

Step 3: Community Forestry in Cambodia
- Presentation on different types of community forestry in Cambodia
- Training on organization methods of three different types of community forestry
- Training on compost production
- Strengthening pagoda task and clean up by house component

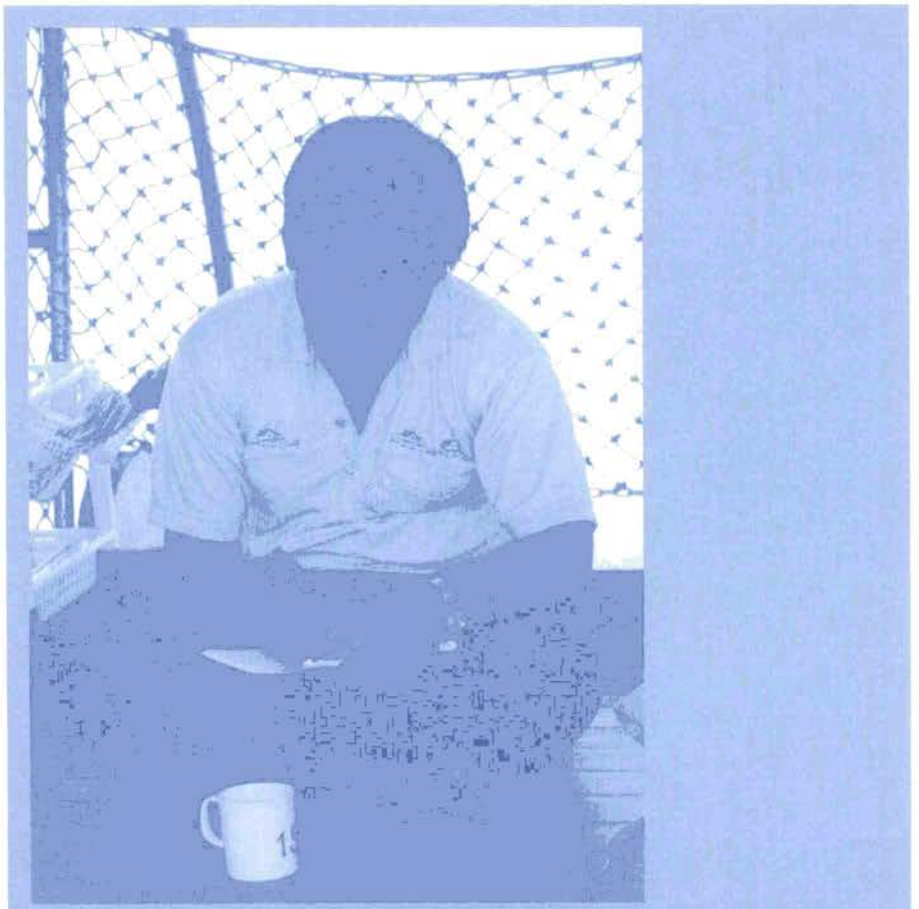
Step 4: Planning Application
- Recall potential information for planning
- Split into small groups and discuss and identify main activities for planning
- Develop annual plan

Step 5: Presentation of Community-Based Natural Resource Management (NRM) Process
- NRM presentation through Buddhism monastery
- Exchange of ideas among participants on management of NRM

Step 6:
- Presentation of developed training curriculum for farmers and school children training
- Finalization of training curriculum for farmers and school children training

Step 7: Important elements of effective facilitation and community development management
- Presentation of problem analysis tools
- Training on meeting/workshop organization
- Define content and method for adult training
- Define content and method for school children training
- Training on tools and methodology
- Training on project progressing review

Step 8:
- Training practice for farmers



Mr. Muthukrishna Namasivayam Pillai,
Chief Chemist for Environmental Education, C.P.R. Environmental Education Centre, India, writing in the barge journal.

Quantity of Air We Inhale Everyday

Time required:
30 minutes.

Target:
Students

Learner objectives/outcomes:
Awareness about the importance of clean air and the quantity of air we breathe everyday

Material/equipment needs:
A 10 lt. plastic bucket, rubber tube, one litre pet bottle, notebook, wristwatch.

Activity description:

This activity is carried out to understand the importance of air and amount of air we breathe every day.

Step 1:
The participants are asked to guess how much air they breathe everyday. They may think it is very difficult to measure, but we can show them how to measure the quantity of air they breathe everyday.

Step 2 :
Fill half the plastic bucket with water. Fill the one litre pet bottle with water and without the cap invert the bottle upward down into the bucket in such a way that the neck of the bottle is just below the surface of water in the bucket. Now call a volunteer from the participants. Ask him/her to take a full breath and allow the air through the rubber tube into the bottle (for this, one end of the tube should be

inserted into the bottle and the other end should be in his/her hand) Now the volume of water, equal to the volume of air he/she inhaled is evacuated from the bottle. Repeat the same exercise until all the water is evacuated from the bottle and count the number of breaths. Now we can calculate, the volume of air inhaled per breath.

Step 3 :

Using the wristwatch, count the number of times he/she breathes per minute. Now using the following formula we can calculate the quantity of air he/she breathes every day.

$$V \text{ (in litre)} = \frac{v \text{ (in ml)} \times n \times 60 \times 24}{1000}$$

Where,

V is the volume of air inhaled every day in litres
v is the volume of air inhaled per breathe in ml.
n is the number of breathes per minute

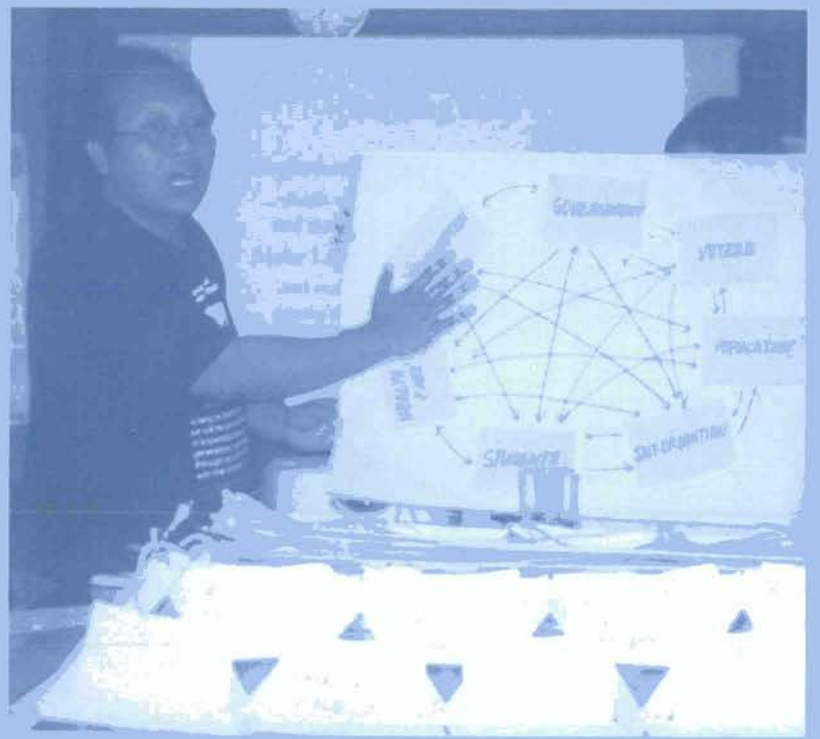
Step 4 :

It will come approximately to 20,000 litres per day. By doing this exercise, the student gets first hand experience of the importance of air.

We can talk about the various pollutants in the air and how even a small quantity of pollutant can affect us, since we are inhaling a huge quantity of air everyday.

Variation of activity

The same activity can be adapted to other age groups.



Mr. Mohamad Basuki Winoto,
Head Organization Development Division, WALHI Indonesian Forum for Environment, presenting linkages from Building the Pyramid.

The Bare Foot Environment Impact Assessment

Time required for activity completion:
Two Days

Age of audience that the activity is targeted to and type of group:
Adults- community

Learner objective:

a. Society understands the right to be involved in the decision-making process of environmental problems
b. Society understands problem analysis such as who is involved, the pattern of development, root of the problem of the existing case, and how the changes and outcomes impact the environment or society
c. Society understands how to conduct advocacy on specific cases and the strategies of litigation or non-litigation
d. Society understands the significance of people organizations struggling with management rights

Material/ equipment needed:
Plano paper, Metaplan, Marker

Background Information:
The environmental problem in Indonesia is not only a technical problem, but a political problem as well. In many cases the government discards the local population interest in situations that deal with natural resources. Even government, without reluctance, applies violence when society conveys the objection on a government plan or making a territory of a community. As a result of these factors, the society opposes the government plan. Many times, the government deploys a public figure to smooth out the business by providing compensation on basis of social participation.

Analysis regarding the environmental impact issued can be manipulated since the drafting process is performed by a consultant. Society input is commissioned in a session of AMDAL. AMDAL is Analisis Mengenai Dampak Lingkungan - Environment Impact Assessment. EIA is one process for those who want to change an area for example: build industry, oil palm plantation, etc. to get permition from the government. A requirement in EIA is that it must participate with the local community, but the fact is communities never are involved in this process. When the ADMAL process was first initiated in Indonesia, many institutions, whether NGO or private institution held ADMAL training. Among NGOs , ADMAL education is expected to serve as media to strengthen the bargaining position of NGO personnel, and to be recognized in the company engaged in ADMAL consulting.

The enforcement of policy without social participation happens too often. This is what the ADMAL training or 'the bare foot environment impact assessment', hopes to do. ADMAL holds an event to strengthen society since society has local knowledge and experience regarding natural resource use. Since the community has been interacting with their surrounding environment, they understand the changes and cause of environmental management. It is currently showed that their method of management is conservation. The ADMAL training is held when society reports that there is pollution or environmental destruction in the territory. It is here where we struggle for social interests on natural resources. Here is the description of this training and educational program implementation.

Activity Description:

This training is conducted in a room consisting of –20-25 people. The methods of teaching are in discussion, lecture, and role-playing. The education materials are as follows:

Introduction:

a. Expectations of training and objective of training
b. Study Process
c. Case mapping
d. Process of AMDAL required and implemented
e. Evidence of social rights
f. Advocacy strategy up on the case and people organization

Activity debrief description:

Wrap up with some example questions such as:
What are the major causes of the case?
Who are involved therein and what roles do they play?
What is the impact on society?
How can society manage natural resources?

Variation of activity:

This activity can also be taken for a group of youth such as a natural club group. It is significant to those to understand the concepts of conservation and effects of environmental problems such as extinction, tree plantations, etc. Analysis on environmental problems can trace why the environment is damaged.

ISO 14001 (Environmental Management System) Games

Ms. Wieke Savitri,
Head Environmental System and Procedure, Friends of Aqua Foundation, Indonesia, giving a speech about her organization's EE activities.

Time required for activity completion
30 minutes game after completing ISO 14001 Training

Age of audience that activity targeted and type of group :
Employees of an organization that has activities, products or services that interact and influence the environment
Group: 15 - 30 participants (3 - 6 groups)

Learner objectives/ outcomes :
The trainees have knowledge about Environmental Management System and can establish the system in their organization to achieve "greener" or environmental friendly production / activity process

Material/ equipment needs :
Cardboard, Markers, Whiteboard, Magnetic buttons

Activity description :
After conducting training about ISO 14001, the trainer will conduct the game to know the response of the trainees.

1. Write the answer from the question list about ISO 14001 on cardboard, then write a number (from 1-10) on the other side of the cardboard.
2. Put the numbered side cardboard on the whiteboard.
3. Divide the participants into groups.
4. The trainer reads a question that has an answer on one of the cardboards.
5. The first group chooses the answer by mentioning the number.
6. Turn the numbered side cardboard, if the answer is correct, the answered side remain open and the group gets 10 scores.
7. But if the answer is wrong, put back the cardboard with the numbered side on top, and the group loses their turn and get no score.

8. The next group chooses the other number. If they choose the wrong answer, the next group replaces their turn until they find the correct answer.
9. Read the second question and do it like steps 5 to 8 until all the numbered cardboard are open. The winner is the group that has the highest scores.

Activity Debrief Description :

1. Question : What changes to the environment can be disadvantages or advantages that is produced from an organization?
   Answer : Environmental aspects

2. Question : Elements of activities, products or services from an organization that can interact with the environment
   Answer : Environmental impacts

3. Question : The tool used by an organization to determine where its position is to the environment.
   Answer : Environmental Initial Review

4. Question : Environmental aspects that can create environmental impacts.
   Answer : Significant environmental aspects

5. Question : A written statement by top management that includes: a compliance with relevant environmental legislation and regulation; makes continual improvement on environmental performance; and has a commitment to prevent pollution.
   Answer : Environmental Policy

6. Question : The part of an overall a management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy.
   Answer : Environmental Management System

7. Question : To establish environmental objectives and targets we shall consider this criteria
   Answer : S (Specific)
   M (Measurable)
   A (Achievable)
   R (Reasonable/ Realistic)
   T (Time bound)

8. Question : After establishing environmental objectives and targets we can proceed in the activities that concern the criteria : What, How, Who, Where, When
   Answer : Environmental Management Program

9. Question : This position needs the qualification of person such as : a member of top management or senior manager; has high credibility and overall knowledge of the organization; has a concern about environmental issues.
   Answer : Environmental Management Representative.

10. Question : A systematic and documented verification process of objectively obtaining and evaluating audit evidence to determine whether an organization's environmental Management System conforms to the criteria set by the organization and communication as a result of the process to the management
    Answer : Environmental Audit

Variations of Activity :

This activity can be conducted to students or adults that are concerned with the environment

Mr. Khamapidth Khammounheung,
Director of Enviornmental Training Center Science, Technology and Environment Agency, Laos, presenting an EE activity to the participants.

Environment Impact Assessment (EIA) Workshop case study

Time required for activity completion:
6 hours (1 day)

Age of target audience/ type of group:
30 officers from line ministries

Objectives:
The participants get more understanding about the EIA and capacity building of EIA system or process in the line sectors concern.

Material/Equipment needed:
Overhead, Papers, Pens, Copies of exercise with the dam site map for each participant.

Activity Description:
Introduction:
Explanation about government policy on socio-economic development - 30 minutes
Explanation about the importance between environment and development (sustainable development)– 30 minutes;
Explanation about the importance of EIA process, regulation on EIA, feasibility study, EIA report in the socio-economic development process – 1 hour;

EIA case study
Explanation about EIA case study – 20 minutes,
Devise in 6 groups (central governor, provincial governor, developer, EIA team, population of Ban Ding, Ban Dong and Ban Tong) - 10 minutes;
Explanation about the roles of each group– 10 minutes;
Participants get an understanding of the exercise and map – 20 minutes;
Game plying or roles play – 3 hours.

EIA workshop case study exercise:

A private electricity company is interested in developing a hydropower project using water from the Nam Xong, which is one of the main tributaries of the Mekong River. The Government is eager that the project should go ahead quickly as 90% of the power is intended for export and Thailand is eager to finalise a deal. The other main benefit to Lao is that significant areas of land in the Nam Noi Valley will be brought under cultivation through irrigation. The project will also build a new road to the area, which the Udomxay Provincial Government sees as a positive development for opening up the area to the northeast for development. The National Government would like to see a start to the project as soon as possible. Funding to build the project is being provided mainly through the International Finance Corporation of the World Bank.

The proposal is that the Nam Xong valley should be flooded with the creation of a 40 meters high dam, which would form a lake covering more than 100 square kilometers. The Nam Xong presently has a dry season flow of only 10 Cubic Meters per second of water and in the wet season it can flow at the rate of 400 Cubic Meters per second and this causes flooding in lower sections of the river defore it reaches the Mekong. Storing the water in the dam will allow water to be delivered at the rate of 120 Cu mecs to the power generating station. The water would be delivered to a power house by tunnel to another valley and discharged into a completely different river, the Nam Noi. The Nam Noi is much smaller and has river flows, which range from 0 in the dry season to a maximum of 120 cu mecs in the wet season. It is intended that there should be a flow of only 10 cu mecs in the Nam Xong, which would be discharged all year.

The Nam Xong is important as a source of subsistence and income for the people along the river system. A number of fish species are known to breed up stream in Ban Ding and some of the fish spend the wet season down the Mekong River as far as the mouth of the river in Vietnam.
Ban Ding, a village of 100 houses and 500 people will be completely drowned by the proposed scheme and rice fields and river fishing on which it relies will be destroyed. Ban Dong down stream will also lose significant income from its present fishing activities. Ban Dong relies currently for all its water needs on the river.

The land to the south of the Nam Xong is in a National Biodiversity and Conservation Area (NBCA) and there are a number of important mammals know to be in the area. Elephant use the river on the south side and they move through the area, which will be drowned by the lake as they move to higher ground in the rainy season. The dam will drown nearly all the habitat of the globally threatened white-winged duck and it is likely to become extinct in Lao as a result of the project.

The company and government are eager to have the scheme approved. The company who will develop the project has promised to work with the land owners and administration to find solutions to rehousing and loss of income suffered by certain people in the project area. Some survey work has been undertaken and the company is starting to focus on the baseline data that must be collected. The dam and power house will employ 30 skilled and semi skilled workers when in operation. It is expected that construction of the dam and associated infrastructure for roads, power house, etc. will be undertaken for over 4 years and the workforce will peak at over 1000 people. It is planned that the construction work force will be housed in a temporary camp immediately adjoining Ban Dong below the proposed dam site. Ban Dong is the same size as Ban Ding.

An environmental consultant has been appointed and public meetings are proposed to discuss the project and develop preliminary terms of Reference for environmental studies.

Who should be represented at this meeting ?

Who are the stakeholders in the project ?
Activities Debrief description:

The exercise consists of 4 parts:

- talking about the socio-economic benefit (include all the positive effects) from the project;
- talking about the technical issues of different constructions in the dam site;
- identifying the negative effects on socio-economic problems and the environment;
- finding a way to resolve all the problems that will be made by the project.

Variations of Activity:

The game playing or role-playing is started by introducing the project of the developer, and the central and provincial governor reminds everybody about the government policy on socio-economic development: hydropower development is one of the priorities of developmental projects in Laos. Finally they have to come with the same comments on the project. The EIA team should talk about the results of the feasibility study and EIA report, and then form group discussion.

Most Treasured Gift

Time required for activity completion:

20- 30 minutes

Age of target audience/ type of group:

Women's group; 10- 20 people

Material/ Equipment needed:

Half burnt candle
Bits of string
Matchbox
Tin cans
Plastic bottle
Used soap bar
Old wax crayon
Various types of buttons/beads
Glue
Scissors
Tape

Objective:

To make the participants aware of the impact an individual can make in safeguarding the environment through reduction of waste.

Activity Description:

This activity incorporates the principles of 'Reuse' in an activity that encourages the participants to use their imagination and encourages teamwork and sharing.

Procedure:

Introduction (5-10 min.)

Pooling of resources:

1. Ask participants to empty out their pockets
2. Use their imagination to come up with an interesting innovative use of one of the objects in front of them. An example would be a ball point pen, to use as a straw after the ink is finished!
3. Go around the group. Ideas will invoke laughter.
4. Make participants aware that if we use our imagination most things can be reused in some way or another.

Activity (10-20 min.):

Step 1:

1. Provide participants/ group with the materials above.
2. Ask them to come up with an innovative gift item for sale.
3. Each participant/group will be given 10 minutes to come up with an item to put up for sale.

Step 2:

1. All the items will be put on display.
2. Each group will then be allocated $10 to purchase these items (not purchasing their own).
3. They will have to allocate all of their money according to their perceived value of the items.

Step 3:

1. The item with the highest value (total of bids) wins the "Most Innovative Design".
2. The items are then 'sold' to the group that bid the highest for it.

Activity Debrief Description:

Go over the materials provided. Where are these items usually found?
What do we usually do with them?
Relate to the topic of reusing items at home.
Identify other odds and ends that can be made into items that have added value to them.

Variations of Activity:

This activity can be done even with a predominantly male group. Instead of a gift, household items involving carpentry and electrical items can be made instead. A longer time frame might be needed.

Ms. Carol Lawrence (Left),
Assistant Unit Head, Education Unit World Wildlife Federation (WWF) Malaysia, shopping for produce at Pathum Thani Market.

A Freshwater Stream Visit

Ms. Evelyn Lim (second from right),
Programme Officer for The Malaysian Nature Society (MNS), taking a break in Ayutthaya.

Time required for activity completion:
2 Hours

Age of target audience/ type of group:
School students: 10-18 years old

Objective:
Students will learn to identify a variety of freshwater animals in freshwater environments by catching, observing and writing about them. Students are also required to access the relative environmental quality of the stream, based on indicators of pH, water temperature, light penetration and the presence of various organisms. They will also learn about biodiversity and the ecosystem of the stream.
Some concepts of the activity are:

- Learning about biodiversity of organisms in a stream;
- The ecosystem of a stream environment, the inter-relation and inter-dependence of organisms in this ecosystem;
- The effects of water quality (pollution) on the physical and biological environment;
- The importance of water for the survival of life forms and human well-being; and
- Learning that measures should be taken to maintain the sustainability of the ecosystem in the stream and its usefulness to mankind.

Material/ Equipment needed:
'A Freshwater Stream Visit' Worksheet (I- IV)
Sampling and measuring equipment
Stream/ Freshwater organisms Identification Guide Sheet (Appendix)
A map of the study areaActivity Description:

Step 1:
Select the sampling stations of different characteristics, preferably along the same stream. The camp facilitator will decide the number of stations to be sampled which will depend on the size of the group.

Step 2:
Brief the students on the habitat courtesies. Alert them to ways to minimize the potential of damaging the habitat and encourage care in their collection techniques. Emphasize that all animals caught are to be returned to their habitat unharmed after the study.

Step 3:
The students are given a short introduction into the biodiversity and ecosystem (food chain, adaptation, etc.) of the freshwater environment. They have to make assessments of the physical condition and write about their observations in Worksheet I.

Step 4:
They are required to carry out simple experiments to determine some physical properties of the stream, such as temperature, pH, light penetration, and surface flow rate. The methodology of all the experiments are given in Worksheet II.

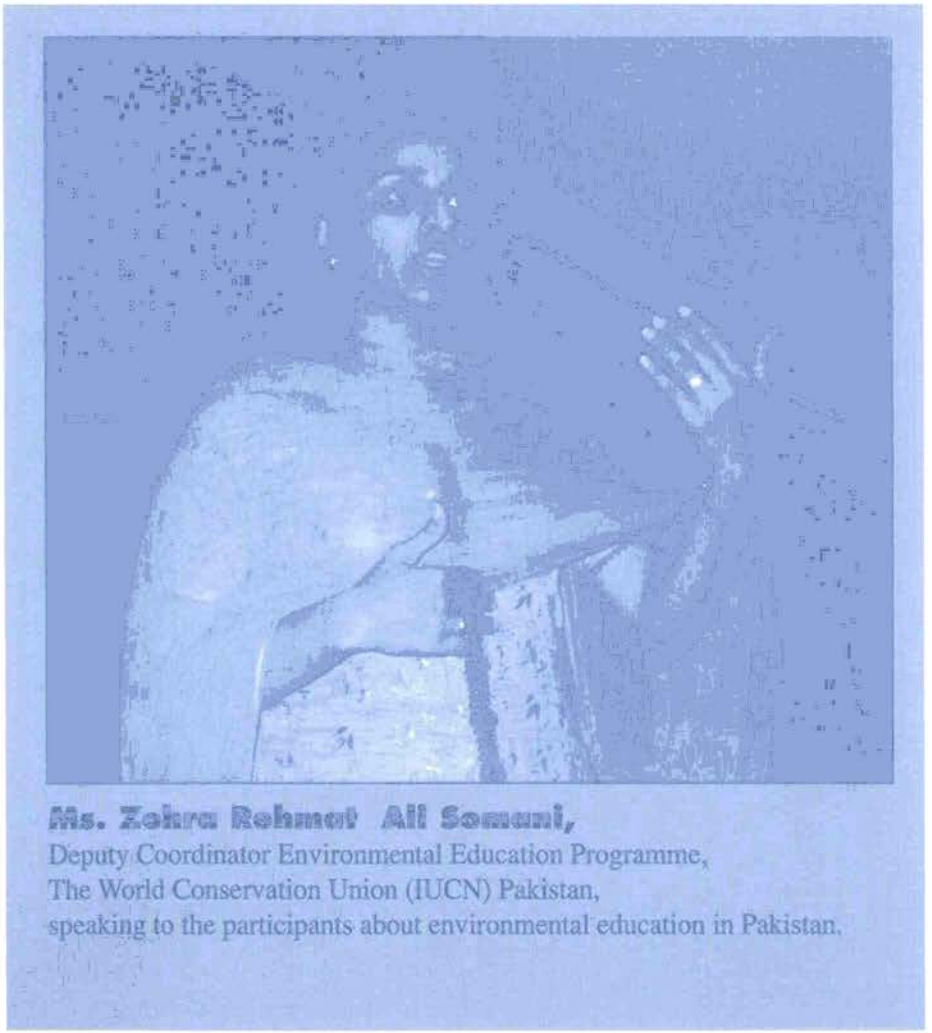
Step 5:
The students are then required to look for organisms on the surfaces, in the depths and among the rocks and plants. Organisms are collected in a mini aquarium and will be kept for further study before carefully released.

Encourage the students to use a magnifying glass/ hand lens to observe the organisms that they caught. They are to list them in Worksheet III.

Indoors, encourage students to discuss their observations and answer the questions in the Discussion section.

Activity Debrief Description:
At the end of the session, discussions are held between the facilitator and the students. Help them to understand the effect of pH, temperature, light penetration andsurface flow rate on the diversity of life forms in the stream. Ask them to compare the two sites and based on the diversity of life-forms, physical conditions and their own observations, comment on the water quality (pollution) in the stream by answering and discussing the questions in the Discussion section.

Summarize the study by reemphasizing that the diversity of specific animals is a useful indicator of habitat quality, as well as overall indicator of environmental quality. We can also tell the students how all the organisms found in the stream collectively form a food chain. Lastly, do not forget to emphasize the role students can play to preserve the environment.



Ms. Zehra Rehmat Ali Somani,
Deputy Coordinator Environmental Education Programme,
The World Conservation Union (IUCN) Pakistan,
speaking to the participants about environmental education in Pakistan.

Web of Life

The interaction of natural resources and their dependence on each other in an ecosystem.

Time Required for Activity Completion:

1 - 1 1/2 hours to complete.

Age of Target Audience / Type of Group:

There is no particular age limit for this activity. This exercise can be carried out with children above the age of 8-10 years up to adults, and even professionals such as teacher educators, teachers and community organisers. The most important thing in making it useful for all age groups is the design of the activity according to the contexts of participants and the area under consideration.

Learner Objectives/ Outcomes:

This activity will assist learners/ participants to:

a. Understand the interdependence of natural resources with each other.
b. Highlight the importance of each element in the ecosystem
c. Look into the issues created by the disturbance of the balance between the natural resources and the life dependant on it.
d. Assist participants/learners to think critically about the issues facing their locality and to come up with sustainable solutions of these issues.

Material/ Equipment Needs:

Chart papers/coloured cards, a pair of scissors, a ball of string, safety or common pins, markers

Activity Description:

Step 1:

This activity starts by preparing cards with the names of the elements present in a particular ecosystem of the participants' choice or a generic ecosystem. This activity will be focused on the mangroves ecosystem. For this purpose cards would contain

the following components of the mangroves ecosystem and the number of cards would be equal to the number of participants.

a) River
b) sea water
c) Air
d) sun
e) Honey bees
f) Big fish
g) Small fish
h) Eggs of shrimp
i) Eggs of fish (Roe)
j) Shrimp
k) Crabs
l) Crab eggs
m) Egrets
n) Snakes
o) Waders
p) Herons
q) Kites
r) Falcons
s) Bird eggs
t) Jackal
u) Indus dolphin
v) Camel
w) Tiger
x) Fishermen
y) Other human beings
z) Hunters
aa) Mangrove tree
bb) Aquatic weeds/ zoo plankton/phytoplankton
cc) Honey

The trainer can prepare the cards beforehand and proceed to Step II, in case of the shortage of time.

Step 2:

The trainer would explain the whole exercise to participants (if they were not involved in preparing the cards). Participants would be asked to stand in a circle outside the training room/workshop hall. (A garden or a big hall or any other area, which is different from the training room, will have a change of the environment.) The cards will then be distributed among the participants. The trainer would ask participants to read the cards and the participant who has got the card of mangrove tree would be asked to come in the middle of the circle with a ball of string in his/ her hand. Participants would be encouraged to think of all the possible linkages between the element written on their cards with the mangrove tree and also with the other elements that depend on the mangroves.

The trainer could initiate the activity. One may like to begin the game by showing the relationship between the mangroves and eggs of fish (mangroves provide the nursery for these eggs to develop into small fish by keeping them intact in the muddy sand). This can be done by tying the string on the finger of the participant playing the role of the mangrove tree and passing the ball to the participant playing the role of eggs of fish, a knot is also tied in his/her finger to show a connection. Participants would then be asked to think of a relationship between eggs of the fish and the other things mentioned in their cards. They may come up with the relationship between the egg of the fish and fish, so the string ball would be passed on to the participant playing the part of fish, a knot is also tied in his / her finger. Continuing in this manner, a web would be formed by finding the relationship and interdependence between the various elements present in the mangrove ecosystem. (From the egg of fish to fish, from fish to water, from water to aquatic weeds, from aquatic weeds to fish, from fish to fisherman and so on.)

Step 3:

After the formation of the web and discussing the interdependence of each element in the web, the trainer would ask the participants to think of the situation where there is no fish, what would happen to the entire web? For a substantial presentation of the situation, the trainer would ask the participant playing the role of the fish to loosen the knots (which have been tied to represent the several connections with different elements in the web) in his/her finger. By the loss of fish from the web other components of the web depending upon the fish, such as eggs of fish, fisherman, herons and other birds, would also be lost. This would make the web loose and its intactness would be lost. This step would provide an opportunity to the trainer to discuss the dependence of different components in the web of life and to show how the loss of one element brings a detrimental impact on the other components.

Activity Debrief Description

The trainer would ask one of the participants to reiterate the whole process to further clarify the process. Participants would then be asked to reflect on the activity in terms of the things they liked in the activity and what do they want to do differently. They would also be asked to reflect upon whether they want to conduct this activity in their classes or communities.

Extension of the Activity: After the reflection session, an extended discussion could take place about the impacts of the destruction of the web of life in the mangrove ecosystem. The trainer would ask participants to list various issues related to the destruction of the mangrove ecosystem. Participants would be divided in groups of 4-5 participants each. They would be assigned to discuss these issues with their reasons and the effective measures to be taken at individual, local and national levels. The following table could be used to facilitate the discussion:

S#	Issues of ecosystem destruction	Reasons of destruction	How to address this issue, efforts at		
			Individual level	Local level	National level
1	Reduction in fish catch	Destruction of mangroves and lossd of breeding sites provided by these mangroves	Taking an initiate to avoid cutting mangroves Creating awareness among other colleagues about the impacts of destroying mangroves	Create a group of active community members to ensure sustainable use of mangroves	Develop a law or a policy on the sustainable use of mangroves

Participants would be asked to present their group work. This could lead to the discussion on specific components of mangrove ecosystem with their relation to the other elements in that system and how their destruction would effect the survival of these elements.

Variation of Activity

This activity could be used for other groups by altering the ecosystem according to the locality of the participants. It can be used for a variety of audiences, including children above the age of 8-10 years. The trainer could use pictorial cards if the participants are not able to read. In order to make this activity more interesting, the trainer could ask participants to choose an ecosystem they want to discuss and to develop cards based on the different components of that ecosystem. This approach would bring more involvement of participants especially if there are children in the group.

Kid's Segregate!

Time required for activity completion:
One hour

Age of target audience/ type of group:
10 – 18 year old students in school located near the river

Objective:
At the end of the module, the participants should be able to:
- Differentiate the types of garbage that they produce;
- Understand where the solid wastes go after use;
- Appreciate the principles of ecological waste management; and
- Segregate their solid wastes.

Material/ Equipment needed:
Different types of solid wastes, bond paper and pentel pen, 5 trash bins/boxes, Venue of activity- cafeteria

Activity Description:
Show them the different wastes that are generated in the cafeteria. Ask the following questions:
What kind of wastes are these?
For each of the wastes, ask the following questions:
Where will they go in 5 years form now? 10 years from now?
What should be done to manage them?

Introduce the concept of ecological waste management. Explain the laws concerning waste segregation. Introduce school program to manage solid wastes. Explain the waste segregation system, recycling provisions, rules and sanctions, etc. in the school.

Ask the students to demonstrate waste segregation.

Activity Debrief Description:
Ask the question: What will they do to promote waste segregation in the school?

Variations of Activity:
This activity can be utilized for adult groups but with variations such as how data is presented. At the end, solid commitments can be made.

For young children below 7 years old, pictures can be used instead of words.

If no solid waste management systems exist, introduce an activity where they are able to devise a system of waste segregation by: identifying the wastes, assessing the volume of wastes, determining how many trash bins are necessary, find uses of wastes, develop linkages for recycling, locate area for composting, get commitment from necessary key actors and stakeholders.

Ms. Donna Paz Reyes,
Deputy Executive Director, Miriam-Public Education Awareness Campaign For Environment (P.E.A.C.E.), The Philippines, expressing her views on effective EE programs.

Participatory Rural Appraisal (PRA)

"How to get clearly the village's information"

Mr. Bhuvadol Namdokmai,
Environmental Educator, Magic Eyes Chao Phraya Barge Program, drafting a proposal for a new innovation in Sabai Sabai.

Time required for activity completion:

1 – 2 Days.

Age of target audience/ type of group:

15 – 18 years old up to adult (Rural people)

Objective:

1. The participants can learn from real situations surrounding a village's environmental issues by collecting the local wisdom gathered from the village members.
2. Raising awareness to the participant about the environmental problems that relate to life-style, culture, land used, economy, and natural resources.
3. Develop synthesis thinking process and learning skills.
4. Linking the relationship between the participant and the local people and support the local wisdom that can solve the community's problems effectively.

Materials:

Site:
Land base activity (at any place/villages that we would like to get information)
Topographic Map (the place that we chose to find out all information)
White chart (1.5 x 2.0 m.)
Compass
Pencils/color markers (at least 5 difference colors)

Background Information:

The Participatory Rural Appraisal (PRA) has been used for years to learn more about a village. It has been used by local community development stakeholders such as NGOs, government officers, local people, local administrative officers, forest rangers, etc. PRA requires all stakeholders to participate on working in the field together to find & share all information that they will put down on the land used

mapping, agriculture and water supply mapping, and socially culture mapping. By the end they will get a more complete picture about the environmental problem, allowing them to find a good solution to solve the problem together.

Activity Description::

For the environmental educator who wants to use PRA to get clearly village's information, they will need all stakeholders to work in the field together. Everyone needs to participate from the initial stage of this process, as they will be asked to use a lot of skills such as questionnaires, interviews, drawing maps, using compasses, measuring distances and assessing land used.

Information collected should focus on the village's history in all three elements: Social & Culture, Economy, and Environment. When & why were things changed? When did it change? How do all elements affect the community? The participants will need to conduct a survey, walking with the community people around the village to do land used mapping, and agriculture and water supply mapping. All the steps that should go through are:

1. **Get to know the village:**
In case the educator does not know the community before hand, he/she should go to the village and have a conversation with the community's leader, a local government officer, and the older people to talk about the activity that will take place in community, telling them they will need a lot of participation from them. This initial stage will make the educator know the community more, and develop trust and familiarity.

2. **Finding the village needs:**
The educator can find an interesting issue that they can use to study and understand that community. He/She should find out the situation about the relationship between the villager's life-style and their environment. The issues can be the community's problem at the time or the issues that can be used to raise awareness to the audience.

3. **Encourage the student:**
To have success in the activity, the educator should encourage the learner. To do this they can do many things such as; take them outside to the community and try to understand by observation first, telling a story about that community the educator found when he/she surveyed, or they can talk about the benefit of outdoor study & exploration to get information by using skills that they already have.

4. **Planning to work in the field:**
This is a very important stage for the learner. They will be asked to work as a team because the village's information will need a lot of details to explain and to understand. The learner will need to write down all questions and use it as a questionnaire. The questions should cover all the details that they will need to understand the community such as;
Do they know any history about their community?
Do they have any folktales about their village?
Where did the first group come from?
How many of them at that time?
Why did the first group choose this place to settle the community?
What did the natural resources look like at that time?
What did the first group do? What was their life style like?
What did the economic situation look like? Did they trade with each other?
When were all these things changed? Why? How did it effect their life/ culture/ environment/ natural resources?
Presently, what is their life style like?
What do the natural resources/culture/economics look like?
What is the most serious problem that affects them now?
Etc….

The participants will need to find out how to conduct an effective interview with the community members and ask the community to participate in activities, ask them to walk around the community and survey the village with the participants, and work on agriculture & water supply mapping, land used mapping, and social & culture mapping. To get all details, the participants should prepare the questions that can get information about the communication system that they have in the village (road, transportation, telephone, telex, post office), the way that they control or rule themselves, information about their education system, and the place that they use to have village meetings. How do they get news from another community? Who is the one that the villagers respect? How do they solve the community's problems? Do they have any traditional festivals? What is that festival and what does it remind the village of?

It is very effective if the participant can do an agricultural time line that can see when they will work in the field and what crops they grow.

5. **Getting the information:**
The participant will use a lot of skills that they prepare before they go to the field. They will interview the people, observe and survey the land, take field notes, and work on mapping and the agricultural time line. To collect the information, the learner should go to interview people more than 3 or 4 times to make sure the information is correct. The educator will need to ask his/her learner to a good recording system to keep the data and information

6. **Summarizing, Presentation and Synthesis**:
At this stage the participant will need togo in the field with the local people. All will need to check the information together. They will be asked to look very carefully at all details, look at the village's history and folktale, the local wisdom, traditional festivals, agricultural time line, education system, historic land used x-section mapping, and community settlement mapping. All participants and villagers will need to synthesize the situation together about all elements, history, culture, economic, land used assessment and the community's problem. This stage will be very useful if all participants and villagers talk more about how they can solve the problem that the community has. If they can synthesize the situation correctly they will see the sustainable road to take.

Activity Debrief Description:

Come back to the class. The educator will ask the learners to share their experience and reflection. How did they work together? What was the good part about working with the local people? Did they see something from another point of view? Is there anything that the learner needs to remind themselves of if they have to do the community study again? Etc,.

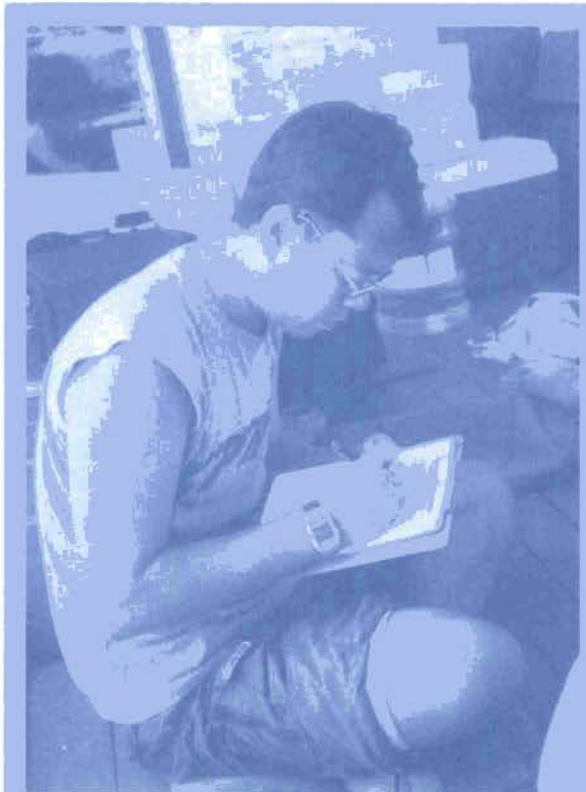
All the information is very useful to publish in a book and give it to the community. The community can then use it as a guide to develop a base on the information they have.

Variation of activity:

The **Participatory Rural Appraisal (PRA)** has always been used by the rural developers to get know village's information, and use as a guide for the community on development. The target group and developer will work very close together to learn about their community and synthesize information

The information will have a lot of faces. The educator can use it as a guide for the next field study such as local wisdom (Herbs study, community forest study, culture study, handicraft study, etc,) land used assessment and mapping.

5R Rubbish Management



Mr. Sinchai Thiensiri,
Project Director/ Environmental Education Center, Thailand Environmental and Community Development Association (Magic Eyes),
writing down an activity debrief in the barge journal.

Time required for activity completion:
2 Hours

Target Age/ Type pf Audience:
Primary School – Secondary School

Objective :
1. The participants are able to explain what the main cause of the problem is, and be able to explain the current situation
2. Form discussion among the participants on what effects are caused by rubbish
3. Participants are able to tell how to handle rubbish
4. Participants are able to give the meaning of Reduce, Reuse, Recycle, Reject and Repair

Requirement Skill : 1. Teamwork
2. Show initiative thru drawing and painting
3. Analysis skill
4. Communication Skill

Material/ Equipment needed :
1. 20 sheets of paper
2. 5 sets of water color, crayon, magic color
3. 10 future boards
4. "Magic Eyes" lunchbox
5. Cloth bag, plastic bag, rubbish bag
6. All types of glass bottle such as clear glass bottle, brown glass bottle and green glass bottle
7. Cans
8. Clothing, handkerchief, sewing kit
9. Used batteries and hardware tools
10. Magic Eyes Recycle posters

Introduction :

Nowadays a quick increase, caused by poor management and behavior, is the main problem to our environment. The easiest way which all of us can help in order to save our earth is to reduce and to recycle.

What are the 5Rs?

Reduce : A reduction of purchasing things or using. For example we can use a handkerchief instead of using tissue.

Reuse : Instead of throwing thing away we may try to make use of it again such as plastic bottles or plastic bags.

Recycle :Reuse the rubbish by bringing them back thru recycling such as recycled bottle, recycled can and recycled paper

Reject : Refuse to buy those products which have too much packaging. Always think how much packaging per each product that you are going to buy.

Repair : Fix your broken belongings before throwing it away. For example, we can repair our radio and clothing.

Activity Description :

Activity A "Create POW" introduction (20 mins.)

- Separate participants into 10 teams (depends on number of words)
- Each team will send a representative and each of them will get a word for their team. Those words are: 1. "Thailand" or the place that this activity are held (trees, beach etc.) 2. Mineral (gold, iron, tin) 3. Packaging (can, form, bottle, pail) 4. Apparel 5. Living place 6. Shops 7. Recycle Bin 8. Trash collector car 9. Refuse dump 10. Incinerator, Landfill (can increase number of words depending on the situation)
- Draw a picture according to the given word
- Combine all pictures together and make it a story
- Make a tale under the topic of "The overflow of Rubbish"

Activity B "Bridge" (15 min)

- Explain how to classify types of rubbish
- Ask the participants how to handle rubbish without telling them about the 5Rs
- Combine those opinions from the participants and tell them about 5Rs

Activity C "Content" (60 min)

- Let the participants choose a card. Each card will contain a word (Reduce, Reuse, Repair, Recycle, Reject). Explain the meaning of each word by using the given example.
- Prioritize 5RS and give the example of how to handle rubbish (for example – use the cloth bag when go to shopping so we can reduce the use of plastic bag. When the cloth bag is dirty we can clean it to reuse and if it tears then we can repair it. If the cloth bag can't be fixed anymore then we can it as a cleaning cloth which can be considered as a recycle method.
- Let the participants find another way based on the 5Rs which we can do in daily life.

Activity D "Conclusion" (25 min)

- Tell the participants the purpose of the 5Rs activity. We will save our earth by following the 5Rs.

Conservation Debate

Mr. Nguyen Le Trinth,
Programme Manager for Education for Nature-Vietnam (ENV), teaching participants how to play conservation debate.

Time required for activity completion :
1 hour

Age of target audience/ type of group :
School students (12-15 years old)

Objective :
Role-playing exercise aimed at helping students acquire a greater understanding about the different interests and views held by the various stakeholders that must be considered in the conservation and protection of Nhieu Cay National Park

Material/ Equipment needed :
Big whiteboard (or five separate small boards)
Whiteboard pens
Papers
Pens Eraser

Activity Description :
Introduction:
The leader will give a brief description of the national park and its conservation and protection problems:

"Nhieu Cay National Park is bordered by local communities with the population of 50,000 people. The beautiful forests of Nhieu Cay National Park grow smaller and smaller every day. Timber cutting and collection of firewood, bamboo, banana, tubers, snails, and other non-forest products occurs daily. Hunting has reduced the number of wild animals at Nhieu Cay, and several species are now extinct at the park. Additionally, cultivation of the surrounding slopes, grazing within the park,and some mining of limestone at its edges all threaten the beauty and ecological integ-

rity of the forest. Visitors of the park also impact tourist sites and trails with vandalism and litter, collection of plants, and to a lesser extent disturb wildlife with radios and other noise while in the forest.

Local people, park management, rangers, tourists, and plants and animals each have an interest in the park, but these interests often are in conflict. What is the appropriate way to meet each group's interests while still protecting the park?"

Directions :

Five teams will be selected and each given an important role in the exercise (the roles are listed below). The groups must then meet privately and discuss their interests in Nhieu Cay, while trying to find a solution that meets their needs, as well as the needs of the other groups.

Groups :

1. Park Management
2. Rangers
3. Animals and Plants
4. Local Communities
5. Visitors and Tourists

Each group then briefly presents its position on how to protect Nhieu Cay National Park, while preserving their own interests. Each presentation is followed by a discussion between all the groups in response to the presenting group's position.

Once all of the groups have presented their positions, the leader will ask the groups to try to decide which problems have been solved and which problems remain unsolved. The leader will write separately the points that are agreed upon on the board, as well as those points for which an agreement could not be reached.

Responsibility of the facilitator :

The total number of people involved in the debate may not exceed 50. The facilitator must facilitate the debate by maintaining control of the discussions, giving each group the opportunity to discuss their views and ideas, leading groups to respond to issues presented by the other groups, and summarizing the main points presented by each group, as well as the proposed solutions suggested. If the program is led successfully, the debate will be lively, but not out of control.

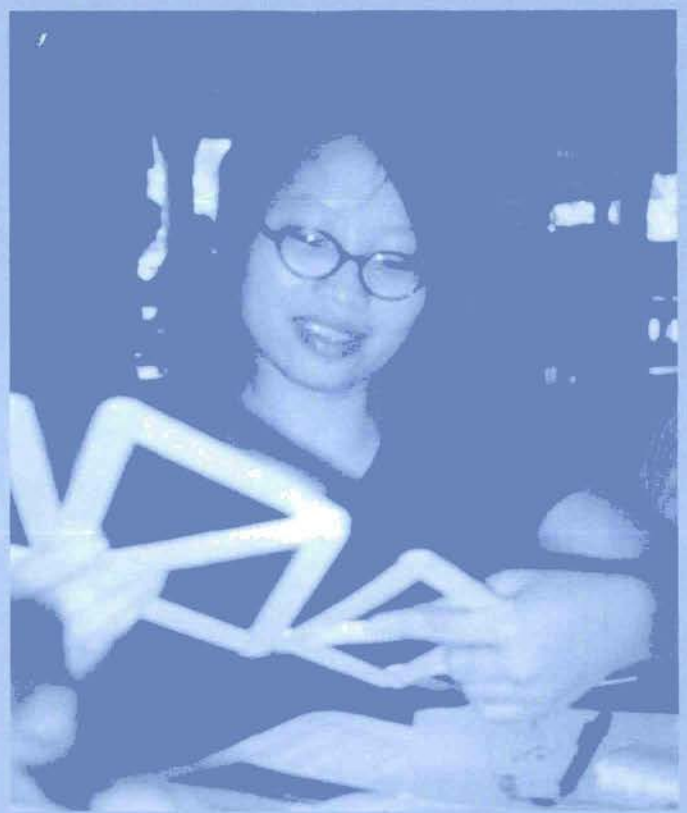
The positions of each group, their proposed solutions, and the final agreements that they work out will be recorded by the leader on the back of a project activity report form and submitted to the project coordinator.

Activity Debrief Description :

Finding solutions for the park's conservation and protection problems is not an easy task, as you may have just discovered. The many views and interests of stakeholder groups are often in conflict with one another. It is not easy to find a balance where each group's interests can be satisfied. Protecting Nhieu Cay for the future of Vietnam is an interest shared by all. The question remains, how can this be done with the support of all the stakeholders? Thank you for your excellent ideas and contributions to helping protect Nhieu Cay National Park.

Variations of Activity :

This activity is not applicable for young students, as it needs some knowledge about the park as well as conservation issues. This debate is easy to adapt to students who have attended the environmental education program for a relatively long time. If used for adults, the facilitator should prepare well in advance all aspects related to the conservation and protection of the park as there may be more complicated questions raised.



Ms. Nyguyet Van Do,
Fauna and Flora International Environmental Education Officer, Vietnam, connecting a level of the pyramid.

Time required for activity completion :

30-45 minutes

Age of target audience/ type of group :

25 or larger recommended
Primary, Middle school students

Objective :

Participants will:

- Identify and describe the migration habits of birds and what they need in order to survive;
- Describe specific mortality factors that would threaten and reduce the bird population when they migrate;
- Make inferences about the effects of human limiting factors on bird population;
- Make recommendations for the way to minimize the factors which contribute to the possible extinction of migration birds.

Material/ Equipment needed :

Site: Land
Blindfolds (in two colors to differentiate between two playing teams)
Chalk
Tape
Board
Photos of some endangered migration birds

Activity Description :

Background Information:
Every year, the birds take their journey from the cold region to a warm one in order to survive. In Vietnam, migration birds fly from the north to the south, and during this trip they stop for food and shelter in several places along coastal areas.

Lack of safe food and shelter are posing big threats to bird populations. People are attacking nature by diminishing forest area, putting pesticides in rice fields, littering, and increasing coastal development. More seriously, many farmers or fishers become bird-hunters when birds migrate across their areas with the economic purposes of selling birds for meat or as pets in the market. The population of birds reduces dramatically every year, and many species are endangered or nearly face extinction.

Humans contribute to the death of migration birds for a number of reasons including :

- Poor hunting methods: fishing nets, cassette tapes, traps, guns, etc
- Disrupting landing sites by diminishing mangrove/forest area, using pesticides in rice fields, increasing coastal development, etc.
- Rubbish or pollution

Advance preparation :

Prepare a large area. Mark the playing site (5m x 10m). Divide the area into three regions representing North, Middle and South. Use objects or chalk to mark obstacles (burned forest, diminishing mangroves/forests, polluted wetland, litter, fishing nets, guns, traps, other animals such as dogs, etc.)

Procedure :

Discussion (10 min.):

- Discuss with children: Every year birds have to migrate in order to survive, and there are thousands of birds crossing this area (ask them to name some species they know).
- Ask the children to tell some of the things that birds need on the way (e.g. stopping on the way for food and shelter)
- Discuss with children what obstacles birds have to face on the migration journey (can divide in small groups to list out limiting factors threatening birds).

Game (20 min.):

Rules: Tell the children that they are going to play the role of migration birds and they will "fly" over obstacles in the journey from the North to the South of Vietnam. Participants are divided into two teams to compete. Another option to play the game might be to let one of the two teams act and stand as obstacles in the playground. The other team will have to replace the other after about five minutes or when all the birds die.

In each team, a cluster of 3-4 birds will fly first, the other waiting in their turn will act as the judge. Birds are blindfolded and have to fly across the playground. Whoever is tagged by the obstacles or step onto obstacles become dead and have to return to the staring place for another player to begin his/her journey. The successful bird will stay at the end side of the South to mark the record.

Play the game!

Activity Debrief Description :

Ask the children, what happened in the game?
Discuss the factors threatening bird populations. Are there lots of birds that survive in migration journey? Who/what is dangerous to migration birds?
Give the participants the facts of bird populations in Vietnam and the region.

Variations of Activity :

As mentioned before, depending on the size and ages of the participants let one of the two teams act as obstacles themselves. This might have a more lively illustration of human factors.

Last day

The river has this very smoothing element about it. I don't know what it is. Maybe a constant pitter-patter of water hitting the sides of the boat as it rocks back and forth. Maybe it is the openness of space, or the smells. Whatever it is, it has captured my heart. This river is completely symbolic of the journey we have all taken together. Running just under us is an interconnectedness we don't fully understand yet; but it is keeping us afloat. Will we ever fully understand? I am reminded of this very tacky bumper sticker I have on my car, as many Americans seem to have. It says, "Everything is hitched to everything else in the Universe." This little mantra, simple as it sounds, creates quite unimaginably, the fragility of everything and everyone. Where have our relationships to the environment gone? How do we correct it as well as allow for human development? The idea to move towards the future to sustainable development brings so many questions. Like the quote it reminds us that sustainability for the environment does not only start and end at just that. It connects all areas of what is human, culture, society, and economy. Where do we start? Take the idea of the river again. A very small change in its organization affects the flow of the water. We can start to take small steps, and make small changes for our sustainable future. Environmental educators already make that step. Teaching reaches out and makes that human connection and brings us to understand our link with the environment. So take this little idea on this river, and spread it out where it reaches everyone, where it reaches an ocean.

Punjanit Leagnavar has edited this publication and prepared the diary entries.

Ms Leagnavar has Thai parentage and grew up in the United States. During the third year of a BSc at the University of Missouri, she spent a semester at Rangsit University near Bangkok and completed a three-month internship with UNEP's Regional Office for Asia and the Pacific.

Appendix

List of Participants

Workshop Evaluation

List of Participants from the Community- based Environmental Educators Workshop :

Cambodia :

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UNEP Asia-Pacific Environmental Educator's Capacity Building Workshop with Magic Eyes May 20 -24, 2002

Workshop Evaluation Summary

1. How would you rate the UNEP Environmental Educators Capacity Building Workshop for Asia-Pacific overall (in terms of effectiveness and usefulness to you as an environmental educator)? Please rate from 1-4, with 4 = Very Effective/Useful, 3 = Effective/Useful, 2 = Just OK, and 1 = Not Effective/Useful at all.

Average rate: 3.6

2. Rate the usefulness of each of the workshop activities (including the debrief) below with regards to the overall objectives of the workshop. (Rating: 1-4, with 4 = Very Useful, 3 = Useful, 2 = Somewhat useful, and 1 = Not useful at all) Average rate for each activity:

3.3 - Water Quality Monitoring
3.4 - Pieces, Patterns and Processes (Ko Kret)
3.35- Pathum Thani Market Scavenger Hunt
2.7 - UNEP Global Environmental Outlook (GEO 3)
3.1 - Building the Pyramid (A Tool for Understanding Sustainable Development)
3.6 - Water Hyacinth Investigation
3.4 - Diffusion of Innovation Game
3.45- Sharing EE Experiences (Participant Presentations)

3. Please rate the other aspects of the workshop using the same scale (1 – 4). Average rate:

3.4 - Facilities (i.e. using the Magic Eyes Barge as the venue for the workshop)4
3.1 - Facility for Pyramid Exercise (Piyavan Resort) 3
3.7 - Barge Crew Duties (Cooking, Cleaning, Navigation, Words) 4
3.0 - Workshop Journal

Additional Comments:
" I liked your journal. I just wish that I had used it much more. I think that it is a good method to use to help participants take back with them the lesson so that the learnings, assimilation can happen whenever."

4. What was the overall most useful activity for you in this workshop? Explain Why?

"I liked two to three activities that includes Ko Kret Pieces, Patterns and Processes, Water Hyacinth investigation and Diffusion of Innovation game. The reason I liked them is they were very interesting. Secondly all these activities had a lot of insight. Through the method of investigation with a positive suspense it made us enthusiastic to work more passionately towards the outcome. I also liked the way in which these activities were carried out i.e. proper facilitation at the beginning and closing of the activity and giving ample freedom to the participants to work on their own was remarkable."

5. What did you like the most about the 5-day workshop?

"Working together and learning was the most important activity for me. It was also important that we shared experience. I learnt that we were kind of on the same boat – literally... and that gave me strength and hope."

6. What did you like least about the 5-day workshop?

"Building the Pyramid (A Tool for Understanding Sustainable Development)
The activity was very long, confusion due to unclear instructions, too much thinking in a day and the repetitive procedure. Not very suitable for school group programs but may be more useful for planners."

7. How could we improve the effectiveness/usefulness of this workshop for the next group (assuming same type of target audience – Asia-Pacific Environmental Educators)?

"You could distribute the material on Building the Pyramid to everyone in advance."
"Have some time for personal reflection."
"More EE activity sharing."

8. Please rate the quality of the workshop facilitation provided by the Magic Eyes staff (1-4, with 4 = Very Good, 3 = Good, 2 = Fair, 1 = Poor)

3.9 - Communication with Participants
3.6 - Energy Level
3.5 - Knowledge of Environmental Education
3.5 - Team-teaching
3.6 - Teaching Style
3.6 - Openness to others' ideas
3.6 - Facilitation Technique
3.6 - Empathy

9. How was the food? Please Comment as you like.

"WOW!! It was wonderful considering that we were also doing the cooking...we could open an international chain of hotel – Barge Cooking Thani Chai of Hotels."

In May 2002 twenty community-based environmental educators from throughout Asia spent a week together, exploring Bangkok's waterways and comparing approaches to their work.

The United Nations Environment Programme organised the workshop with Thai Non Governmental Organisation "Magic Eyes", which utilizes a live-aboard converted rice barge for its 'discovery learning' environmental education programmes with schools and other groups.

As well as demonstrating this outstanding model of educational practice, the workshop introduced participants to the findings of UNEP's Global Environment Outlook 3 report and sustainability training tools - the Pyramid and Amoeba games - developed by Atkisson Inc.

This enabled the workshop to combine three important maxims for environmental education: think globally, act locally and make connections.

The workshop also provided a forum for participants to share the success stories they are creating in their own communities through environmental education.

This publication documents the experience of participants during this unusual and innovative workshop and presents the results as a sourcebook for other educators of the region.

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