

GEO *for Youth*

in Latin America and the Caribbean



open your eyes to the environment



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United Nations Environment Programme
Regional Office for Latin America and the Caribbean



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Antonio Caso 142, Col. San Rafael

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Open your eyes to the environment

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Telephone (525) 2024841, Fax (525) 2020950. Internet: www.rolac.unep.mx

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CO-ORDINATION AND PRODUCTION TEAM

Project director: **Kaveh Zahedi**

Project co-ordinator: **Luis Betanzos**

Co-ordinating team: **Alejandro Jiménez, Kathrine Zaletnik, Charmaine Lee and Corinne Quinto**

Regional co-ordination team:

Southern Cone: **Silvia Salerno** and **Rodrigo Ures, Fundación Ecológica Universal**, Argentina

Andean region: **Mariela Canepa, Grupo Saywite**, Peru

English-speaking Caribbean: **Nadia James, Ministry of Environment, Energy and Natural Resources**, Barbados

Mesoamerica and Spanish-speaking Caribbean: **Luis Betanzos** and **Alejandro Jiménez**, Mexico

EDITORIAL TEAM:

Adriana Fariello, Uruguay

Andrea Grondona, Argentina

Ángela Tapia, Peru

Gabriel Pozo, Chile

Iván Jiménez, Mexico

Jessica Valero Padilla, Mexico

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Juan Diego Valenzuela, Colombia

Luis Enrique Heredia, Venezuela

Magalí Oñate, Chile

Mariela Canepa, Peru

Mavoy Smith, Jamaica

Nadia James, Barbados

Oneka Scott, Guyana

Poema Mühlenberg, Brazil

Silvia Salerno, Argentina

Vidal Castillo, Panama

Yordanis Puerta de Armas, Cuba



Design: Iván Jiménez and Puntotr3s design

Cover design: Carolina Villarreal

Design of page 110: Tomás Castrejón

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Poema Mühlenberg, Brazil

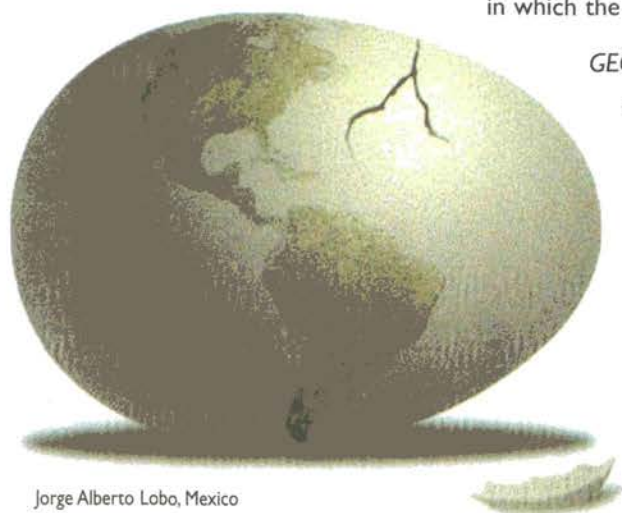
Presentation

The mission of the United Nations Environment Programme (UNEP) is to provide leadership and encourage partnership in caring for the environment by inspiring, informing, and enabling nations and peoples to improve their quality of life without compromising that of future generations. Working with youth is a fundamental part of our mission. However, more than just an opportunity to comply with our mission, the *GEO for Youth in Latin America and the Caribbean* has been an enormously rewarding and educative experience for the hundreds of young people involved, as well as for those of us at UNEP.

This work is based on the personal experiences of young men and women in their communities, towns, cities and countries. It represents the efforts of hundreds of young people in Latin America and the Caribbean who have shared case studies, poems, drawings and photographs of the region. The *GEO for Youth in Latin America and the Caribbean* is part of the GEO (Global Environment Outlook) project and draws on the GEO evaluations in the region.

In this book, youth have shared with us their vision and hopes concerning the environment. They have chronicled the state of their region's environment as they see it, and what they perceive is not very encouraging. These young people paint a picture of a region whose environment is in rapid decline. Case studies and many personal experiences show us that the water we all depend on is being increasingly polluted, that the air we breathe becomes dirtier by the day, that our biodiversity and forests are being quickly lost and our coasts under constant threat.

At the same time, young people have shown once more that they will not remain impassive while witnessing the deterioration of the environment. In the chapter "Youth in Action" in particular, we can see that they have taken on the challenge of protecting and improving their environment. Many of the stories presented are an inspiration not only for other youth all over the world, but also for all those who have it within their power to help promote better policies and programmes, in which the environment is an essential part of a nations' development.



Jorge Alberto Lobo, Mexico

GEO for Youth in Latin America and the Caribbean: open your eyes to the environment is a wake-up call to people in Latin America and the Caribbean. We hope it can inspire everyone, young and old, to contribute in some way or another to protect the environment. There is a lot to be done and young people have shown that they can make a difference in the present situation. We now depend on everyone to accept the challenge and bring about that transformation!

DR. KLAUS TÖPFER

A handwritten signature in black ink, appearing to read 'Klaus Töpfer', written in a cursive style.

Executive Director
United Nations Environment
Programme (UNEP)

Foreword

The *GEO for Youth in Latin America and the Caribbean* project has been very enriching. Thanks to its many participants, we have been able to promote and strengthen the solidarity of youth in our region through a form of expression never seen before.

Thanks to it, youth in Latin America and the Caribbean today play a notable part in the process of evaluating the state of the region's environment, as well as helping to establish new policies and encouraging action that may lead us to a sustainable future.

This space has allowed us to combine different youth efforts by working with various organisations, schools and individuals in the region and, at the same time, strengthening UNEP's Youth Advisory Council by getting young people from different countries to participate and spread the message of the need for sustainable development.

The most important legacy left to us by this work is, first of all, the recognition of the main concerns, dreams and perceptions of youth about the present state of the environment. Youth have proved themselves to be enterprising, always ready to take the initiative and undertake the concrete actions to solve the problems. Second, it enables decision-makers to draft and implement better policies and action plans for our countries and our region.

This publication is of great value to our region and should be widely disseminated, presented at all youth fora and in all spaces dealing with the topic of youth and the environment, not only as a product but as the most important space for our region's youth to participate when it comes to matters relating to the environment and sustainable development.

RICARDO SÁNCHEZ SOSA



Director, Regional Office
for Latin America and the Caribbean

UNEP

Patricia Elizondo, Mexico



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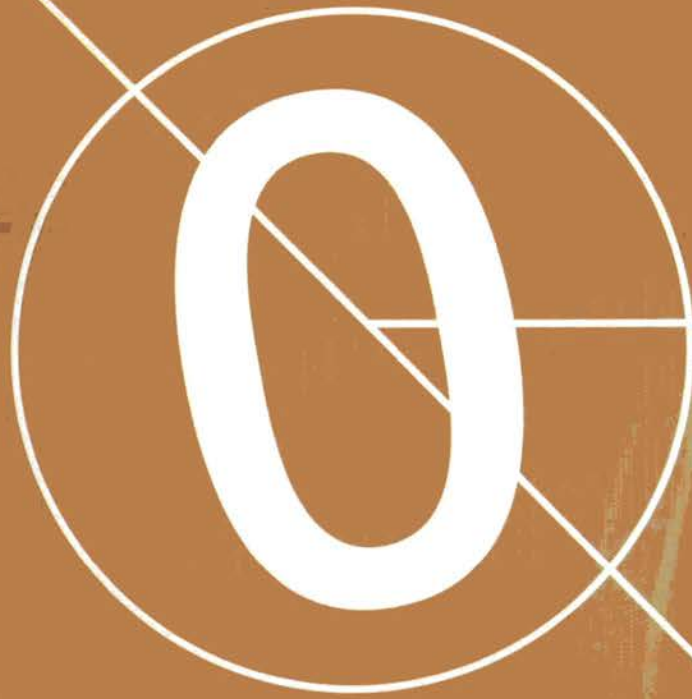
This report has been published thanks to the participation of hundreds of young people in Latin America and the Caribbean who have shared with us their experiences and knowledge. We give a very special thanks to Norberto Fernández, Regional Co-ordinator of UNEP, for his support in undertaking the project and keeping it going. We also want to thank the following for their valuable contributions: Marion Cheatle, Matilde Díaz, Tessa Goverse, Teresa Hurtado and Rody Oñate (UNEP), Lilian Sánchez (MERCOSUR Youth Group, Uruguay) and Loretta Serrano (ITESM, Monterrey, Mexico).

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Ezequiel Miodownik, Argentina



INTRODUCTION

layout



message from the editors



Introduction

GEO for Youth in Latin America and the Caribbean: open your eyes to the environment is part of the GEO global environment process.

The project began as a response to the persistent demands by the region's youth to join in UNEP's activities and processes so that their constant efforts concerning the environment would be recognised.

The GEO for Youth LAC project is part of a process begun by UNEP in 1995 known as GEO. The GEO reports periodically examine the state of the environment and provide guidance for decision making, formulating environmental policies, planning appropriate measures and allocating resources.

Since its beginning, GEO for Youth in Latin America and the Caribbean has been a participative environmental assessment process, where the youth participants have had the opportunity to express their main concerns and tell of their successful projects.

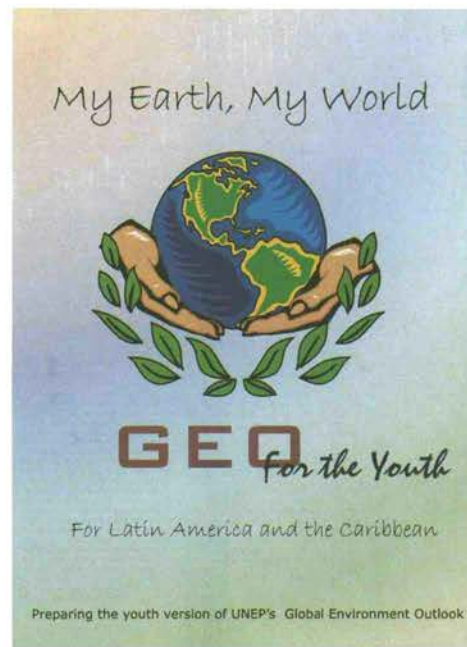
The principal objective of this report is to present the vision of the region's youth on the environment and provide concrete proposals to solve problems in their communities and thus promote strategies to allow them to be part of an active participatory process.

This process has provided an opportunity to be part of an open forum for expression and exchange of opinions between the youth of different countries, in which they have built the basis for environmental awareness promoting sustainability.

More than 800 young people between 15 and 25 from youth organisations and schools throughout the region took part in the project. To prepare the report the region's youth shared experiences gained through research and case studies, by taking photographs, and by writing poems and stories.

To ensure the project's success, it was carried out in four sub-regions: Mexico, Central America and the Spanish-speaking Caribbean islands; the Andean region; the English-speaking Caribbean; and the Southern Cone. At the same time a communications strategy was prepared that involved a workbook, a web site and a bi-monthly information newsletter, keeping all the participants up to date with the project's activities.

Two editorial meetings were held to prepare the report and they were attended by more than 25 young people from the region. The first one was in Huatulco, Mexico in November 2000, and the second in Mexico City in March 2001.



This report is the result of the whole process and the beginning of a much wider UNEP participatory initiative for youth.

Message from the Editors



Welcome to the *GEO for Youth in Latin America and the Caribbean: open your eyes to the environment* report!

GEO for Youth is a unique forum where we have been able to share different experiences and points of view. What makes this report original is that it has a life of its own; the more you read of it the more you will become aware of its energy, vitality and enthusiasm.

As representatives of youth in Latin America and the Caribbean we feel responsible for preparing a publication that will meet the expectations of those who made valuable contributions. The report expresses the hopes, dreams and concerns of most young people in the region. But the document is not the only result of this process; it also helped us to reaffirm our sense of community and establish firm friendships.

The report is written by and for young people; we hope it will serve as a useful reference and an inspiration to take concrete action to preserve not only our biodiversity, but also the cultural variety and wealth of all our people. It is dedicated to those who wish to contribute to improving our environment, from ordinary people to decision-makers at all government levels and in all our countries.

We are sure that this project will be the beginning of a process to change the way society looks at the environment. The dream of achieving sustainable development will not be out of reach if younger generations promote that change by making constant efforts and encouraging solidarity among the countries in the region.

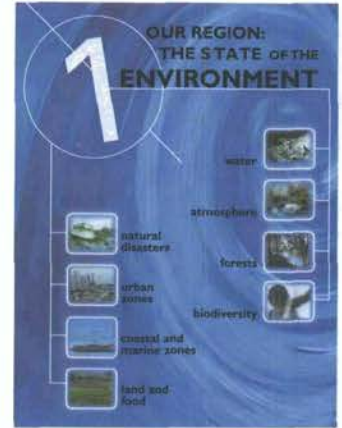
We want to thank the Regional Office for Latin America and the Caribbean of the United Nations Environment Programme for offering us this opportunity of expression. Starting now, we must work to turn our dreams and hopes into reality. Remember, we are not alone in this great struggle and what we do today will determine the world we bequeath to the children of tomorrow.

THE EDITORIAL TEAM

Layout

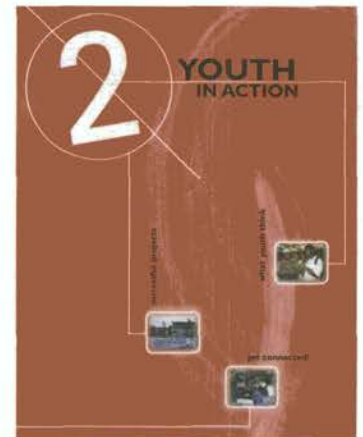
OUR REGION: THE STATE OF THE ENVIRONMENT

Chapter 1, "Our region: the state of the environment", is divided into eight subjects: Water, Atmosphere, Forests, Biodiversity, Natural disasters, Urban zones, Coastal and marine zones, and Land and food. This is the outline used in GEO reports and it is designed to make it easier to analyse the problems.



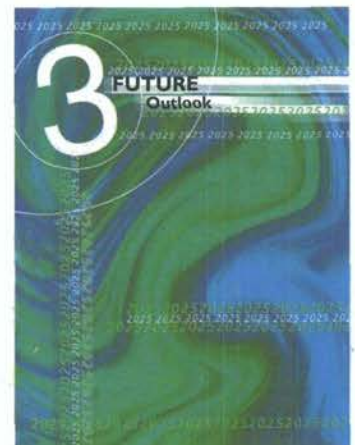
YOUTH IN ACTION

Chapter 2, "Youth in action", is very important because it describes the activities and projects on which young men and women are working throughout the region to solve environmental problems. In it you can read and learn about how different projects were approached and developed, get to know young leaders and how you can become involved in different activities. Our main objective is to inspire our readers to participate, to copy the projects and engage in activities that can bring about significant changes to their environments.



FUTURE OUTLOOK

In the final chapter, "Future outlook", different ideas are presented about the future of the region in the year 2025. The young editors have decided to imagine the future of planet Earth 25 years ahead with three scenarios: an optimistic future, a pessimistic future, and a future if present trends continue.



OUR REGION: THE STATE OF THE ENVIRONMENT



**natural
disasters**



**urban
zones**



**coastal and
marine zones**



**land and
food**



water



atmosphere



forests



biodiversity

Introduction

We, the youth of Latin America and the Caribbean, want to say what we think about the present state of the environment. We want to express our concerns and identify the main problems faced by our communities and localities, as well as discovering what the connection is between the many problems with which we deal. We intend to motivate society to act and make it aware of the importance of putting a stop to and reversing the degradation of natural resources. As a final aim, we want everyone to provide ideas in order to find solutions.

The chapter deals with eight subjects, under each of which an explanation is given of the state of the environment in Latin America and the Caribbean. In addition, some ideas are put forward by young people in the region as their contributions to the project. The division into subjects was done simply for the sake of convenience as there is no doubt we all agree that while there is a single problem, its consequences are multiple.

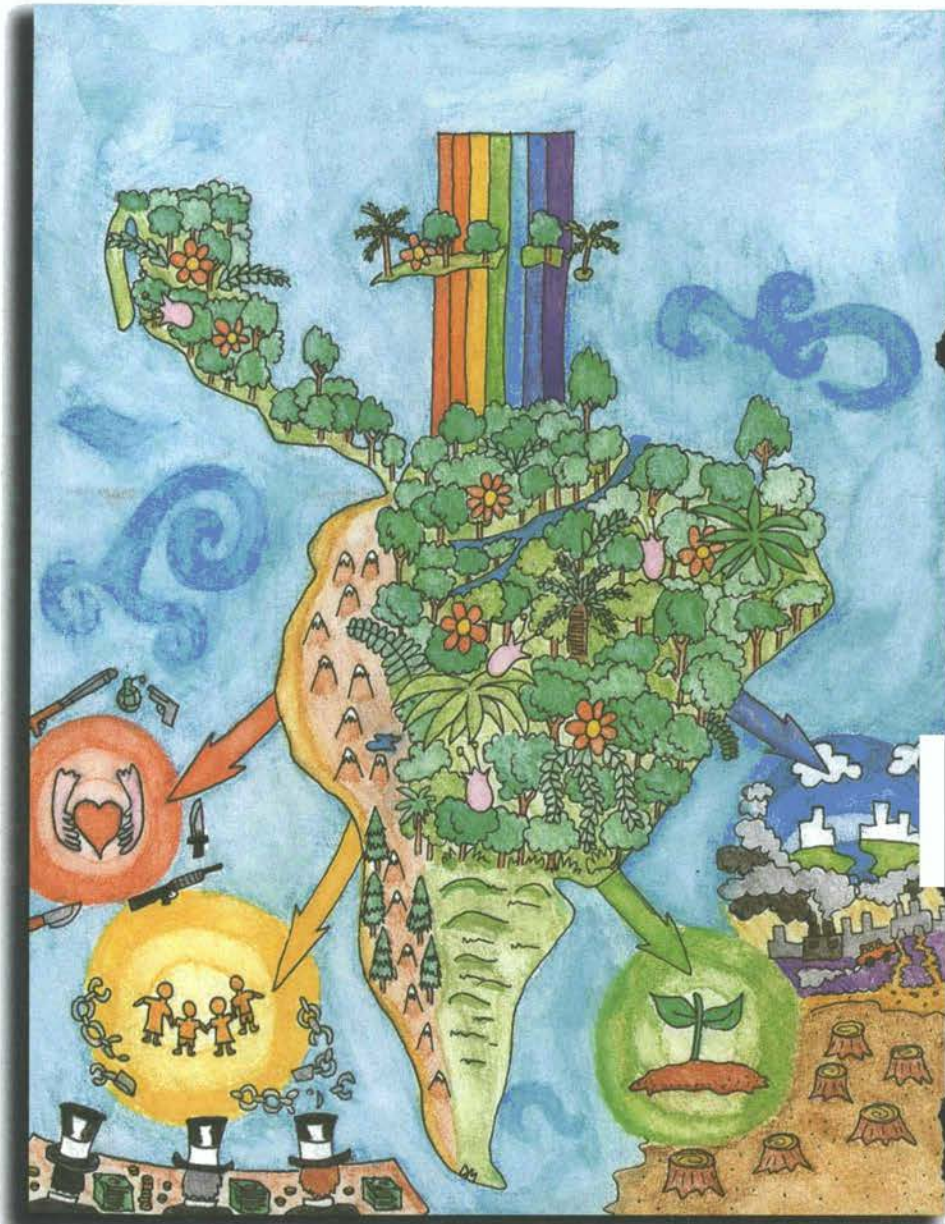
6 Latin America and the Caribbean contain most known ecosystems, and some of its regions have more variety and natural wealth than entire continents. Our region includes extensive deserts, tropical forests (for example in Amazonia), swamps (like those in Paraguay and Brazil), extensive plains, cold zones and very rich marine ecosystems. Some countries in the region (Brazil, Colombia, Ecuador and Mexico) are what is known as *megadiverse* where natural wealth is so enormous that science has still not classified many animal and vegetable species.

Different cultures have developed in the region (outstanding ones include the Inca, the Maya, the Olmec and the Aztec), that began to modify their surroundings for their own benefit. With the arrival of the Europeans (*Conquistadores*) intensive exploitation of resources began, becoming accentuated during the Industrial Revolution.

For decades environmental degradation has been a constant in the region; until a few years ago, governments and trading corporations made most decisions about resources that belong to all of us. But society is now better organised and has become aware that it is us, the citizens, who must demand change and oblige decision-makers to respect our rights, one of which is that of enjoying a healthy environment.

Social and economic changes in the region have had great repercussions on our natural resources. In the period between 1940 and 1980, the population of Latin America and the Caribbean rose from 160 to 430 million and total consumption of energy quadrupled.

According to the United Nations Development Programme (UNDP), the human development index grew in all countries of the region during the period 1960-1994; the standard of living also improved thanks to a higher gross domestic product (GDP). In spite of these



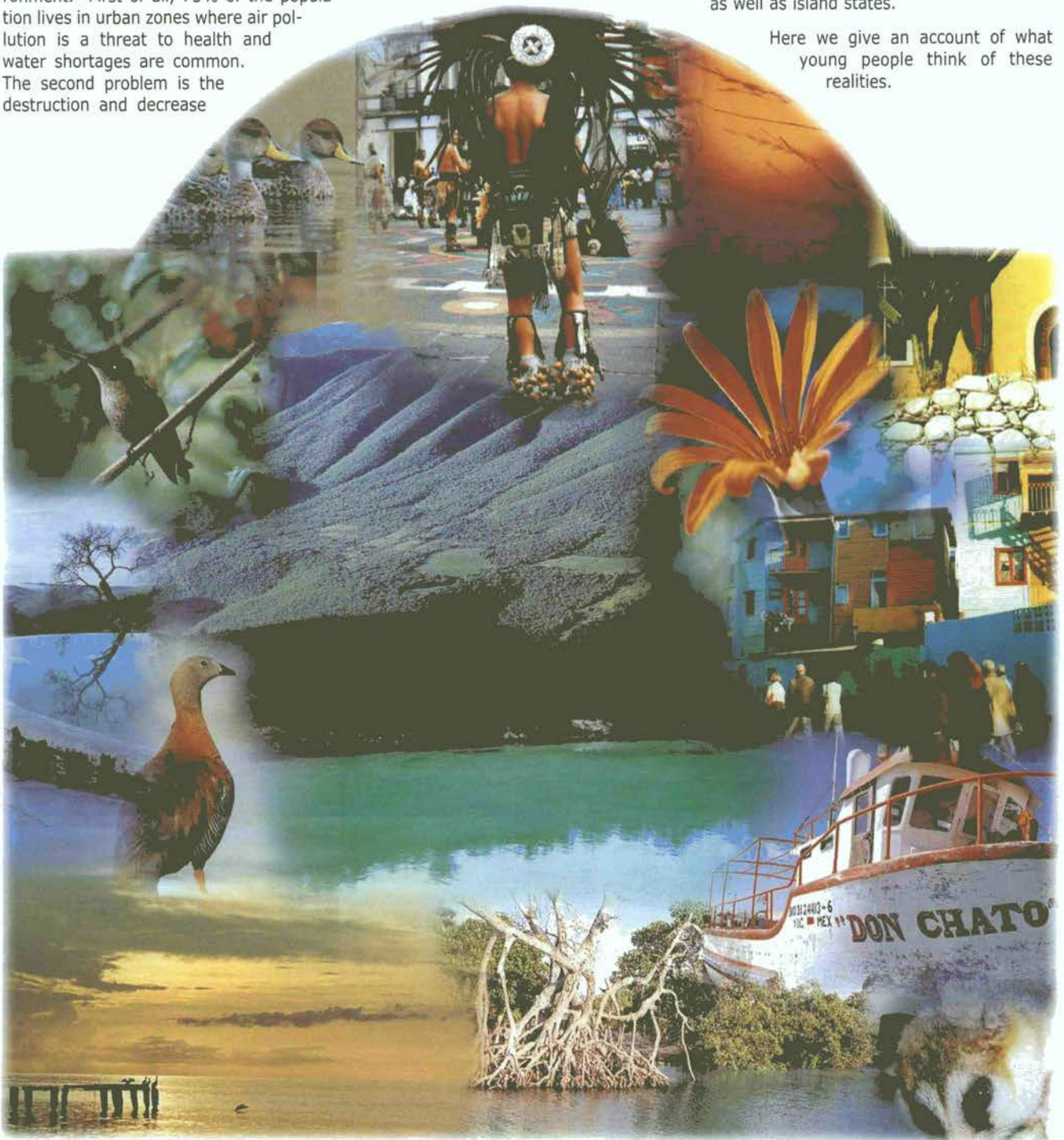
Grupo Vida, Daniel Martínez Núñez, Peru

encouraging and positive trends, there is still an unfair, and at times scandalously so, distribution of wealth. Furthermore, the hoped-for alleviation of poverty which would result from the success of free market reforms has not yet occurred.

The region faces three main problems of the environment. First of all, 75% of the population lives in urban zones where air pollution is a threat to health and water shortages are common. The second problem is the destruction and decrease

in forest resources, especially in Amazonia, and the subsequent threat to biodiversity. In third place is the possible regional impact of the global process of climate change, caused by phenomena such as forest fires, disasters caused by hurricanes and floods and the trend towards a rise in sea level that endangers many regional cities located in coastal zones, as well as island states.

Here we give an account of what young people think of these realities.



Photos above, clockwise, submitted by: Marcela Ruiz Barba, Mexico; Cristian Müller, Argentina; Marcela Ruiz Barba, Mexico; Cristian Müller, Argentina; Barrio de Boca, Matias Melecrinis, Mitronov Romero, Argentina; Gerardo del Castillo, Mexico; Cristian Müller, Argentina; Gerardo del Castillo, Iván Jiménez T., Laguna de Chankanab, Mexico; Alberto Cáceres, Mexico; Gerardo del Castillo, Mexico; Cristian Müller, Argentina; Pato maicero, Cristian Müller, Argentina.

Water

Water is vital for life; without it organisms can neither satisfy their basic needs nor survive. It is indispensable for all living organisms and covers 70% of the planet's surface but, unfortunately, only 2.5% is freshwater while the rest is salt water. Of that small fraction, 70% is frozen in the polar icecaps and the other 30% is distributed in the atmosphere, in surface waters and in aquifers. Less than 0.01% of the planet's water is fit for human consumption (SEMARNAP, 2000). Water is related to and determines various environmental conditions; at the same time, different factors influence the shortage or abundance of this resource including climate, altitude, type of soils and vegetation. Its availability, use and pollution affect all aspects of life on Earth. Water must be taken into account when subjects such as forests and vegetation, atmosphere, biodiversity and urban zones, to name just a few, are considered. It is linked to forests and vegetation because it is absorbed by the roots of plants which also form and retain soils, thus reducing the risk of landslides or floods that follow heavy rains. Deforestation affects the water cycle and the atmosphere by causing a reduction in rainfall. Natural phenomena such as *El Niño*, made worse by human activity, also affect the amount of rain and available water. Furthermore, urban areas face a serious water shortage because they require huge quantities that can only be extracted from the subsoil at greater and greater depths or brought from far-off watersheds. Cities contribute to water pollution because they lack a public health infrastructure and laws to regulate its use. Water pollution in ecosystems such as lakes leads to a loss of species that include birds, insects and fish, all of which die from poisoning.

Floods, waste matter, pollution and transmitted diseases are all subjects related to water. Water pollution is mainly caused by domestic and industrial sewage and these pollutants inflict damage on the development and maintenance of aquatic life and make it dangerous to use water (for drinking and to practice water sports, fishing, camping, tourism, etc.). Of course, polluted water is dangerous to human health and leaks from water distribution networks also cause problems to communities. Irrigation has a direct and negative effect on water resources and so do large hydraulic projects which, together with agriculture, use huge amounts of water and thus alter bodies of water and their dynamics.



Villa Tacul,
Ángeles Pérez,
Argentina

Gustavo Soriano, Mexico



"Maicero" duck, Cristian Müller, Argentina

WATER POLLUTION

This is one of the most serious environmental problems. It will also be examined when discussing urban areas because cities negatively affect freshwater sources and reserves by using them to discharge chemical substances, heavy metals, hydrocarbons, untreated sewage and garbage, among many other pollutants. However, it should be pointed out that even in the presence of

some polluting elements, bodies of water have a certain capacity to purify themselves because of their currents and interaction with the air.

Access to freshwater is an acute unsolved problem in many places in Latin America and the Caribbean.

Who can enjoy freshwater?

Today 95% of the Cuban population has access to potable water services, classified as follows: domestic connection (72.9%), public service (6.2%) and easy access (16.4%). Of these, domestic connection is the one that provides a better quality of life because the water is piped indoors. However, there is not enough work being done on sanitation and this has meant a sustained deterioration in the environmental quality of bodies of water, which are used in many cases as receptacles for raw or treated waste materials from agricultural, industrial and domestic sources (CIGEA, 1999).





Anonymous, Paraguay



Water self-purification

Water courses have a certain capacity to purify themselves of pollution but, when it is continuous and excessive, it becomes permanent. To recover the normal state through a self-purification process is slow and the problem persists a long time after the polluting discharges have ceased.

DIEGO LÓPEZ, MARTÍN IBARRA, MARTÍN BENÍTEZ,
CARLOS CASATI AND MAURICIO AMIGO, PARAGUAY

Polluted water is dispersed in watershed rivers and can be scattered over large areas with adverse effects on rain, rivers, lakes, oceans and aquifers. Often the polluted water may appear to be clean but it contains germs, chemical substances and other pathogenic agents that cause or transmit diseases, sometimes fatal. Water pollution has become a serious problem in such Caribbean countries as Barbados, Jamaica and Trinidad and Tobago.

Pollution of rivers, lakes, underground deposits and other bodies of water is getting worse; beautiful rivers have been converted into open sewers that carry domestic and industrial waste. *GEO for Youth in Latin America and the Caribbean* and *Social policy pollutants* have outlined how these industries affect water resources.



Matias Melecrinis, Mitronov Romero, Argentina

Social policy pollutants

In some countries there is cause for concern over the state of water basins. Industries installed close to rivers or lakes dump their waste into the aquatic ecosystems and kill the creatures living in them, as well as making the water unfit for use. The basins may also become polluted because of the pesticides farmers use. Finally, we might mention the waste produced by poor families without proper sanitation services. This is an aspect, as we can see, where the pollution problem is closely related to a country's social policy.

LOS NOCHEROS, ARGENTINA

What does GEO LAC say about water?



The Latin American region is extremely rich in water resources and more than 30% of the world's continental surface water is carried by the Amazon, Orinoco, Sao Francisco, Parana, Paraguay and Magdalena rivers. With 12% of the world's total land area's water and 6% of its population, the region has around 27% of the total run-off, most of it concentrated in Amazonia. Despite this, two thirds of the region's territory is classified as arid and semi-arid.

The island of Barbados, in the Caribbean, is among the 10 most arid countries in the world, and the island nations in this sub-region have a per capita supply of water resources considerably inferior to those of other island groups in the world, about 13.3% of Indian ocean and 1.7% of South Pacific supplies. Furthermore, regional problems of availability of water are getting worse, in particular in countries with large arid areas.

The demand for water grows rapidly with the increase in population, industrial activity and tourism. Specifically, the growth of the tourist industry has placed enormous demands on the islands' water resources (CEO, 1999). That pressure is complicated because many types of water extraction may be unsustainable. Pumping aquifers at rates greater than what is required for replenishment is a particularly serious aggravating factor, and in this respect very little is known about the natural limits. In addition, it is thought that the growing rates of deforestation may be contributing to the annual cycles of severe floods and droughts.

Access to potable water is still a pressing question. It is estimated that in 1995, 27% of the regional population did not have access to potable water while 31% continued to lack drains and sanitary services.

The main cause of water pollution is the direct discharge of untreated domestic and industrial waste into surface waters. With the expansion of industry, mining and the use of agrochemicals, rivers and aquifers are polluted with organic solids, chemicals, oxides and heavy metals.



Da Silva and de Jesús, Brazil

The bad habit of dumping garbage affects not only our immediate surroundings but also water courses and coastal zones. The following contribution from Peru is a clear example of water pollution.

The Willcamayu river



In recent years young people in this part of inner Peru have seen the damage done to the Vilcanota river, a very important water course for the inhabitants of southern Peru. Occobamba, a community and the source of our river Willcamayu, is well aware of this very serious problem because the inhabitants have seen how the water course that Nature gave us has been polluted by thoughtless people dumping chemicals and domestic waste. The river brings pure water, full of life and totally unpolluted; it is water that comes from a source in the high and snowy peaks that are home to aquatic species that provide food for the inhabitants of agricultural communities on the banks of the majestic Vilcanota.

MATILDE CAHUATA P. AND ERNESTO KANA M.,
ASOCIACIÓN CUNA DE LOS CHANCHIS, CUZCO, PERU

The worst aspect of water pollution is that it is never-ending. In Trinidad and Tobago local companies dump their waste into ditches and streams from where it filters into underground layers and finally empties into the sea. An example is given in the following text on slops.



Arroyo Miguelete, Gurises Unidos, Uruguay

Slops



Mud and water in tanks that transport or store petroleum are among oil industry contaminants and they are toxic for fish, plankton and mangroves. Two local rum distilleries annually produce close to 19 million litres and the principal waste dumped by this industry, known as "slops", reaches a volume of about 170 million litres per year (EMA,1999). Slops have a high residual sugar content, with a pH between 4.0 and 6.5 and are dumped into our public drainage system or into water courses, with serious consequences for aquatic life. (Any substance with a pH of less than 7 is considered to be acid.)

THERESE JABOUR, TRINIDAD AND TOBAGO



Ezequiel Miodownik, Argentina

Because it reaches neighbouring water courses, it is very disquieting to see, as happens in Paraguay, that rainwater drainage is used to discharge untreated sewage (as explained in *Drainage in Paraguay*). Rivers and lakes are connected to water basins so that any hazardous waste dumped is carried to them by the currents. Waste matter in the water system can reach all the way to the sea where it affects fish that is then eaten by humans and animals. The case study *Lake Tiscapa was dying*, in Nicaragua, tells of one such affected river.

Another source of pollution is heavy rainfall that brings sediments, waste and polluting agents which, once they are in a lake, are lethal to its living organisms. This is explained in the text *Sediment also destroys*.



Drainage in Paraguay



There is a massive overflow of drainage from sewers that remains hidden beneath the bridge on Avenida España to the east of the stream, and causes a very serious pollution problem down river. All the effects are very visible: the stream is discoloured, turbid, has a greasy surface, with solid waste deposited on the edge and a profusion of sewage fungi.

MATÍAS BRIZUELA, RENZO FERRARI, FABIÁN FIGUERO, HUGO GERHMANN, MANUEL RIVAROLA, FERNANDO UGARTE AND DANIEL VILLANTE, PARAGUAY

Besides the concentration of people and industrial production in large metropolitan areas, other factors cause significant pollution: growth of conventional drainage systems without corresponding treatment facilities; intensification of agriculture near metropolitan areas; economic structure changes, with growing emphasis on manufactures; concentration of run-offs from paved areas in developing cities and the need for artificial regulation of river flows. ■



Lake in process of sedimentation, Iván Jiménez T., Mexico

Lake Tiscapa was dying



In the centre of the city of Managua, people used to get drinking water from Lake Tiscapa and it was a tourist attraction. Its pollution problem started in 1967 when the government began public works that altered its natural state so that it attracted more rainfall and all the waste matter that comes with it.

The flow is now so large that it has not been possible to build a treatment facility for the sewage before it reaches the lake which runs the risk of breaking its banks because the volume of water is so high.

Recovery work is now underway and, thanks to citizen participation, the government is taking action to preserve this Managua city attraction.

INDIRA SILVA MIRANDA, CRISTEL SILVA MIRANDA AND ANA LIGIA DÁVILA, NICARAGUA



Anonymous, Paraguay

Sediment also destroys



Sedimentation, the result of poor soil conservation practices, is also a strong source of water pollution. Sediment fills dams and damages generating turbines and irrigation pumps, also reducing the amount of sunlight that penetrates the water. If there is not enough sunlight, water plants that normally provide the water with oxygen stop growing. Frequently, factories change water courses into open drains, into which they dump mineral oils, colorants, toxic chemical substances and other dangerous industrial waste. The mining and oil industries also dump corrosive acid waste.

TARA GASKIN, KIRAN MAHTANI, TINA MARSHALL, SHANIELLE SMALL AND JACLYN WALTERS, BARBADOS



WATER SUPPLY

Water supply depends on many aspects related to the environment. For example, forests regulate the water cycle while urban areas generally demand a large supply of the vital liquid. It would be impossible to think of efficient water supply without imagining large areas of forests and mountains with the qualities needed to guarantee supplies of fresh, clean, pollutant-free water.



The availability of water is a pressing question in many countries and, although there is a great wealth of hydraulic resources in the region, water is not always fairly distributed in every country. Several zones in the world suffer from chronic water shortages while the world-wide demand for the resource has

Osver Polo Carrasco, Peru

grown by more than 600% in the last 100 years (SEMARNAP, 2000). In Latin America and the Caribbean, countries like Brazil and Argentina have large reserves of freshwater, while in others it is very scarce. The situation is described in *Water resources in Colombia*.

There are many examples of deficient water supplies and one of the extreme cases is in the northeast of Brazil, as explained in the case study *Water problems in my region*. We shall learn of another example in Guyana in *Land of many waters*.

A lack of storage infrastructure makes it very hard to conserve available water, as is explained in *Lack of infrastructure*, and this deficiency leads to ever greater supply problems.

Water resources in Colombia



Colombia is one of the countries with the planet's largest rainfall and, consequently, biodiversity, and with a water supply that surpasses the 10,000 m³ level (WRI, 2000a).

In general, industrial water consumption is high, because most companies have old production systems without the means to reduce waste and prevent water pollution.



Ixchel Estrada, Mexico

Water problems in my region



In the state of Pernambuco, in the northeast of Brazil, water shortage is a very old problem and some localities are becoming deserts. Many people living in the vicinity of Recife, the state capital, have already suffered from the effects of drought.

In Camaragibe there are places where piped water only arrives every 10 days and, as there is no running water, people often drill wells. In the rainy season some people have to use basins, pots, buckets and pails to collect drinking water.

Today things are better and the water arrives every third day; but the hillside neighbourhoods get barely any since the pressure is so low that the little there is comes in the very early hours of the morning, when people cannot make good use of it.



Osver Polo Carrasco, Peru

Land of many waters



Guyana is divided into eight watersheds that correspond to the country's eight most important rivers. More than half the rural areas lack an adequate water supply system and people often complain because they can neither cook nor wash. More than half the country's interior consists of grassland, swamps and water basins. It is said that Guyana is two and a half metres below sea level and that it is sinking by two centimetres every year. Just imagine then how sad it is to hear that there are entire communities without water; to see children who must walk almost a kilometre to fill a pail with water only to lose half of it on the way home. It is ironic that this happens in some parts where water abounds. Guyana has water, but very few means of taking advantage of it.

ONEKA SCOTT, GUYANA

In some countries privatisation of water supplies has been a strategy used to encourage people to care for and use it rationally, but charging for water is a two-edged sword because many people are left without what is a valuable resource because they cannot pay for it; at the same time, placing an economic value on it ought to help make people more careful when using it.

Many cities have problems in supplying drinking water. For example, Mexico City's potable water is brought from very far away making it more expensive to extract and transport.

With each day that passes water supply problems become more acute, water basins are damaged by human factors such as deforestation, dams, mining and industrial activity, to say nothing of the difficulties caused by urban sprawl.

HEALTH AND WATER

We must always keep in mind that water should be used sensibly; if we waste it today, in years to come we might not have enough of it to enable us to survive. Health and good quality water are intimately related for, to remain healthy, the population needs to have continuous access to drinking water. It is the duty of governments to guarantee both a proper supply and a good quality of service to prevent diseases caused by stagnant

water. There is so much to be done that the actions governments take are often not enough because treatment plants are costly and the technology in our region is obsolete.

Water with a rust colour or that has pathogenic organisms poses great danger to health and must be purified.

Water and health



The use of polluted water for recreational activities is a serious danger to health and this applies not only to uses that imply direct contact with it such as swimming in rivers, but also to indirect contact such as fishing.

ANDREA MABEL GRONDONA, ARGENTINA

Lack of infrastructure



Populations settle where there is abundant water (by lakes and rivers), cities grow and factories are built. But at times the water becomes scarce because some towns do not make proper use of it. Although they have abundant water, they do not have enough storage facilities, treatment plants or potable water distribution networks to meet the needs of a growing population.

JAMAL JONES AND ALLAN TROTMAN, BARBADOS

IRRIGATION

The irrational use of water for agriculture signifies huge waste because of loss through evaporation and infiltration and it may even, in extreme cases, cause soil erosion. Due to the enormous volumes used, aquifers do not have the time to be adequately replenished; this reduces their water level and water seeps into them from other sources, perhaps bringing salts or other polluting substances.

To this problem may be added domestic and industrial pollution of water and salt water seeping into freshwater, making the latter unfit for use. All these factors mean there is a constant drop

in the volume of freshwater available to meet the needs of living organisms that depend on it, as well as human beings. Irrigation systems are inefficient because they waste large volumes of water and deplete its supply.

In the following contribution we shall see the importance of proper irrigation methods.



Anonymous, Paraguay

Water crisis in Mexico



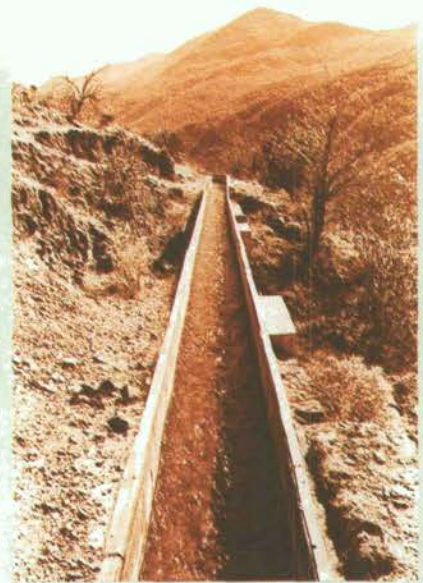
According to the latest information available on extraction and use of underground water in Mexico, there are 632 aquifers from which a total of 25,856,000.20 m³ is extracted. The water is used as follows: 70% for irrigation, 21.5% for public use, 2.1% for domestic use and 6.4% for industrial use (SEMARNAP, 1998).

As Sandra Postel mentions in her article *Redesigning Irrigated Agriculture*, it may be concluded that proper irrigation methods are a decisive factor in efficient water resource management.

Although industry and the federal, state and municipal governments have directed their efforts towards the treatment and reuse of domestic and industrial water, statistics reveal that only 30% of the water used is treated and, therefore, there remains a very large volume on which greater efforts are needed. The objective is not to minimise the importance of treating domestic and industrial sewage but, when it comes to agriculture, to use other means to complement the action taken. A common practice is to make soils impervious to water during irrigation, in order to minimise losses from evaporation, as well as to use the well-known drip irrigation to replace the very inefficient flood irrigation method.

Unfortunately, the lack of economic, technological and other resources to deal with the problem is even more evident in poor regions or those where access is difficult. Government water subsidies, although they make the cultivation of some agriculture species more attractive, can also encourage indiscriminate use in order to avoid the extra work involved in applying the measures mentioned above.

Finally, it should be mentioned that education also plays a decisive role because, until the magnitude of the problem and its possible solutions are known, it will be hard to achieve large-scale favourable results. Proper agricultural education could allow 70% of the water consumed in Mexico to be treated, thereby reducing waste to a minimum and stopping excessive extraction of aquifers by reducing demand.



Gustavo Soriano, Mexico

Water polluted with human and animal faeces, which is unfortunately common in some countries, can transmit typhoid fever, cholera, dysentery, malaria and other contagious diseases.

Present irrigation systems are inefficient, because they waste large volumes of water and this has a negative effect on available reserves, as is shown in the following example.

Irrigation and water supply



Most plants need large amounts of water. As a result, crops are mainly sown in zones where rainfall is plentiful. But, to produce enough food to meet their needs, people who sow crops must also irrigate dry zones. The water used by a country to irrigate its fields is irreplaceable because any excess cannot be reused.

JAMAL JONES AND ALLAN TROTMAN, BARBADOS



Ezequiel Miodownik, Argentina

HYDRAULIC PROJECTS

Throughout recorded history, water has been used as a means of transport and there are now proposals to construct large projects similar to the waterways of South America to promote river navigation that would facilitate trade and help develop the region's economies. Many are unsustainable, but those who promote them defend their presumed benefits by saying they would improve the quality of life of people living near them. An exam-

ple is the project to construct a waterway on the Paraguay and Parana rivers. Many independent evaluations have been made on the environmental impact and give details of the repercussions the work would have on ecosystems, but they seem to have been ignored on account of the economic interests involved. Features of this great project are described in a case study drafted by the *Centro Ambiental La Escalera*.

The river Parana waterway



Two studies that cost millions —carried out by various government commissions— examined the economic and engineering feasibility of the most ambitious project in the Americas, the Parana river waterway, while side-stepping its environmental impact on the natural environment. The project consists of a 3,442 km river waterway that would allow large vessels to navigate on the Parana and Paraguay rivers (CIH, 2000).

One of the ecosystems that would be affected by the project is "El Pantanal", the world's largest swamp that lies between Brazil, Bolivia and Paraguay. This huge area is home to endangered species like the blue macaw and plays a crucial role in the life of many species of migratory birds.

This waterway (that will affect the Parana river's flora and fauna) is designed solely for economic reasons without any consideration being given to the ecological value of the affected species or to hydrological, vegetation and geomorphologic aspects. The effect it would have on the delicate living creatures/environment relationship indicates that more prudent and conservationist criteria need to be adopted.

CENTRO AMBIENTAL LA ESCALERA, ARGENTINA

Although water is a vital resource, in Latin America and the Caribbean it is not given the attention it deserves and, while the region is very rich in water resources, the situation of potable water is cause for concern. As has been mentioned, the main aspects related to water are supply, use, pollution, and human health. The problems concerning each of these aspects come from the lack of a proper sanitary infrastructure, little education and information, the absence of standards and, where they exist, a failure to apply them.

But other circumstances make the situation of this zone's water resources even more complicated with rural and urban areas tending to increase their demands on those that are available. Some Latin American cities have expanded so quickly that they have outgrown their infrastructure and, therefore, their populations cannot avoid contact with polluted water, the cause of most of the region's most common diseases.

Something else that places water resources in danger is the constant pursuit of economic power and profits on the part of industries that neglect the environment. In the Caribbean, the tourist industry has a serious effect on the water supply and is the cause of much pollution. Competition for water has grown among users, countries and regions, so that today water is not only an important economic resource but also a strategic factor in international politics.

Atmosphere

The Earth's atmosphere keeps us alive. In the beginning, the primitive atmosphere was made up of methane, ammonia and other toxic gases that do not permit life to develop. Millions of years had to pass before the appearance of oxygen and other gases that make up our present atmosphere.

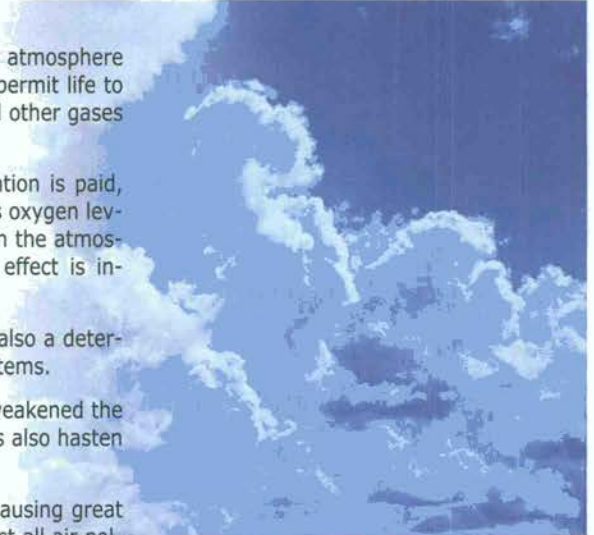
The atmosphere is a part of the environment to which usually little attention is paid, even though many factors can affect it. Deforestation, for example, reduces oxygen levels and, if it is caused by deliberately felling trees and burning forests, then the atmosphere is contaminated by carbon dioxide and the so-called greenhouse effect is increased and influences global climate change.

Burning fossil fuels produces large emissions of carbon dioxide and this is also a determining factor in climate change that has an influence on all natural ecosystems.

The continued use of products containing chlorofluorocarbons (CFCs) has weakened the troposphere's ozone layer and emissions from motor vehicles and industries also hasten the deterioration of the atmosphere.

The thinner ozone layer allows ultraviolet rays to penetrate and, besides causing great damage to ecosystems, they can cause diseases such as skin cancer. Almost all air pollution can be traced to human activity.

Acid rain, also caused by atmospheric pollution, affects water supplies as well as biodiversity and food resources, since some types of vegetation are sensitive to acidity (low pH levels) in soils or ground water.



Gerardo del Castillo Ramirez, Mexico

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CAUSES OF DETERIORATION OF THE ATMOSPHERE

Human beings have done a great deal of harm to the atmosphere and in less than a century we have undone a lot of what Nature took millions of years to build. We are the only species that has not only adapted to its environment, but has also changed it to make our life easier. These processes of change are the main reasons why our atmosphere is rapidly deteriorating.

Human beings' pursuit of the material translates into the number of private and public transport vehicles seen everywhere, as well as the tremendous amount of garbage. Industrial development produces large quantities of gases that damage the atmosphere and the ozone layer, as is reflected in the poem "When the sky was blue".

For the most part, these contaminants are molecules like methane, carbon monoxide and carbon dioxide, smog and chlorofluorocarbons, gases found in commercial products such as fire extinguishers, refrigerators and air conditioners. Smog and smoke come from industry; methane is produced by burning garbage.

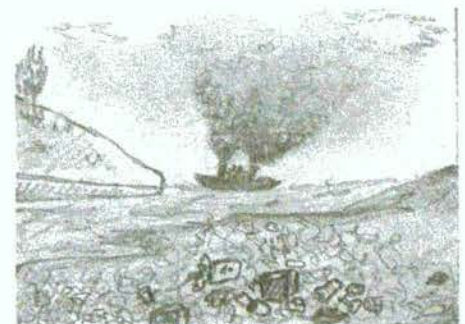
Industries are also the cause of damage to the atmosphere. However, the following contribution from Cuba shows us that some governments are taking corrective measures.

WHEN THE SKY WAS BLUE

*Once upon a time the sky was blue,
and there were no factories
or motor cars or buildings
to spoil our house.*

*"Once upon a time the sky was blue..."
that's how my granddad
used to start his fairy tales
that now console me.*

Anonymous, Mexico



Florencia Asaldo, Argentina

MEDITATION

*God created the sky and the Earth
 He also gave us air and water
 For the use of man
 However, this he destroyed
 Seas and rivers of crystal water
 Blue skies would cover us everywhere
 And these lands earthly paradises
 What else could we want?
 But man so able to destroy
 And so worrisome in his being,
 Didn't realize the damage caused
 And that all the indifference makes us parish
 The blue skies, already dark
 The clean waters oil-covered
 The leafy forests destroyed
 Unlawful man, don't destroy anymore!
 There is time, recuperate!
 Clean the waters, and plant the trees
 This will bring back the fish and the birds
 And together, the Earth will rejoice
 We would return to the earthly paradise
 To the Earth that God bequeathed us
 To be proud to call ourselves human
 And to deserve what he gave us*

Prebetera, Rojas, Sartini,
Scelza and Veralgito, Argentina

Efforts to clean the atmosphere



In Cuba, the Technical Ozone Office forecasts that by 2005 there will be a 50% reduction in the emission of hazardous substances into the layer that protects against the penetration of ultraviolet rays, as a result of a strategy designed to totally eliminate their importation.

These substances are not produced in the country and fewer and fewer of them are being imported thanks to the strict application of regulations that leave the way clear for the use of ecologically, socially and economically beneficial hydrocarbons.

The Cuban government organises special forums to teach technical personnel in public enterprises to make the change to LB-12, an entirely Cuban refrigerant gas obtained by specialists in the province of Santiago de Cuba and that replaces ozone-aggressive substances (OTO, 1998).

More than 350,000 domestic appliances and 10,000 small-scale commercial installations already use this substance, although the situation requires that it be introduced much more rapidly.

In Cuba the government and individuals are making every effort to achieve a balanced harmony with Nature, despite the high cost to the country's economy.

What does GEO LAC say about the atmosphere?



The principal source of atmospheric emissions in Latin America and the Caribbean is deforestation, particularly in the Amazon Basin, which is an important natural source of methane and nitrogen oxides. Some parts of the region also face the problems that come with industrial development and urban growth.

It is hard to obtain the reliable information needed to prepare inventories of emissions of greenhouse gases (GHG) because of the scarcity of concrete data. Changes in forestry practices and in land use are difficult to define, and many data are lacking or must be deduced from other statistics or even by word of mouth. There is also a generally deficient monitoring infrastructure, except in large urban zones.

Emissions in the Caribbean are mainly caused by refineries, but mining activities are also significant. Air quality is not usually a cause for concern to the small islands in the region, but constant urban growth and industrialisation, especially in the Dominican Republic, Cuba, Jamaica and Trinidad and Tobago, will require greater attention. Monitoring infrastructure is lacking, and the same is true for regulations although it would be possible to remedy the situation in three of the countries where concern about air quality is greatest.

In the specific case of the Caribbean, it is important to note that, in spite of not contributing much to regional carbon emissions, and much less to world emissions, this sub-region, and particularly the small island states, may feel the consequences earlier than others because of an increase in sea level due to global warming.

The region is responsible for 4.3% of world's total carbon dioxide emissions from industry, and for 48.3% of emissions due to changes in land use.

Energy deregulation and privatisation could increase emissions because it is probable that market forces will not favour biomass and hydropower. Private investment tends to prefer fossil fuel power plants instead of hydro-



Burning at an open garbage dump in the island of Cozumel, Iván Jiménez, Mexico

Many poor people in Latin America have neither housing nor jobs. They have to pick through garbage to find items they can sell for recycling such as paper and cardboard, glass and metals. They sometimes burn what cannot be reused such as plastic bags, containers, organic garbage and automobile tyres, and anything else they come across. Nevertheless, the garbage is often left exposed for a long time and polluting dust and particles are carried away by the wind.

Burning garbage is a serious problem that adds to air pollution. The following text, *A ban on burning* explains the situation in Buenos Aires.

A ban on burning



By banning domestic burning of garbage, Buenos Aires has recovered its prestige as an open city, with the humid pampas landscape on one side and the Río de la Plata on the other. The ban has made it a cleaner, totally pollution free, city. However, the same cannot be said of zones close to industrial districts and the problem has become generalised over the years, and there are no plans to put a stop to polluting emissions.

ANONYMOUS, ARGENTINA

Most urban air pollution is caused by motor cars; it could be much less if only we could be persuaded to use our cars responsibly. An example comes from Speightstown, Barbados, in a text that suggests ways to reduce the number of vehicles and the pollution they cause.



Air pollution in Speightstown

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Speightstown suffers from a serious air pollution problem but a lot could be done to remedy it if people could be persuaded to stop using motor cars and opt for alternative public transport. Gases from car engines are mixed with water vapour in the atmosphere and form clouds that produce the acid rain which can seriously damage buildings, animals and the nearby salt marsh.

The air we breathe contains a mixture of polluting gases: carbon monoxide, sulphur anhydride and lead, which affect the nervous and circulatory systems; these are gases produced by car and motor cycle engines, and they contribute to global warming. The poem "My space polluted" refers to polluting vehicles and their effect.

DAMIÁN BOUCHER, BARBADOS

My space polluted



*It was a mild morning
and in the distance hovered
the usual imperial
crown of pollution.*

*The difference was clear
halfway up the mountain
for, when looking down,
all was lost from view.*

*Thousands of cars and trucks,
innumerable buses and vans,*

*factories and motorbikes
and trains with many wagons.*

*All belching out the
myriad contaminants
produced by and for consumers'
insatiable demands.*

*It is a free choice
All of us make
to let majestic pollution reign
over us unhindered.*

ANTONIO ALEJANDRO ALANÍS PEÑA, MEXICO

A possible solution proposed for pollution problems is to use non-fossil transport such as electric vehicles, and this is referred to in the text *Solar vehicles in Latin America*.

Solar vehicles in Latin America



Mechanical engineering, electronic engineering and industrial design students at Peru's Pontificia Universidad Católica got together to develop an interdisciplinary project and the result is a solar vehicle. The aim is to show that, in spite of living in what is considered to be a Third World country, Peruvian students have the capacity and talent to develop a technology that aims to replace gasoline—which is scarce and very expensive to import—and help to reduce environmental pollution, one of the capital's main problems.

These vehicles are a non-polluting option because they use energy that is clean, easily accessible, cost-free and feasible in view of the shortage of fossil fuels and the very high cost of gasoline. All this makes a solar car an interesting future transport choice.

ELOY HERNÁNDEZ VILLALPANDO, PERU



Solar car, Carlos Hadzich, PUCP, Peru



Solar panel in rural medical centre.
Carlos Hadzich, Peru



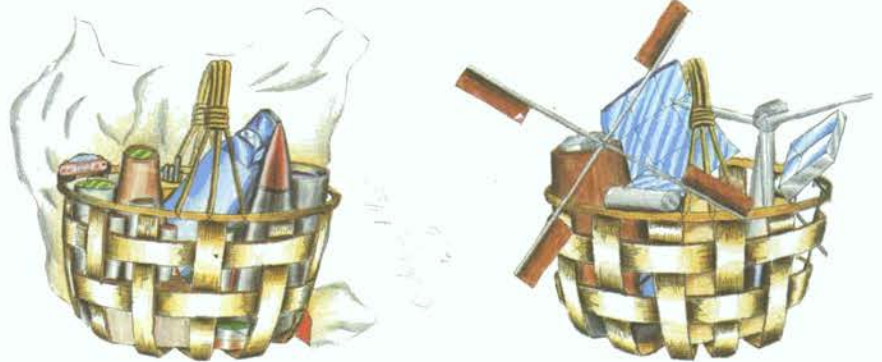
electric power plants because capital costs are lower and they produce quickly, profits although energy costs are higher.

Many countries have substantial potential for curbing carbon emissions given the region's renewable energy sources of biomass and hydropower, and the potential of forest conservation and reforestation programmes to provide valuable carbon sinks. ■

CONSEQUENCES OF AIR POLLUTION

Chlorofluorocarbons (CFCs) rise up into the troposphere and damage the ozone layer that shields us from the sun's ultraviolet rays, a cause of skin cancer. Another consequence of this type of contamination is global warming, produced by increasing the

greenhouse effect; polluting gases accumulate in the atmosphere and form a layer that absorbs the sun's heat and raises the planet's temperature. The text *A ray of light* suggests possible solutions for climate change problems.



Cristopher Moore, Barbados

A ray of light

In spite of negative trends, we can rise to the challenge of climate change but only if governments everywhere make a collective effort and restrict emissions of gases such as carbon dioxide. But if developing countries are to reduce these emissions within a reasonable time they will need financial assistance.

The world must be left in no doubt about the harm these pollutants cause so that governments will have to strengthen and apply legislation on air pollution.

ALDANE MARAGH, JAMAICA

It is a great pity that in Latin America we now have to face problems like acid rain, seen in cities in Chile and Mexico, which until a short while ago we thought were very distant.

HUMAN HEALTH AND AIR POLLUTION

The atmosphere is vitally important and if we reduce the ozone layer more ultraviolet rays will penetrate with harmful effects on human health and the environment. In humans these rays cause skin cancer and cataracts, weaken the immune system and make it easier to get skin infections like herpes. The text *Damage to health by UV-B rays* mentions the effect air pollution has on health.



Ezequiel Miodownik, Argentina



Damage to health by UV-B rays

Excessive exposure to UV-B radiation reduces people's immune system defences and increases probabilities of getting skin cancer which, although one of the less dangerous cancers, can be fatal.

People with pale skin have few protective pigments and thus are more susceptible to skin cancer; however, whatever our skin tone, we are all exposed to the danger. A reduction of 5% in the ozone layer could signify 240,000 more cases of non-melanoma cancer throughout the world. UV-B radiation also causes an increase in eye problems such as cataracts, deformation of the lens and presbyopia (MMA, 2000).

UV-B rays are not only harmful to people; they also harm animals and plants by stunting the growth of, among others, sunflowers, maize and rye.

Marine life also suffers and the rays' harmful action reaches a depth of 20 metres in clear water causing damage to fish larvae, plankton, water plants and many other important food chain organisms.

We must stop using products that damage the ozone layer.

MARÍA FERNANDA DELGADO, COLOMBIA

A reduction in the ozone layer can also harm farm animals, crop production and forestry, the tourist industry and fishing. It inhibits the growth of some plants with a subsequent drop in production and the same is true of fish, whose numbers drop significantly year by year. Ecosystems also will be affected by damage to plants' biological functions and because of an increase in mutations. See box below on *The ozone layer at great risk*.

The ozone layer at great risk



In September 1999 it was revealed that, according to satellite scientific research data, the "hole" in the stratospheric ozone layer had reached an unprecedented 28,300,000 km² over the Antarctic (1,000,000 km² more than the maximum registered in 1998). At the beginning of the same year, the deterioration in the ozone layer over the northern hemisphere had also reached unprecedented levels, to the point that forecasts were made of the possible appearance of another ozone layer hole over the Arctic.

LUIS BETANZOS, MEXICO

While some air pollutants only have local repercussions, the adverse consequences of most of them cause damage all over the planet so that, in the long run, countries that cause hardly any pollution will be also seriously affected. Such is the case of the Caribbean region where, although emission levels are relatively low in the world context, damage will still be caused by global climate change.

Air pollution also has serious psychological and social connotations. The world is fascinated by innovations and it has become a challenge to even further improve the most modern technological advances. The consumer society has given an impulse to scientific development, seeking an automated world as its ideal.



Mill, Carlos Hadzich, Grupo PUCP, Peru

ALTERNATIVE ENERGY

Alternative energy —also called *renewable* and, recently, *green energy*— offers many opportunities and has features that make it competitive with other energy sources. It consists in using natural resources, but without creating a reaction that would pollute

or alter ecosystems. Let us look at the text *Alternative energy sources*, from Colombia, and a contribution from Cuba that explains the potential of using solar energy.

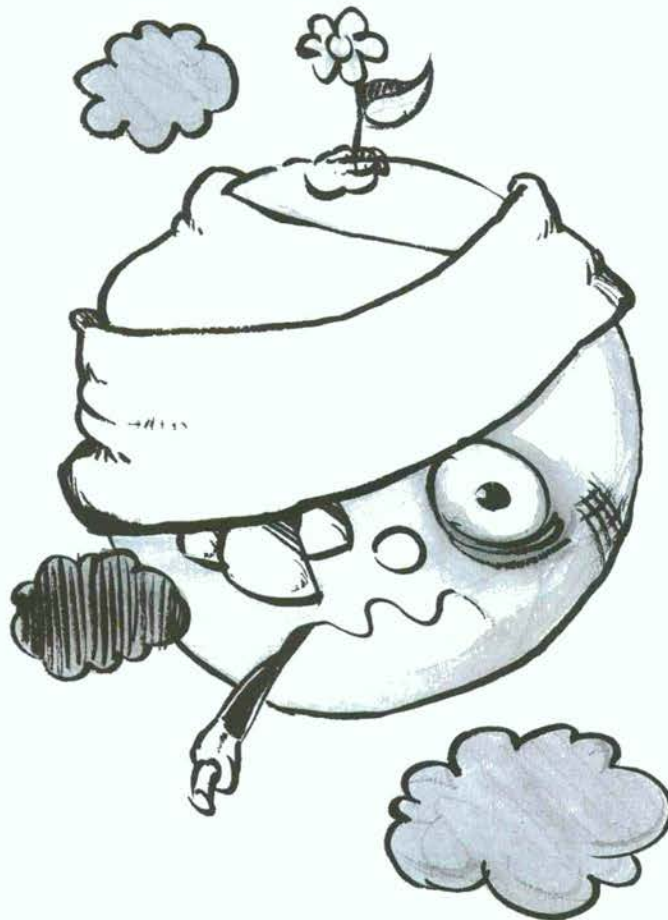
Alternative energy sources



In Colombia, a million and a half homes lack electric energy, most of them in rural zones where it is very expensive to connect it. The only feasible way of making the service available to those marginalised zones is to use alternative energy sources.

In Antioquia, the University's alternative energy group has investigated how to introduce an autonomous domestic energy supply system. The system aims to use solar, wind and small hydraulic installations with a minimum effect on the environment. These options would have a significant impact in Colombia because they allow private operators to compete in the market (as established by Law 142 of 1994) thus reducing the cost of public services and promoting research, as well as solving the energy problem, at least for part of the population.

GRUPO GEO JUVENIL, COLOMBIA



Solar energy in Cuba



Photovoltaic generators have several advantages; one is that they supply uninterrupted electricity during their useful life period with hardly any operating and maintenance costs and without producing contaminating residues.

Thousands of Cuban residents living in zones where access is very difficult have the advantage of this technology. Recently, some 400 students from the province of Holguín, in the eastern part of the island, benefited from a national programme designed to achieve sustainable development in the country's most ecologically susceptible areas.

KARINA REYES AND JOSÉ GONZÁLEZ, CUBA



vida
2000, NUEVO MILENIO

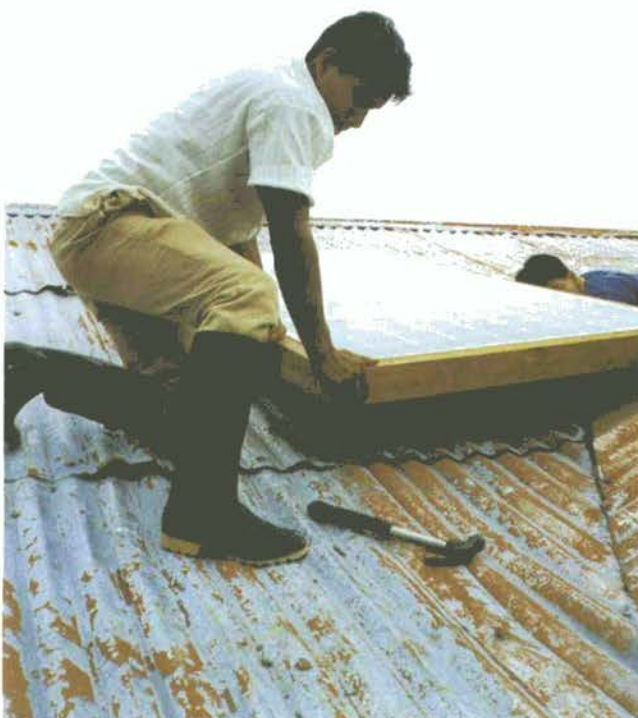
Anonymous

What can we do to reduce air pollution?



We can limit the emission of toxic gases by changing traditional energy sources for other options, place filters on factory chimneys, replace industrial methods by others that do not pollute, control open-air garbage dumps, and so on.

WALTER PREBETERA ET AL., ARGENTINA



Solar cell, Carlos Hadzich, Grupo PUPC, Peru



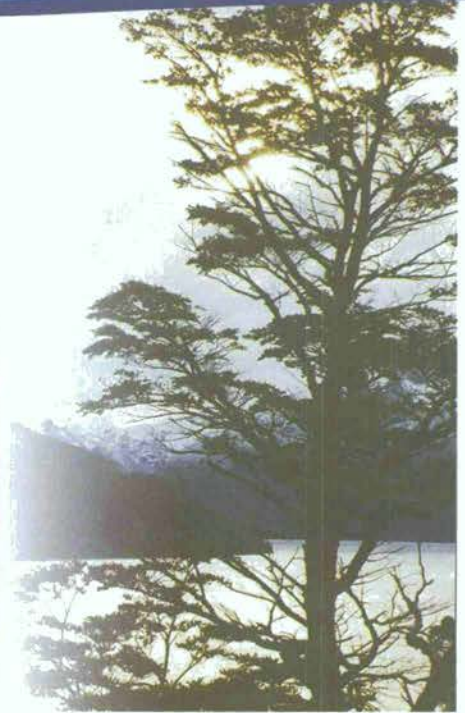
Forests

For millions of years forests have played a very important role in human history. They shelter all types of flora and fauna, produce the oxygen we breathe and, thanks to this beneficial action which lets the trees filter polluting gases, the air is clean. In addition, they attract water and regulate the hydraulic cycle, improve the microclimate and protect and improve the quality of natural resources such as soil, water, flora and fauna.

Forests are beautiful, they muffle noise, bring oxygen to the environment, reduce wind speed and protect, shelter and feed different animal species.



Panama Jungle, Panama



Nahuel Lake, Ángeles Pérez, Argentina

DEFORESTATION

In their ignorant rush towards "progress", human beings have given no thought to the harmful effects of deforestation on ecosystems.

The principal cause of deforestation is felling trees so that forest land can be used for agriculture, to raise livestock or to build houses even though other building materials are available.

24

Deforestation affects the water supply and leaves the deforested areas vulnerable to floods. When trees are cut, the land is left without cover and exposed to erosion so that the water runs off unimpeded and causes floods.

An example of the consequence of deforestation is the destruction of the Amazonia forest. "Development", the irrational use of resources and the apathy of individuals and governments have brought this important biomass to the brink of disappearing.

The risk to Amazonia is very great indeed and scientific estimates show that, if the present rate of destruction continues, in 20 years it will only have 4.7% of its original vegetation (Laurence, 2000).

Local populations will not be the only ones affected by such destruction. Amazonia is of global importance because of its enormous biodiversity—many species have not yet been classified—and it regulates global temperatures as well as having the world's largest freshwater reserve (WRI, 2000a). Furthermore, the native populations who live in harmony with their environment, have age-old knowledge about the sustainable use of natural resources.



Gustavo Soriano, Mexico

Poem for Amazonia

I cannot believe humanity wants
monsters made of iron and cement
instead of the indescribable beauty
and vital happiness of the forest.

I believe cities are inhabited by sleepwalkers
who have forgotten what is really worth having
and the joy of living in peace with Nature.

My hope is to save what is left of the forest.

Please listen to my plea.

Listen to the voice of alarm that echoes from the forest
and be ready to fight
for Amazonia, for life and for love.

I love the forest.



Forests have been the main suppliers of timber for firewood, furniture, ships, the food industry, railroad building and paper making, and others.

However, recent FAO studies show that the exploitation of forests for firewood is no longer a determining factor in deforestation (WRI, 2000a).

Poor forest administration is in large part responsible for deforestation which threatens not only biodiversity and habitats, but the ecosystem as a whole. An example from Trinidad and Tobago denounces human intervention as a cause of deforestation. It is ironic that human beings—supposedly the most intelligent species—who have the capacity to protect wildlife areas by settling elsewhere, do not do so. This is a threat to the animals that take shelter and nest in the forest; for them there is no way to undo the damage already done.

Deforestation affects many aspects of the environment and ecosystems react to that. The poem "Natural resources in Panama" gives a description of the consequences of deforestation and stresses the need to act.

Intensification of agriculture, replacing forests by crops, new technologies to cultivate dry lands (one of the main biodiversity reserves) and changes in coastlines indicate that, in the near future, deforestation may become even worse.



Ixchel Estrada, Mexico



Ezequiel Miodownik, Argentina

Deforestation in Trinidad and Tobago



Deforestation is an environmental problem in Trinidad and Tobago, where each year hundreds of forest hectares are lost to fire. Impressive areas of forests are felled to obtain wood, to make way for agriculture and for human settlements. Quarrying is also destroying our forests and there are now 75 quarries being worked in Trinidad and Tobago from which close to 24,000 m² of material is extracted (EMA, 1997).

THERESE JABOUR, TRINIDAD AND TOBAGO

What does GEO LAC say about forests?



In Latin America and the Caribbean (according to latest available estimates for 1995) natural forests cover 47% of the region's total land area. Almost all (95%, or 852 million hectares) is tropical forest in Central America, the Caribbean and tropical South America.

In the Caribbean, all surviving tropical forests are in interior mountain regions and this makes their exotic species vulnerable and exposed to fires.

The remaining resources, covering some 43 million hectares, are found in temperate South America, mainly in Argentina, Chile and Uruguay. The world's largest intact forest area is found in the northern Amazon basin and the Guyana shield.

Natural forest cover continues to decrease as a consequence of opening up land for agriculture and livestock raising, building roads, dams and other infrastructure as well as mining, and not forgetting forest fires, a particularly important factor.

The expansion of the agricultural frontier to meet the needs of larger populations, has been one of the main causes of deforestation. Because forests are considered to be a territorial reserve, they are often occupied by illegal settlers or squatters.

Uncertainty as to land tenure at times leads to negligent soil management, which in turn leads to more felling of trees. In effect, in many countries traditional slash and burn practices have been the principal means of advancing the agricultural frontier. The expansion of banana plantations in Mesoamerica, Colombia, Ecuador and some Caribbean countries, as well as coffee growing and sugar production in Brazil, have exerted strong pressure.

Another important problem is giving extensive forestry concessions to forestry companies in a growing number of countries. An example is the concession of almost six million acres to a company in Guyana.

In the Caribbean, large forest tracts have been lost through direct forest exploitation, as well as by converting forests into cropland and permanent pasture.

Natural resources in Panama

I

What has happened to us, campesino,
that our own carelessness
has almost deprived us of
trees like the harino?

Why do we no longer see the cedar,
macano, fig tree, mahogany,
cedron, oak and espabe...?

They have gone because of our
merciless deforestation.

II

We have almost seen the end
of macaws and parrots,
the whitetail, sangre toros,
monkeys, ñeques and deer.

We no longer see the painted rabbit;
the land is sadly bereft,

caught in a trap of loneliness
by harsh and heartless
felling so often used
to rid us of our heritage.

III

Many springs have dried up,
rivers no longer attract
and our fields no longer
sway with crops.

The hills have been stripped
of all their vegetation,
fire embraces them every day,
no words can describe the erosion
that so proudly proclaims the des-
truction

our species has wrought on Nature.

IV

It is time to wake up
and proclaim we will no longer
stand by
helpless and do nothing to undo
the damage

that is a constant reminder of our
inertia.

We have to accept coexistence
as the best solution.

We must admit our only path to
survival
for ourselves and other species
on the verge of extinction
is to recover and replenish our
forests.

ANONYMOUS, PANAMA



Rolando Cunha, Brazil

Slash-and-burn techniques

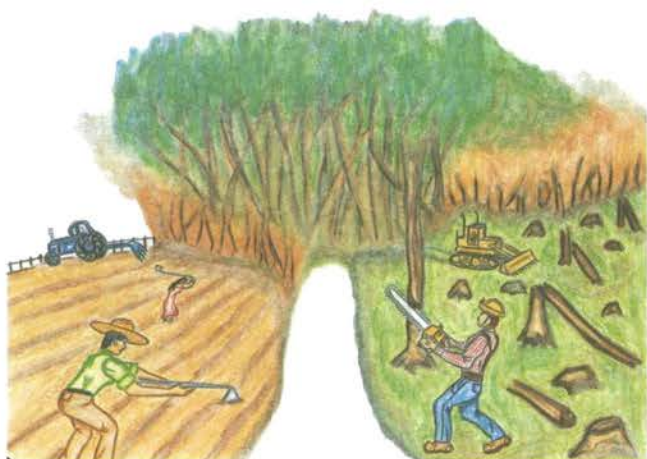
Slash-and-burn practices in forests to make way for agriculture and livestock get worse as population increases. The extension of agriculture causes immoderate felling to allow roads to be built so that hundreds of hectares of wooded areas all over the region disappear.

Slash-and-burn practices are still very common in the region and their consequences are not always known, although we learn about some of them in *Defenceless*, a contribution from Paraguay.

Defenceless

The erroneous belief that slash-and-burn practices help crops to grow causes forests and scrubland to be destroyed every day. There is complete ignorance about the repercussions these practices have on the living creatures that inhabit the zone: insects, on which birds feed, are killed, and so are the birds that nest on the branches of trees soon to be consumed by flames.





Ezequiel Miodownik, Argentina

Inevitable



It is inevitable that people chop down large numbers of trees not only to build houses and make furniture but also for firewood and timber.

To keep a permanent supply of wood trees must continue to be replanted and large areas reforested; only thus can we obtain the resources we need and produce such other benefits as more benign and less violent winds. By doing so we would give forest-dwelling animals a permanent habitat. So, whenever we cut a tree we should plant a new one for the benefit of plants and animals and to conserve our environment.

FÉLIX BARBOZA VÁSQUEZ, YAMBRASBAMBA,
CHACHAPOYAS, PERU



Kathrine Zaletnik



In many countries the need to conserve forests has an important place on the political agenda and has led to significant innovations such as the “extracting reserves” in Brazil. Another advance is the use of incentives to promote conservation of primary forests, encourage natural regeneration or the establishment of forest plantations. It is expected that recent political reforms in Costa Rica, Guatemala, Paraguay and Uruguay will stimulate the conservation and reforestation of thousands of hectares.

Forest fires may destroy up to half a forest’s above-ground biomass, with serious but little known effects on forest fauna. Furthermore, surface fires may release considerable amounts of carbon into the atmosphere.

Other pressure factors on forest resources that must be taken into account concern technology, such as slash-and-burn practices, and others that are more complex and related to the process of expansion and depletion of land for agriculture, in which small producers –if indeed they intervene– are simply the spearhead in colonising virgin territories, which then pass into the hands of livestock, agro-industrial (banana, pineapple, coffee) or forest enterprises that continue large-scale exploitation of these territories. ■



Ixchel Estrada, México

It is not only trees that are lost in forests; many plants that could be used in medicine disappear and so do animals that inhabit those areas.

Given the region's precarious economic and social conditions and the population's need to find a means of subsistence, Latin American authorities face the challenge of ensuring respect for the few laws that now exist to protect the environment.

To face that challenge, without denying the people's right to exploit natural resources, the authorities should create and put into practice projects that improve farming techniques and environmental conservation methods, so that people may make a rational and sustainable use of forest resources.

Because many areas can no longer be cultivated and rivers are polluted, there is a connection between forests and poverty and hunger and this makes people abandon their land and emigrate to other more fertile zones, leaving behind completely eroded areas and worsening desertification. In search of better places to make a living, they reach the forests and very quickly invade them, perpetuating what has become a vicious cycle. The text *Population and poverty* is a Panamanian example of this.

Population and poverty



Population growth and poverty are decisive factors in the future of our forests; as the population increases, resources become fewer and are quicker to deteriorate. Education is one of the best long-term solutions, for it is only through education that we can end the cycle of poverty and increase people's awareness of the importance of caring for their environment.

ENNIO ARCIA, PANAMA

SELLING THE FORESTS

For most people a cut tree is more valuable than one that is still standing. When an area has been deforested by lumber companies, the loss of habitats is not taken into account when calculating their costs. Forests are exploited without using proper

techniques, without planning and with few measures taken to mitigate the environmental impact. The text *Forestry extraction in the Güeppi, Peru, reserve zone* tells us of the forestry extraction practices in Colombia and Peru.

Forestry extraction in the Güeppi, Peru, reserve zone



The Güeppi reserve zone is bounded to the north by the Güeppi river and the Putumayo river in Colombia. It has a large indigenous and mixed race population and lies within the forests of the western arch of the Amazon where the world's greatest wealth of plants and animals is found.

Because of its great forest diversity it has been subject to selective extraction of commercially valuable wood varieties by Peruvian and Colombian lumber companies. In 1994, when it seemed that cedar had been totally depleted, extraction of white woods began. A special type of credit (*habilitación*) was the traditional marketing system controlled by Colombian traders and industrialists whose activities endangered the zone's timber potential.

Growing preoccupation with the practice made both countries consider article VIII of the Amazonia Co-operation Treaty between them approved in May 1986 and establishing "the need to maintain the balance between economic growth and the preservation of the environment".

AIVI SISSA QUEIROLO, PERU

FOREST FIRES

Ecosystems in Latin America have been transformed to increase the availability of land for agriculture; to do so, we have cut down trees and left a large part of the soil exposed to erosion; grasslands or croplands suffer from drought and this creates ideal conditions for fires to break out.



Forest in flames, Panama

Fire



In February 2001, an environmental disaster affected the Tayrona natural park area in Colombia when fire broke out and destroyed 200 hectares of dry tropical forest. It affected many types of flora and fauna and caused alterations to the habitats of birds and animals. It will take between five and eight years for the area to recover (Grupo Tayrona, 2001).

The causes of the fire are unknown but such disasters are usually the result of a carelessly thrown cigarette butt, glass bottle or something else that thoughtless people leave behind.

VOLUNTEERS, GRUPO TAYRONA, COLOMBIA

Many forest fires are caused by small embers that have not been properly put out and something so simple can lead to huge conflagrations that destroy flora and fauna. Although the subject of climate change will be dealt with in the section on natural disasters, it is worth noting that among its most damaging effects are droughts which can leave exposed the inflammable organic leaf layer, making the forests vulnerable to fire.

Population pressure on forests is a product of poor soil management and the use of unsuitable land for agriculture. Also contributing to the deterioration of our forests are traditional extensive livestock practices that need large areas for grazing.

The precarious socio-economic conditions of the inhabitants of forest zones force them to depend on hunting and agriculture for subsistence, and this sometimes prevents the rigorous application of legislation to protect forests. The only way out of this situation is to improve crop practices so that sustainable use may be made of natural resources without endangering them.

Fires may destroy up to half the forests' surface biomass, with serious but little known effects on fauna. Furthermore, surface fires release carbon into the atmosphere.

Hell



Last summer, fire broke out in parts of the southern provinces and the most affected were La Pampa and Mendoza, although there were also fires in Rio Grande and in Neuquén. In La Pampa more than a million hectares were lost to fire (*El Tribuno*, 2001). Large areas of mountain forests were burnt, wildlife and livestock were killed and families were evacuated.

The defective methods used to combat the fire turned it into a disaster. Unfortunately, this happens in my country every year during the summer and it gets worse each year.

ROCÍO CELESTE LOMBARDI, ARGENTINA

But there is no drop in the rate of deforestation in Latin America, forests are rarely rehabilitated and there are few conservation areas in forest zones. It is a pity to see that even areas designated as protected receive little support because the region lacks sufficient resources.

As cities and populations grow so do their demands on forests. Poverty and the lack of education are determining factors in the future of forests.

Repercussions



By indiscriminate felling to make way for human settlements and new industries, and to free land for cultivation, by causing forest fires and attracting pollutants that bring acid rain, human beings risk not only the existence of forests and their fauna, but also their own.

Unfortunately, few people realize how serious the problem is. There is an urgent need, therefore, for people to be made aware of the damage they cause to themselves, and for those responsible to take immediate and drastic measures to put a stop to the deterioration.

GUADALUPE MANO AND CAROLINA D'AMICO, ARGENTINA

Biosphere reserves endangered by forest fires



Two of Cuba's six biosphere reserves are in Pinar del Río, the most western province. This territory —with almost 56% of the area covered by forest— has often been hit by forest fires (CITMA, 2000) which have increased in the last 10 years. In 1991, a fire lasting several days burnt 900 hectares of forest close to the Sierra del Rosario reserve.

In 1999, close to 4,430 hectares were lost to forest fires in the southern part of the country. Forest fires not only affect vegetation, they also have direct repercussions on the ecosystems' biodiversity.

It is up to the competent authorities to control the fires and, even more important, to prevent them. Forests are indispensable to the planet's equilibrium and the more conflagrations there are, the more endangered are the species that today inhabit the Sierra del Rosario and the Guanacabibes Peninsula, according to specialists in the provincial delegation of the Ministry of Science, Technology and the Environment.

EUGENIO LANDEIRO, CUBA

ROADS THROUGH THE WOODS

Because they make it possible for people to settle in forest areas, the new roads built encourage aggressive colonisation and the take-over of land, facilitate trading in fauna and flora species and the creation of pastures that contribute to deforestation. These activities are not always carried out by people in dire poverty, but by those eager to profit. For example, forest exploitation is one of Paraguay's most profitable activities but it is also one of the most destructive.

In a poem sent from Peru great concern is expressed for the general idea that a cut tree is worth more than one that is still standing.



Martha Roa, Mexico

THE MOST BEAUTIFUL GREEN



Which is the green that we like best?
It is not that which
is appreciated for
giving us air and life.
Or that which gives hope
to trees, bushes and other grasses
that shelter multicoloured birds
and animals large and small.
The green that is home
to curious grey and other
dull coloured insects,

source of the strangest
and most beautiful sounds.
Sounds and melodies that,
very slowly but inexorably,
we are silencing
until finally they will never be heard again.
Shameful as it is to admit,
perhaps what we value most of all
is a rectangular piece of paper
we call the greenback
that can purchase all our heart's desires.

It is a paradox to destroy life,
the last green refuge we have,
and exchange it for whims
or belching black smoke.
To sell and destroy life
finally wiped out
by a green, insignificant piece of paper
tinted with the shade of mourning.

ORGANIZACIÓN SOCIAL DE BASE JUVENTUDES, PERU

PRESERVING THE FORESTS

There are several reasons why preserving forests should be a priority, one of which is explained in the text *Medicinal plants* about plants with a high medicinal value that grow in forests and can help cure numerous diseases.

Forests can only be preserved by sustainable use and reforestation, practices that safeguard plant and tree species and ensure that they are not depleted. Guyana, for example, has developed a national conservation and sustainable use of natural resources strategy, as pointed out in the text *Swamps in Guyana*.

Some ideas on preservation suggest that people who inhabit forests or live close to them should be responsible for their care but this will not be possible if they have no incentives to protect them. The text *The Maya biosphere reserve* shows us how to preserve them with the help of their inhabitants. They must also be given alternative sources of income, especially if the forests and their resources are their only means of subsistence.



Maguey, Marcela Ruiz Barba, Mexico

Medicinal plants



Colombian Amazonia is one of the world's large reserves and a spectacular genetic bank with a great diversity of flora and fauna. Getting to know all the treasures it holds and to preserve them is a challenge to humanity. But thanks to wise management and because they are used by the indigenous communities, these resources have been maintained and conserved.

Amazonia shelters innumerable natural products that can be used to make handicrafts and ornaments, as well as in industry and medicine. Oils, essences and natural dyes are extracted from its trees and many of them have curative and preventive properties (*Revista colombiana*, 1979).

Edible nuts (marañón, inchi, cacali) from Amazonia, as well as being an important food source, have medicinal properties.

In Colombia, many public and private entities work on the study, inventory and utilisation of these valuable vegetable resources that may help to cure human diseases (PFIS, 1993).

ADRIANA VALENZUELA, COLOMBIA

Swamps in Guyana



In collaboration with the Environmental Protection Agency (EPA), the Forestry Commission has prepared a three-part strategy to administer swamps (May, 2000): preservation, conservation and development.

The preservation zones will only be used for scientific and research purposes; conservation zones will be for low-impact activities such as ecotourism; development zones will be for sustainable activities authorised by the EPA after studying the environmental impact. Guyana is starting to become aware of the importance of swamps to its fragile coastal zones.

NATALIE KING, GUYANA

The Maya biosphere reserve



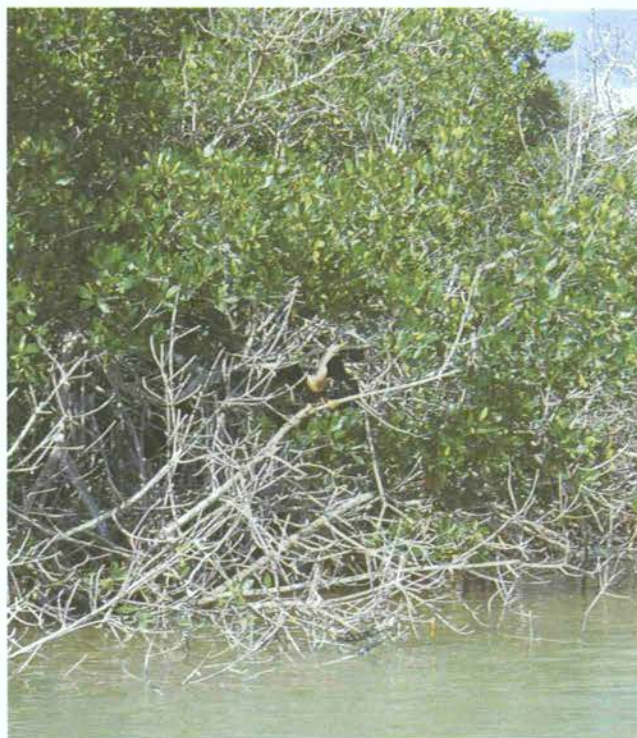
The Maya biosphere reserve in the Petén region in Guatemala covers a tropical forest area of 1,400,000 hectares (CI-UNESCO, 1995) and is considered to be Mesoamerica's largest forest area. It is home to innumerable species of migratory birds and is the habitat of many more in danger of extinction. It is also a cultural jewel since Tikal is one of the most important settlements in the Maya culture.

In this reserve there is an ecological school —ecoschool— whose aim is to provide the local inhabitants with an income so that they do not have to resort to illegally felling precious trees or converting the forest into pastures or cropland (Beth and Gines, 2000).

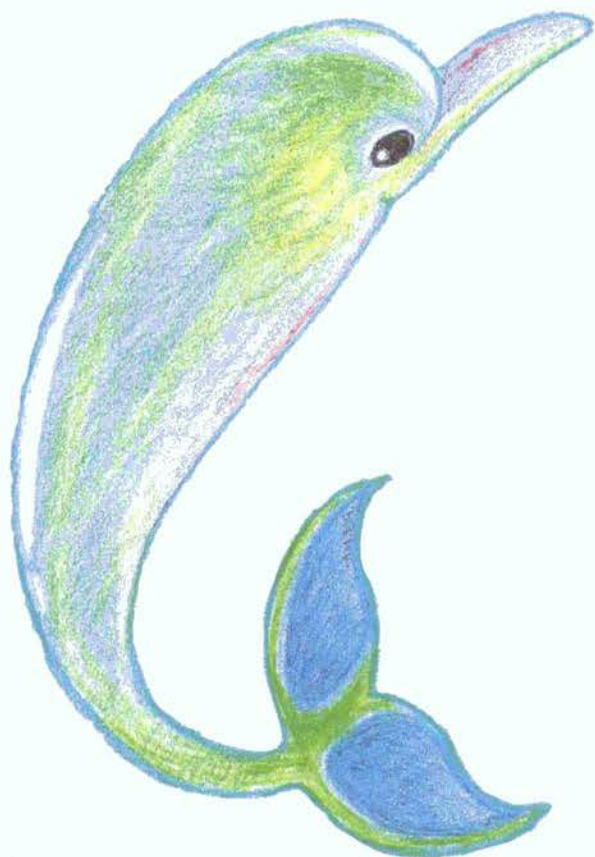
CATALINA CASANOVA, GUATEMALA



Tree, Marcela Ruiz Barba, Mexico



Gerardo del Castillo, Mexico



Poema Mühlenberg, Brazil



Alberto Cáceres, Mexico

An ecological pause



Paraguay has tropical and semitropical forests and a prosperous lumber industry that brings in foreign currency and provides many jobs.

Last November the Ministry of Agriculture and Livestock (MAG) published a new forest cover map for the eastern region prepared from satellite pictures taken in 1997. The report, which does not include the western or Chaco region, shows that there only remain 2,837,718 hectares of forest areas compared to the 8,805,000 hectares in 1945, or a loss of 5,967,282 hectares in 52 years of deforestation, at a rate of 314 hectares per day (*Diario ABC*, 1998).

More efficient reforestation strategies must be applied to prevent trees from disappearing. Let us analyse one of the world's greatest reforestation experiences: the Yguazú Forest project carried out by the Shell company in Paraguay in the neighbourhood of San Juan Nepomuceno. It has been concluded that the tree species in Paraguay that produces most short-term benefits is the *Eucalypto grandis*. If we planted this species, our forests would be able to recover their native species in what might be called an ecological pause.

PATRICK HERNEGARD, VICENTE PALACIOS,
EDUARDO PEREIRA AND ANDRÉS LESME, PARAGUAY



Mónica Navarro, Mexico

Biodiversity

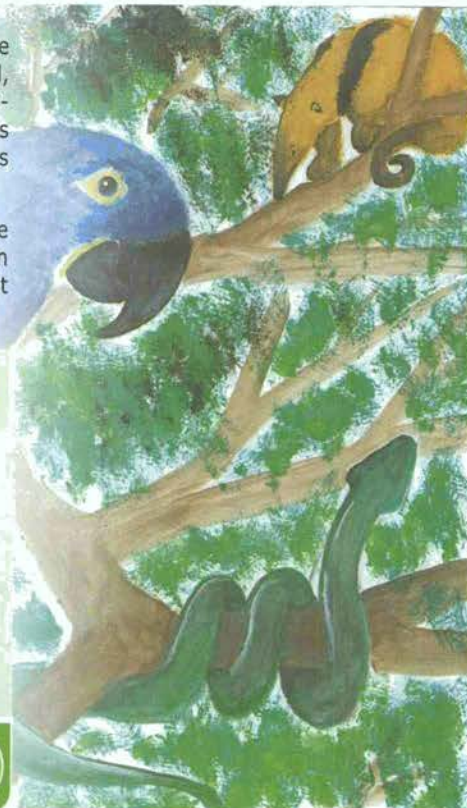
Some countries in Latin America and the Caribbean are known as megadiverse because of the variety of their ecosystems and species. Examples are Brazil, Colombia and Mexico, where many pre-Columbian cultures knew and practised sustainable means of subsistence that blend in with their surroundings. This cultural wealth has now been greatly reduced and there prevails an attitude of mass consumption, perhaps the principal cause of environmental deterioration.

We should all be committed to protecting flora and fauna because, ever since we appeared on Earth, we have benefited from the generosity of plants and animals. In recent decades, however, uncontrolled exploitation of flora and fauna has meant that many species either have been extinguished or are now on the point of disappearing.

What is biodiversity?

Biodiversity is the variety of life forms and includes ecosystems (land and water), ecological complexes of which they are a part, the diversity among and within species.

The concept of biodiversity includes all types of biological varieties which, in general, can be classified on three levels: genes, species and ecosystems. Biodiversity is the result of the evolutionary process which is evidenced by the existence of the whole range of different life forms.



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CONABIO
WWW.CONABIO.ORG.MX
MEXICO, 2001

What use is biodiversity?

Biodiversity helps to maintain ecological equilibrium and allow life to continue; for example, it is thanks to all the Earth's green plants and all the animals that pollinate them, spread their seeds and control their deprecators that we owe the atmosphere's gaseous balance on which climate depends. It is thanks to biodiversity that fertile soils are protected, climate regulated, nutrients spread and fixed, and so on.



GERMÁN AGUILAR CAMPOS, MEXICO



Gerardo del Castillo, Mexico

Land ecosystems present a wide range of biological diversity. Coral reefs are important ecosystems that harbour hundreds of animal and vegetable species. Owing to their biological wealth, swamps must be protected to conserve them. In *Entre Ríos mammals* we read about species in a region in the north of Argentina that have been lost and why.



Cristian Müller, Argentina



Cristian Müller, Argentina

Entre Ríos mammals



The present rate of species extinction is being greatly accelerated by the loss of biodiversity caused by the destruction of habitats, the expansion of areas for farming and livestock, excessive exploitation of fauna and flora, pollution of the environment, indiscriminate hunting and the introduction of exotic species.

A report by the Museum of Natural Sciences and Anthropology gives a preliminary list of 72 species of mammals, classified according to the World Nature Union categories, in danger in the province of Entre Ríos.

An analysis of the information shows that more than 30% of the province's animals face problems of preservation. Thus, it is known that:

- The following twelve of the province's species have been extinguished: garantilla wolf, puma, jaguar, collared peccary, coati, pampas deer, melero bear, ocelot, carreta armadillo, black howling monkey, *rabo molle* armadillo and *aguará guazú*.
- Endangered are: the swamp deer, and the river wolf.
- The following are vulnerable: the delta mouse (endemic), the chestnut hummingbird bat and the *gato de las pajas*.
- Under risk are: the hairy armadillo, the *gualacate* and the red weasel.

There is not enough data available on the hocio rosado mouse (endemic to the delta), the *colicorto de azara* and the Delta marmot.

The museum does not have examples of most of our rodents and bats and no information is available on them.

Even greater damage is being done to this resource, that only covers about 12,000 hectares of our provincial territory, by improper use of protected natural areas, unsustainable production practices, the threat of large infrastructure works and the continued pressure of human beings on species such as the *guazuncho*, the capybara and the otter.

What does GEO LAC say about biodiversity?



Official UNEP statistics show that more than 34,000 vegetable species are now in danger of extinction and 50% of the world's flora and fauna could disappear

over the next 100 years.

The constantly accelerating reduction of genetic diversity, of species and ecosystems, is not only intrinsically undesirable but also represents a significant threat for human material wellbeing as it implies less capacity of ecosystems to provide key products and services.

The total number of the planet's species is enormous: some 1.7 million have been described but it is thought there are many more with estimates ranging from five to almost 100 million and 12.5 million suggested as a reasonable approximation. Most species are found in tropical rain forests that perhaps harbour more than 90% of the total. Regions with the richest biodiversity are Africa, Asia and the Pacific, Latin America and the Caribbean.

Tropical, sub-tropical and temperate habitats of the region are exceptionally rich in biodiversity. The neotropical ecological zone has 68% of the world's tropical rain forests and the region, with 40% of the total vegetable and animal species, is thought to have the highest floristic diversity in the world. The warm Amazonian valleys, the high, cold Andean mountains, the Brazilian Atlantic forest and the dry forests of Mesoamerica are home to some of the world's richest ecosystems. Arid and semiarid vegetation is found in mountainous zones that stretch from the southern part of Ecuador to Chile, in northern Colombia, Venezuela, Argentina and northeastern Brazil.

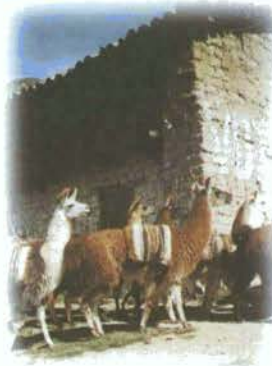
In spite of the growing interest in biodiversity conservation, the lack of government and institutional support for research and development, suggests that the trend towards declining biological diversity will continue in the next decades.



Alberto Cáceres, Mexico



Gerardo del Castillo, Mexico



Giuliano Ardito, Peru



Gerardo del Castillo, Mexico

CONSERVATION ZONES

Doubt has been expressed about the efficiency of environmental protection areas in conserving biodiversity. All the Earth's elements and organisms make up a unique complex and many people do not see why biodiversity examples should be kept only in

some parts of the world. Nevertheless, in spite of these opinions, protected areas have been established in some countries, as we shall see below.

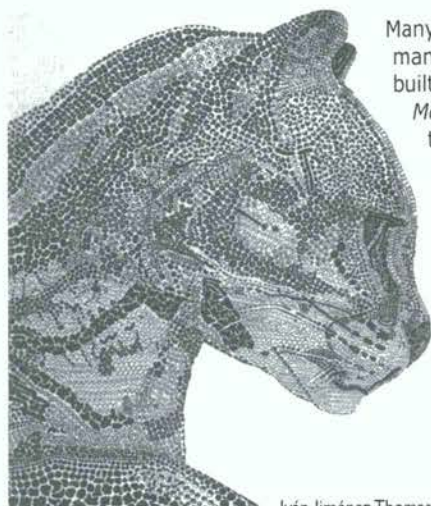
In defence of our species



A report by the Ministry of Science, Technology and the Environment shows the very great diversity of landscape in Cuba. Fifty percent of the country's 6,500 species of vascular plants are endemic and 2% had been extinguished by the end of 2000. Of the 1,600 species of fauna, 42% are endemic and 10% have disappeared. Some of the causes for the loss of biological diversity in Cuba are:

- Poor management of determined vulnerable ecosystems.
- Destruction of species' natural habitats.
- Application of intensive agriculture.
- Failure to integrate proper conservation strategies and sustainable use of diversity and economic development activities.
- Inadequate control of illegal capture of valuable species, poaching and fishing species that fetch high prices on the market.
- Lack of control on compliance with legislation in force.
- Lack of awareness and failure to educate people about the environment.

To permit development of vegetable and animal species in their natural habitat, the government has a 236 units protected areas system of which 79 units are classified as nationally important protected areas because of their ecological, social and historic-cultural relevance. They are managed according to the following classifications: natural reserves, natural parks, ecological reserves, outstanding natural elements, managed floral reserves, fauna refuges, protected natural landscapes, and managed resources protected areas; there are also six biosphere reserves.



Iván Jiménez Thomas, Mexico

Many protected zones are not respected and human settlements or public infrastructures are built close to them. The following texts, *Northern Mexico* and *The Galapagos in danger* give us two examples, in Mexico and the Galapagos islands, famous for their biodiversity and where there are species unseen elsewhere such as the Darwin chaffinch and the giant tortoises also known as "galápagos".

Northern Mexico

In the state of Baja California Sur, in Mexico's Northwest, it is essential that the environment be kept clean, above all when it comes to very special places like the protected natural areas, classified as a heritage of humanity. One of these places is Hare Eye's Bay (Bahía de Ojo de Liebre) where each year blue whales arrive to give birth; the other is the Vizcaino Desert. These sites, which ought to be preserved, are mostly threatened by commercial companies and open air garbage dumps.

In 2000 there was a risk that a salt extracting company would begin operations in one of these bays, which would have endangered the whales' breeding grounds. Fortunately, the general outcry that followed led to the project being stopped.



MAGDALENA LAGUNAS VÁZQUEZ, MEXICO



Victor Sanjinez, Peru

Marcela Ruiz Barba, Mexico



Ecosystems and their vegetation are similarly threatened. In the Caribbean such vulnerability is accentuated by factors such as: steep slopes and rapid topography changes that fragment ecosystems; a concentration of population with all that implies; and the high frequency and variety of natural disasters.

The small size of Caribbean islands and their ecoregions also create substantial risks for local habitats. Such pressures have meant that two thirds of the coral reefs (with their extensive biodiversity) are in danger and the remaining third is severely damaged.

Loss of habitat has been the greatest threat. Habitat conversion has been severe in the Central American forests where 244 species of vertebrates are in danger of extinction.

The intensification of agriculture, replacing forests with plantations, new technologies for cultivating dry lands (some of the most important biodiversity reserves) and the modification of the coastline suggest that the trends may worsen in the near future.

Together, Latin America and the Caribbean has the second largest number of threatened birds in the world (after Asia and the Pacific), the third largest number of mammals (after Asia and the Pacific, and Africa), the third largest number of marine species (after Asia, the Pacific and North America), the second largest number of reptiles (after Asia and the Pacific) and the second largest number of amphibians (after Asia and the Pacific).

With respect to *biosafety* (the possible adverse impact of genetic modification of living beings, or *biotechnology*, on human health and on the diversity of species, particularly those important to world food and trade), the debate revolves around the establishment of precautionary measures to avoid risks from trading in genetically modified living organisms (GMOs) that could set off a genetic contamination or erosion effect. The United States, Canada, Australia, Argentina, Chile and Uruguay —known as the Miami Group— object to these measures

The Galapagos in danger



The Galapagos Islands are the scene of daily disasters, some natural and some caused by humans. An example of these tragedies is the recent 300 tonnes oil spill from the tanker *Jessica* that ran aground and left irreparable traces. Its environmental sequel can be added to others that include the invasion by exotic species, overpopulation, excessive fishing, fires and the growing number of tourists (*Hoy*, 2001).

In 1994, a fire destroyed regions of Isabela island, where there is a large wild goat colony introduced by the inhabitants. Their number grew rapidly with damaging effects on the ecosystem since they destroy vegetation and threaten the giant tortoises by competing with them for food.

In 2000 various tuna trawlers entered the marine reserve area where fishing is prohibited, but their owners got off without paying any penalties. Nature in the Galapagos is in danger.

DIANISBEL HERNÁNDEZ GUZMÁN AND
YANISLEY GUILARTE ROJAS, CUBA

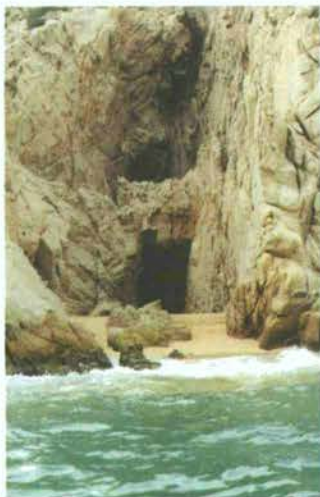


Biosphere reserve Sierra del Rosario, Cuba

Mangrove swamps are appreciated throughout the region because they are so biologically diverse.

However, they too run the risk of becoming tourist centres. Let us look at a case study on the importance of a mangrove swamp in Colombia.

The biodiversity of every country in the region is under threat. For example, Brazil has the world's second largest number of birds in danger of extinction (103 species); Peru and Colombia are in fifth place, each with 64 species. In the Caribbean islands various original species have been extinguished because non-native species were introduced or because their natural habitat has been destroyed.



Marcela Ruiz, Mexico

Mangrove swamps



A mangrove swamp is a low-lying forest that reaches altitudes of between 10 and 15 metres and is the tropical version of a coastal saltwater marsh. They are so named for their vegetation and are an ecosystem of salt tolerant plants. They contain trees of different species, kinds and families, as well as lianas. They are the natural habitat of, among others, amphibian and reptile species, oysters, insects, birds, fishes, lizards and barracudas; there are also some mammals like simians, rats and mongooses.

In these areas the soil is formed because the roots of this type of vegetation retain solid particles that reach the coast.

This ecosystem is very fragile and vulnerable. Mexico, Panama, Colombia and Cuba have the largest extensions of mangroves in Latin America and the Caribbean.

ADRIÁN ÁLVAREZ ADÁN, CUBA
RAMON DODSON, BARBADOS

The Santa Marta mangrove swamp, Colombia



Mangrove swamps are found on almost all the world's tropical and sub-tropical coasts. They are important ecosystems because they maintain the proper saline conditions and regulate water evaporation, protecting the salt from drying and desalinisation. Mangroves are capable of fixing both carbon and coral systems or technically controlled agricultural land.

Mangroves are aquatic spaces inaccessible to many adult predators and are the best possible places as natural breeding grounds and refuges for birds, reptiles, fishes and crustaceans.

The large mangrove swamp of Santa Marta, Colombia, contains 3.4% of the mangroves of the Colombian Caribbean and gross primary phytoplankton production is two to seven times higher than the annual average of the world's principal coastal lagoons (I.V.H., 2000).

But public works have caused destruction, have isolated coastal lagoons and strangled mangrove roots. An example is the Magdalena trunk road which has interrupted the natural fresh and salt water flows and thus caused damage to the mangrove swamp.

Because of the importance of this ecosystem Colombia has established programmes to recover and restore mangroves on both the Pacific and Atlantic coasts. Nurseries have been built to produce plantlets to encourage local communities to help restore mangroves, especially in places where the swamp has died or been destroyed.

JUAN DIEGO VALENZUELA, COLOMBIA

HUNTING AND TRADE IN SPECIES

Biodiversity is threatened. It is urgent to preserve what still remains in the region, especially in the tropical Amazonian forests and in the coastal ecosystems inhabited by hundreds of species that guarantee the continuity of life on the planet.

One of the reasons for the drop in the number of species is that those classified as wildlife are hunted and sold. On roads through forests in Mexico or in Central America, it is a common sight to see people offering parakeets, monkeys or macaws very cheap and in lamentable conditions.

Cynthia Dabul, André Barata and the RENACE corporation have written about this subject.



Organismo Project, Brazil

Trade in biodiversity



Trade in wildlife species of flora and fauna has increased since the 1980s because of the great demand in developed countries in North America, Asia and Europe. This is considered to be the world's third most lucrative illegal trade, surpassed only by weapons and drugs. Trafficking methods are similar and the result is the death of two out of three examples caught (Bertonatti, 1997).

CYNTHIA DABUL AND ANDRÉ BARATA, ARGENTINA

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insofar as they might become a barrier to international trade. The Cartagena Protocol on Biosafety finally adopted in January 2000 (with the approval of the Miami Group) establishes precautionary and information mechanisms as well as prior agreements on the transport, handling and safe use of GMOs.

In spite of biotechnology risks, perhaps the main problem in protecting biodiversity is how to avoid destroying habitats and the consequent extinction of species (many of which science has still not classified). The intensification of agriculture, both in tropical and semiarid regions, felling of trees and the depletion of swamps, have reduced the population of many species. ■

Exporting camels



In the Chilean region of Tarapaca many species, but especially llamas and alpacas, are bought and then taken to the northern hemisphere to be sold as pets. This puts at risk the altiplano countries' genetic resource and, besides, dangerously reduces wildlife populations. Measures taken by non-governmental organisations and by the state to conserve and preserve these species have not had the hoped-for results so that several of them are still vulnerable and in danger of extinction.

CORPORACIÓN RENACE, RED NACIONAL DE ACCIÓN ECOLÓGICA, CHILE

Technological development is allowing human beings to manipulate the planet's live organisms, alter their biological characteristics and trade in them, often prejudicing the countries they originally lived in, as well as the inhabitants, as can be seen from the following case studies.



Traffic in birds, Cynthia Dabul, Argentina



Manuel Gómez, Peru

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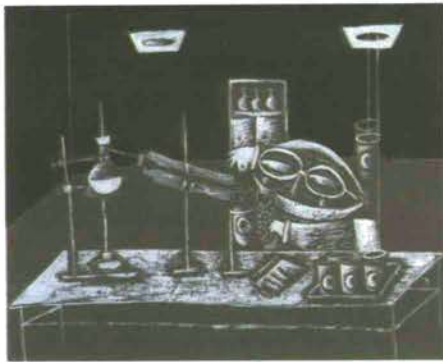
Anonymous, Panama

Biological pirating



Plants and other organisms are natural biochemical factories: more than 60% of the world's inhabitants directly depend on ingredients found in plants and used to produce medicines. The United States of America invests thousands of millions of dollars every year on research to discover new substances, and Brazil is an easy target for biological pirating. The great treasures of the future will not be petroleum or robots, but the genetic bank contained in each life form, from the simplest to the most complex.

ANDRÉ BARATA-SILVA AND
NELSON LADNIUK, BRAZIL



Ixchel Estrada, Mexico



Poaching and animals in danger,
Ezequiel Miodownik, Argentina

The following poem remain us a very important word:

NATURE

*The Voice that created cosmic grandeur
powerfully roars into that
silent void,*

*of the immense many-splendoured
fountain, in a single, intense,
mysterious flash.*

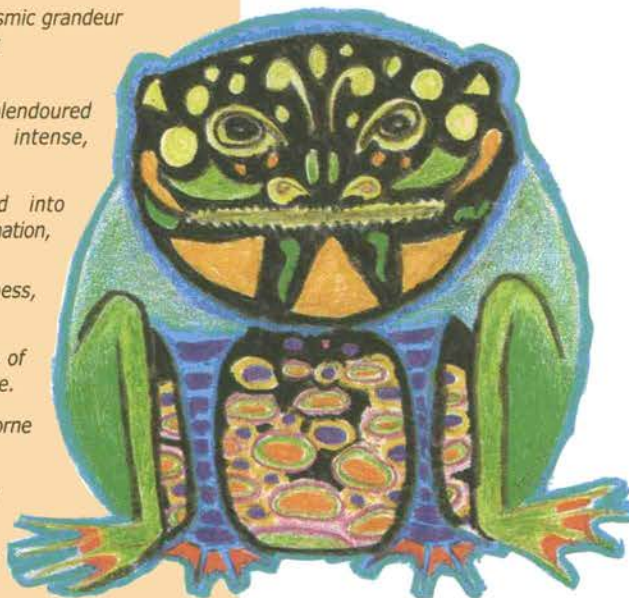
*The Voice transformed into
radiant and creative illumination,
bursts forth into the
eternal abyss of nothingness,*

*filling resounding space
and time in a symphony of
being, of love and of hope.*

*The Voice as messenger borne
on the wind's wings,*

*lovingly caressing the birds
as it passes by,*

*filling the mountains with
rhythmic accents
of breeze and harmony,
light and fantasy.*



Poema Mühlenberg, Brazil

CÉSAR CRUZ-ROJAS, MEXICO



Sylvana Jazbec, Argentina

*She is beautiful... so is our land
She is short-lived... so is our land
She dies because Nature so ordains...
Our land dies because human ignorance so ordains*

We conserve species useful to human beings because each one, whether animal or vegetable, has a function in the complicated natural system; to protect them is the duty of society as a whole. Young people like you are studying and working to conserve plants and animals that are a treasure of incalculable value.

Have you perhaps asked yourself whether one of the plants or animals that have just been extinguished might have contained a cure for the diseases, AIDS for example, that are a threat to the world's youth?

Natural Disasters

There have been many changes in natural phenomena throughout the planet's long history and, when human beings made their appearance, they too began to suffer the effects of natural catastrophes that have cost so many lives.

Large numbers of people in Latin America and the Caribbean perish in natural disasters or see their means of subsistence destroyed. The region's most frequent disasters are volcanoes, hurricanes, floods, earthquakes, fires, landslides and tropical storms; although they are natural to our planet and will always occur, with or without human beings, we play a very important role because our actions make them worse.

It cannot be said that people are responsible for all natural disasters, but they are responsible for those that result from improper soil use, excessive deforestation, urban development of vulnerable areas and covering soils with asphalt so they can no longer breathe. They are also responsible for causing climate changes that are a consequence of economic activities where gases are emitted that affect the atmosphere's equilibrium; also, their use of natural resources is often irrational.

Global climate change is attributable to human activities that alter the composition of the air. These activities include burning fossil fuels, felling and burning forests and emitting large volumes of carbon dioxide which, when added to other gases, acts as a sponge that absorbs solar radiation close to the land surface and helps to cause global warming.

We have already seen the consequences of climate change in the Caribbean, for example, where the rise in the sea water temperature has caused a phenomenon known as *coral whitening*.



Diego Álvarez, Argentina

Coral whitening



The year 1998 was a difficult one for the world's coral reefs due to the abnormally high temperatures of the water surface.

The high water temperatures —and at times other environmental conditions such as pollution— separate algae from the coral which then becomes whitish. The whitened coral is still alive but becomes diseased because it is not getting the energy that normally comes from its close symbiotic association with algae. The whitened coral hardly grows and generally does not reproduce. If the marine temperatures return to normal within a short time, the algae return to the coral and it will probably recover. However, some coral communities may die even if the water temperature improves.

ONEKA SCOTT, GUYANA



Ixchel Estrada, Mexico

The following text explains the relationship between climate change and natural disasters.

Climate change and natural disasters



Industrial and economic activities raise the concentration of greenhouse gases in the atmosphere; these gases are the cause of a climate change that may unleash large-scale and abrupt modifications in the Earth's systems.

Natural societies and systems are vulnerable to extreme climatic conditions. Every day we can see the damage done in our region, the deprivation and deaths caused by drought, floods, heat waves and avalanches, among many other climatic phenomena.

We could cite innumerable examples of how climate change affects different aspects of our life. It is sad to say that even when we are experiencing it and starting to feel the consequences, our governments do not take the actions they should. I do believe they will have to set aside their differences and begin to pay attention to what the people they represent say... Or is that asking too much of them?

SILVIA SALERNO, ARGENTINA

El Niño is the term used to describe a phenomenon that begins when the surface of a zone in the Eastern Pacific close to the Equator starts to warm, the effects of which extend practically all over the world. It is a natural phenomenon exacerbated by human activities. It has been known since at least 1525 and has grown in intensity and frequency in the twentieth century.

It normally occurs every three to five years, lasts for six to 18 months and reaches its maximum intensity around Christmas, which is why Peruvian fishermen gave it that name in a reference to Jesus.

The 1997-1998 *El Niño* caused catastrophic floods in the south of Brazil and close to the Pacific coasts in Ecuador, Peru and Chile, as well as in Paraguay, Uruguay and the northeast of Argentina. It also caused a severe drought in Colombia, Guyana and the northeast of Brazil, as well as in zones in the Peruvian and Bolivian altiplano.

RELATION BETWEEN NATURAL DISASTERS AND HUMAN ACTIVITIES

The damage that natural disasters cause depends, a large degree, upon our governments and on each one of us. In our region mud and lava slides, sometimes burying whole communities, are common because human settlements are built in dangerous zones and the responsible authorities do not enforce regulations or take preventive measures.

Strong rains in Venezuela's coastal zones in December 1999 produced a landslide of thousands of cubic metres of mud that obliterated everything in its path until it reached the sea. This disaster cost thousands of human lives and enormous material damage.

Usually the people most affected live in extreme poverty and their dwellings are destroyed by earthquakes or washed away by very heavy rainfalls.

The Mexico City tragedy of 1985 was a clear demonstration of the force of Nature, very bad urban planning and negligence by authorities.

Although it happened a long time ago, its consequences can still be seen in the epidemics that break out because devastated communities do not yet have proper sanitation services.



Ixchel Estrada, Mexico

What does GEO LAC say about natural disasters?



Earthquake activity particularly affects the western coast of Latin America but also includes the whole of Mesoamerica and the Caribbean, because of the pressure that builds up between the Pacific and North American, Cocos and Caribbean, Nazca and South American plates. The effect on the environment of all this seismic and tectonic activity is to create a relatively high risk of earthquakes and volcanic eruptions, in some zones added to the already high risk of hurricanes and floods.

Climate change is a threat to Latin America and the Caribbean because most of the region is ecologically and socio-economically vulnerable. Many of its large metropolitan areas, including the main ports of Latin America and the Caribbean, are particularly vulnerable to a rise in sea level. Climate change would affect agriculture and hydraulic resources, as well as ecosystems and tidal zone fishing.

Global warming models indicate that growing world temperatures could affect many atmospheric parameters, including rainfall and wind velocity, leading to an increase in extreme climatic events such as storms, heavy rainfall, cyclones and drought. Some of these natural phenomena, floods in particular, are initiated or made worse by human degradation of the environment and the disturbance of previously stable ecosystems.

According to the Inter-Governmental Panel on Climate Change (IPCC), thermal expansion could cause a five-fold increase in the rate of sea level rise so that it could be one metre higher in the next 100 years. To this must be added the possibility of polar ice melting, adding another five or six metres to sea level. On the other hand, increasing temperatures cause a proliferation of contagious diseases borne by vector insects meaning more outbreaks of malaria, dengue fever and cholera, among others. ■



Diego Álvarez, Argentina

Are serious losses of life and property in earthquakes due to our being caught off guard because we do not have the scientific knowledge to warn against them? No, we do have the knowledge but it is very rarely applied as preventive measures that would mitigate the damage caused by these unpredictable disasters. The anthropocentrism of human beings has been their own worst enemy; furthermore, the situation is aggravated because of a lack of resources, information, planning, and honesty on the part of inexperienced and corrupt authorities.

Earthquake in Mexico



One of the world's largest cities is located in the Valley of Mexico, a zone of heavy seismic activity made more dangerous because much of the city is built on what used to be a lake.

Natural soil conditions, lack of planning and official negligence came together in 1985 when a Richter scale 7.9 degree earthquake caused thousands of people to be killed. These deaths might have been avoided if the characteristics of the soil had been taken into account when buildings were put up and if appropriate building regulations had been enforced.

As they say in Mexico, "you lock the stable door after the horse has bolted". This was a tragedy waiting to happen, something to make the authorities strictly enforce building regulations and to launch a civil awareness campaign among the city's inhabitants.

Let us hope the experience will serve as a warning to authorities in other cities so that they can avoid a similar tragedy to that of Mexico City by making the necessary changes in their regulations and educating their inhabitants on the protective measures they should take.

ALEJANDRO JIMÉNEZ CABAL, MEXICO

FLOODS AND HURRICANES

People often settle in unsuitable places, or they change geological structures to suit their convenience. Mexico City, for example, was founded on an island in the centre of a large lake that dried up with the passage of time and made more space available for

the town to expand. Every rainy season the water rushes down towards the lower parts and causes flooding that requires larger and more complex drainage systems to be installed.



Diego Álvarez, Argentina



Jorge, Guyana

Floods in Peru



It was in the capital that the disaster, caused by very heavy rains, happened and affected thousands of inhabitants; it immediately extended to five departments in the interior of the country. It swept away dozens of houses and destroyed cropland and even cost the life of one person in Tacna.

The Chillón river flood in Lima last summer, when its increased flow broke the dam and the river broke its banks, left more than 1,800 people homeless (*El Comercio*, 2001). Three days after the water raged furiously over the town and broke the protecting dams, neither the city nor Civil Defence authorities had taken steps to deal with this perverse panorama of floating broken chairs, dilapidated mattresses and shells of unusable TV sets. People could not let go of their spades and brooms and continued to fight against the mud. There was a shortage of blankets, clothing and food. Most families lost their belongings and did not even have anywhere to cook their meals.

ÁNGELA MILAGRO TAPIA ARCE, PERU

Hundreds of people have died in Central America from floods caused by tropical storms, natural disasters very frequent in the Caribbean, where every year —between July and September in the so-called *hurricane season*— at least one of the islands is devastated by a passing hurricane.

The path of destruction this leaves makes the affected zone unrecognisable: roofs torn off houses, serious floods and interruptions in domestic water and electricity supplies that last for weeks. The closer we get to the coasts, where parts of houses can be seen floating out to sea, the worse it gets.

Because of poor environmental engineering and the scant attention paid to legal norms on building in coastal zones, tourist installations often suffer from the violence caused by waves that come with depressions, storms and tropical hurricanes. Barbados has a law prohibiting building within 30 metres of the coast, but this regulation is often ignored, with catastrophic results. The following contribution is an account of what happened when hurricane Mitch hit Central America.



Diego Álvarez, Argentina



Getting ready for hurricane Mitch on the island of Cozumel, Sergio González Bucio, Mexico

Hurricane Mitch and its impact on the village of Gualiqueme



Three desperate people were running in the village of Gualiqueme taking several children with them; they were fleeing from the terrible rain that had made the river break its banks and whose dangerous current swept away the houses that lay in its path. On October 30th, 1998, a group of people were trapped by a current so strong that it had uprooted trees. Hundreds of villagers were left homeless, without food, sick and without clothes; the river had swept everything away.

Similar disasters were suffered by thousands of families in Olancho who lost all their material possessions (from their houses to their crop land), as well as loved ones. They remained isolated from the rest of the country and little help reached them.

This might have been a far different story if only the authorities had an early warning system in place.

GUILLERMO COBOS, HONDURAS

Natural phenomena have always been with us, but human beings have modified both their intensity and their effects so that they often turn into disasters.

Governments not only have the duty to take preventive measures, but also to evaluate the danger. In their own interest, people must demand that such measures be taken and compliance with regulations enforced.



Diego Álvarez, Argentina

Urban zones

The last five decades have seen great changes in Latin America and the Caribbean with a steady growth in the number and locations of human settlements as more and more people were drawn to what were to become enormous urban areas like Mexico City, Sao Paulo, Buenos Aires, Rio de Janeiro and Santiago.

The impact of these cities in the region extends far beyond their boundaries and they jeopardise the quality of life over large areas because of their unsustainable demands for energy, food and other resources. Also, the waste they produce damages the soil, air and water.

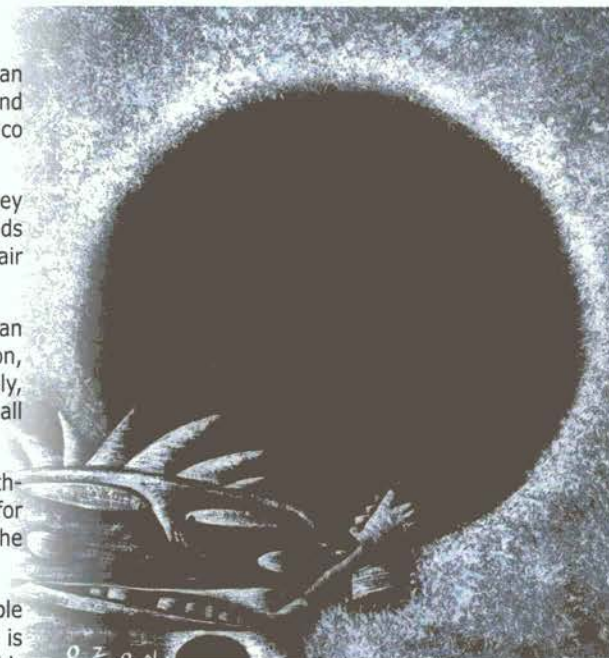
Many natural resources become exhausted in our region's cities and very polluted urban zones are the source of some of the most serious environmental problems. In addition, they suffer from a loss of biodiversity, a shortage of freshwater, deficient food supply, overpopulation, consumerism and poverty, as well as social and economic conflicts, all factors that convert them into complex human and environmental systems.

A large part of this is due to a lack of planning and environmental management, together with a predominance of economic interests that take precedence over caring for Nature and the quality of life, and to the lack of awareness and scant promotion of the sustainable use of resources.

The availability of jobs and the concentration of capital in cities are what attracts people to them. Large numbers emigrate from rural areas in the hope of finding work that is not available at home because most rural property is concentrated into large landholdings, agriculture is mechanised, wages are low, public education, health and other services are either non-existent or unreliable.

Without other options, they come to urban centres where, they believe, they are more likely to find work.

Urbanisation is not always in the form of large cities; it is common in the region for small towns to change and modify to make room for migrants, as in the following example in the Caribbean.



Ixchel Estrada, Mexico

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Anonymous



Osver Polo Carrasco, Peru

Urbanisation and the Caribbean



Because of excessive urban development, there is unequal use of natural resources in the Caribbean. For example, in Guyana people constantly complain because they do not get enough water.

However, urbanisation affects not only water supplies; it often leads to poor land management. Primary land is converted to more profitable farmland. Native plants and animals of the Caribbean can be eliminated due to the loss of their habitat to built-up areas.

Urbanisation also causes the deterioration of indigenous cultures. Sadly, every day we lose more crop land and our ancestors' knowledge about how to use medicinal herbs and plants is threatened. Luckily, however, research has led to efforts being made on how to recover this information, and these efforts are continuing. Preserving our cultural legacy is a matter of concern to us.

An example of unplanned urbanisation is given below and shows that the urban blot has spread beyond the originally established limits.

Mexico City airport



Mexico City is not the only metropolis with an airport in its centre. When the international airport was built, it was at some distance from inhabited areas, but then people started to move closer and closer until the airport was entirely surrounded. This is one example of how urban zones have expanded in recent years.

Now the city is totally built up and can spread no further and an alternative airport is being designed further away.

CÉSAR CRUZ ROJAS, MEXICO



Towns consume a lot of resources.
Anonymous, Guyana



Ángeles Pérez, Argentina



Poverty. Marcela Ruiz Barba,
Mexico

What does GEO LAC say about urban zones?



The Latin America and the Caribbean region has a highly urban population. Between 1975 and 1995 it rose from 192 to 344 million people and estimates were that it would reach 380 million (75% of the total) in 2000. Most of this population lives in large cities like Mexico City (15.4 million) and Sao Paulo (15.7 million).

The lack of planning and the failure to comply with controls also lead to the potentially dangerous juxtaposition of industrial and residential areas, as well as to a general process of urban development exposed to risks that come from urban areas being vulnerable to natural events. In the first case, residential zones' inhabitants are exposed to industrial discharges of emissions and dangerous effluents. In the second, as is shown by the devastating impact of both hurricane Mitch in Central America at the end of 1998, and the floods in Venezuela at the end of 1999, the lack of planning and failure to comply with controls may imply very high reconstruction costs and a devastating loss in human life.

Population density and growing economic activity have increased air pollution in many cities, among the worst affected being Mexico City, Sao Paulo and Bogota, causing their inhabitants severe respiratory problems with higher rates of lung infections and many premature deaths. Treatment is costly and production is lost through absenteeism.

During the 1990-1997 period, the proportion of poor homes in urban zones in Latin America dropped from 35% to 30% although in 1996-1997 in some countries this figure was still 40% or even higher. Examples are:

- Bolivia (47%)
- Colombia (39%)
- Ecuador (50%)
- Paraguay (40%)
- El Salvador (39%)
- Honduras (67%)
- Mexico (38%)
- Nicaragua (66%)

AIR POLLUTION IN URBAN ZONES

Air pollution is a serious problem in urban zones like Sao Paulo, Mexico city and Santiago in Chile where petroleum-burning toxic gas emissions from factories, refineries, motor vehicles and other sources are permanent



Industry is concentrated in cities that attract people. Old steel mill in Monterrey.
Jessica Valero P, Mexico

This continuous contamination alters, either directly or indirectly, surrounding ecosystems and it is worse when the cities are in unfavourable geographic locations, such as valleys.



Many cities are surrounded by a poverty belt where people lack basic services.
Anonymous, Paraguay.

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Air pollution in Santiago, Chile



One of the region's most polluted cities is Santiago, Chile. Its topoclimatic characteristics, geographic location, industrialisation, type of urban development, concentration of population and vehicular traffic are some factors that account for the production, persistence and increase of its air pollution.

Santiago's geographic location (in a basin, between the Andes mountain range and the coast, at 500 meters above sea level) and the thermal inversion layer make a considerable contribution to the persistence of air pollution, especially critical in winter and characterised by a high content of particles, ozone and carbon monoxide and by low levels of sulphurous compounds.

Industrial processes, private motor vehicles, public transport, residences, unpaved roads and localities are among the sources of the city's air pollution. Motor vehicles are the main cause of pollution by nitrogen oxide, hydrocarbons and carbon monoxide.

LUIS BARRETO, CHILE

POLLUTION AND WATER

SHORTAGES IN URBAN ZONES

Surface and ground water, river and marine pollution is caused by the unplanned concentration of population and by industrial activities in urban centres. This pollution is aggravated by poor management of solid waste and effluents, plus the lack of treatment of domestic and industrial sewage.

In the province of Buenos Aires most sewage is dumped into the Río de la Plata, as can be seen from the following text.



Río de la Plata. Anonymous, Argentina

Río de la Plata



Because almost all sewage water from the metropolitan area is dumped untreated into the Río de la Plata, one of the most serious problems facing Buenos Aires province is water pollution. This is made worse by scant control and monitoring by the authorities of industrial discharges into rivers and other water courses.

CECILIA IGLESIAS, ARGENTINA

Not only is the water polluted, but large cities lack this vital liquid. Today, many cities in the region must bring water from large distances and at very high cost in order to supply their millions of inhabitants.

Forecasts are that in the future water supplies will inevitably be exhausted; wars will no longer break out over territory but over access to this invaluable resource.

POEM TO THE CITY



*Empty air;
breathe in...
breathe out...
The wind blows,
human smoke,
heavy pollution.*

*The air was so clean
we wanted to breathe it;
the air is so polluted
we want to vomit.*

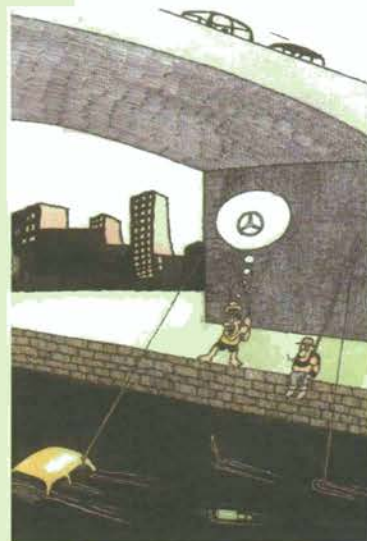
*The air is full of problems,
the river bed has become a sewer;
fishes die on the banks;
the river carries a tin can and a tyre,
the confused air surrenders.*

*In silence was the river identified;
in filth is the river now identified;
it stops and speaks its sad refrain.*

*What is it you are doing to me,
what is it you will do to me...?*

*You used to sweep along... today
you are stagnant;
I used to run... today I barely move;
you used to cleanse... today you soil
I used to please... today I kill.*

*Your water frightens...
Just as the polluted air frightens.*



Erico de Olivera, Brazil

BRIGADA ECOLÓGICA, CAMARAGIBE, BRAZIL



María Fernández, Uruguay

Fr.
PE.
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The poor have to settle in marginalised zones that are more vulnerable to natural risks and often lack a proper water supply or any sanitary services although, in contrast, these are often very well developed in urban areas. Unplanned growth has other environmental effects associated with the absence of proper sewage disposal: a demand for water that exceeds the supply, and the pollution of aquifers.

The treatment of solid waste and effluents is particularly troublesome in Latin America and the Caribbean. The problem is not only the amount but also the quality and composition of waste that has undergone a change from being dense and almost completely organic to being voluminous and increasingly less biodegradable and containing additional toxic substances. This trend appears to be directly proportional to city size and to personal income, and to a shift in lifestyles.

According to a PAHO study, waste is deposited in factory yards, in empty lots or in open air dumps or controlled landfills, without any thought to the damage it causes to the environment and health. Although some countries like Argentina, Brazil, Colombia, Mexico and Venezuela have a legal control framework, they almost always lack the physical and human resources infrastructures necessary to apply it nationally. The problem becomes worse when hazardous wastes are imported from industrialised countries.

In Latin America and the Caribbean as a whole, less than 2% of sewage is treated. The topography of many Latin American and Caribbean cities makes it hard to use conventional methods to make water drinkable, to treat sewage and to collect solid waste. ■

GARBAGE IN URBAN ZONES

A serious health problem is posed by the open garbage so common in urban zones. Even if it is collected, there is no certainty as to where it will end up; some of it is used as sanitary fill, and some is simply thrown into a garbage dump, generally illegal. The saddest thing is that very poor people living in cities have to go long distances to rescue whatever is edible from the garbage, or to survive by selling what can be salvaged.

A stadium filled with garbage



Not even the most popular football team's fans could fill the Jalisco stadium. But the garbage can. With the waste we produce in the metropolitan zone of Guadalajara we could fill the stadium to capacity every three months, and that represents more than 3,500 tons of garbage a day, more than half of it from households (*El Informador*, 1999).

Accumulating enormous amounts of garbage over long periods causes putrefaction, degradation, infection and a combination of highly dangerous liquids that are known as garbage juice or leachates. These liquids can infiltrate to pollute underground water that is then extracted for human consumption.

ÁLVARO ROMERO FLORES, MEXICO

In Brazil, millions of people survive thanks to garbage. The many boys and girls who must search the dumps for food are exposed to dangerous toxic hospital waste.

Buenos Aires' metropolitan area has more than 100 illegal garbage dumps. In Mexico, in the state of Jalisco, there are also serious problems with treating solid waste because of the huge volumes produced.



Anonymous, Nicaragua

NOISE POLLUTION IN URBAN ZONES

A serious threat to public health is the pollution caused by excessive noise. It is due to undesirable effects that accompany the growth of cities, such as more motor vehicles, factories, public and private construction works, electronic equipment, etc. In

some countries noise pollution has grown so much that there are legal restrictions on the number of decibels that may be emitted outdoors.

Noise pollution in Asuncion



The capital of Paraguay is rapidly growing and this growth has been accompanied by noise, a very bothersome pollutant.

Noise pollution has increased significantly in recent years due to factors inherent in the expansion and development of the city, such as the increase in motor vehicles and new paved roads. The problem affects the inhabitants of Asuncion and causes nervous system problems or the gradual loss of hearing. At the same time, excessive noise makes it more difficult both to teach and to learn.

To alleviate the problem and make life more bearable, the Asuncion town authorities have ordered a restriction (often ignored) on the number of decibels that may be emitted in the streets and in public places.



Tea Xuxana, Paraguay

EMMA ZANOTTI, MARCELO NICORA, LIZZI TOERREANI, FRANCISCO ARIAS, MARÍA EUGENIA HALLEY AND NATALIA ROJAS, PARAGUAY

VISUAL POLLUTION IN URBAN ZONES

Visual pollution is a stress factor with which many city inhabitants must live day by day. It consists in the proliferation of

advertisements, luminous signs and billboard announcements, graffiti and electric installations on light posts, among others.

Advertising in Lima

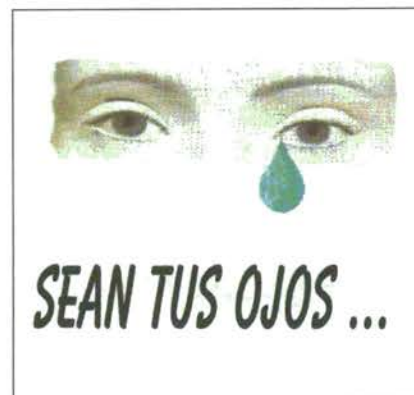


Those of us who live in Lima are not generally aware of the visual pollution that is everywhere we look, although most of the main avenues and even the Pan-American highway have an abundance of advertisements of products and services that are extravagant, colourful, striking and even adorned with neon lights. They all invite, bewilder and try to persuade us to buy, buy, buy.

This gets even worse when elections are near because political campaigns fill the city with political propaganda: its streets and avenues are saturated with posters, signs, pennants, and everything else imaginable.

Visual pollution of public space is quickly growing in spite of a regulation that prohibits leaving political propaganda after the elections are over; in fact, in several districts of Lima it stays there forever in spite of the concern expressed by citizens at what in many cases, as well as being a disturbance, is an invasion of their private property.

MARIELA CÁNEPA, PERU



(Your eyes...)
Argentina



Jessica Valero P, Mexico

THE EFFECTS OF URBANISATION ON THE POPULATION

While urban zones have few green areas, they do have plenty of unhealthy open spaces. A city's population is exposed to numerous types of pollution and, in general, survives with a quality of life that leaves much to be desired. Living in a metropolis may

bring on conditions such as stress, heart and respiratory problems, obesity and depression. Urban surroundings seem to accentuate violence, lack of respect for human rights and class distinctions.

The city



Who has not had to wait in line for a bus, jump out of the way of cars, push through crowded streets, put up with the noise of motor vehicles, the shouts of street vendors, cars' horns? People who are used to all this may be able to put up with it, but those who are not can become so upset they start to fight with their families as soon as they get home, or lash out at everyone else.

DANUBIO FERREIRA, BRAZIL



La concentración de la población en zonas urbanas están demandando mayor servicio público, principalmente el servicio de agua potable.

UNA DEL OÍA. NO TODOS LLIGAN CON EL PAR BAJO EL BRAZO

La población del Perú ya supera los 25 millones

Cada hora somos 49 más, pero la tasa de crecimiento anual ha bajado al 1,7

según el INEI la tasa de crecimiento anual ha disminuido -de 2,1% en los años 70 al 1,7% en 2007-, el número de personas de población peruana 2007 había que ya fueron legados a los 25 millones (25 mil habitantes, 10 millones de habitantes, 64 años con 177%).

que que Macho de Dios, Moquegua, Tumbes, Piura, Tarma, Chicla y Ayacucho disminuyen, en conjunto, el 7% de la zona norte al 18% de la

Población peruana

0-14 años	10,5 millones
15-64 años	11,5 millones
65 años y más	3,0 millones
Total	25,0 millones

(The population of Peru passes 25 million) Osver Polo Carrasco, Peru

Keep in mind



A tree generates the oxygen that 10 people breathe in a day. A car consumes in an hour the oxygen that 800 people breathe in a day, or what 200 plants consume every day.

SOURCE: "LA ECOLOGÍA EN CASA", FUNDACIÓN ECOLÓGICA POR UNA VIDA MEJOR, WWW.FUNECOVIDAMEJOR.COM/ECOCASA.HTM ARGENTINA

Keep in mind



Managua, in Nicaragua, can no longer cope with its garbage. The city produces 1,212 tons per day and is one of the capital cities in Central America with the greatest number of solid waste disposal problems (*La Prensa*, 2001).

The population of Greater Buenos Aires generates approximately 15,000 tons of garbage a day (*El Clarín*, 2000).

In Lima, Peru, the amount and composition of solid waste depend on the population types and the lifestyles of the inhabitants. In districts of metropolitan Lima where poor families predominate, there is less garbage per inhabitant than in the better off sectors.

In Georgetown, Guyana, people are totally unaware of the environment. It is a common practice there to throw trash out of vehicles or dump it in rivers and sewers which are almost always clogged and cause constant floods. Garbage left on roads obstructs the access of vehicles and causes horrendous traffic jams.



Chaos, Ixchel Estrada, Mexico

Green spaces in large urban areas are often displaced by "urban planning" and there are few squares, gardens, parks or natural reserves.

City green areas have recreational functions and help to make life more pleasant.

There are innumerable environmental problems due to a lack of education and ecological awareness. Many of these problems would be solved if we were all aware that our surroundings merit respect and a daily effort to improve them.

Because most urban growth is a consequence of our present economy, we should question our economic and urban development models. The quality of life should be a priority rather than the economic growth calculated in figures, or the unequal accumulation of goods. To rethink our priorities and to take action are the only solutions if the unsustainable advance of our cities is to be turned back.

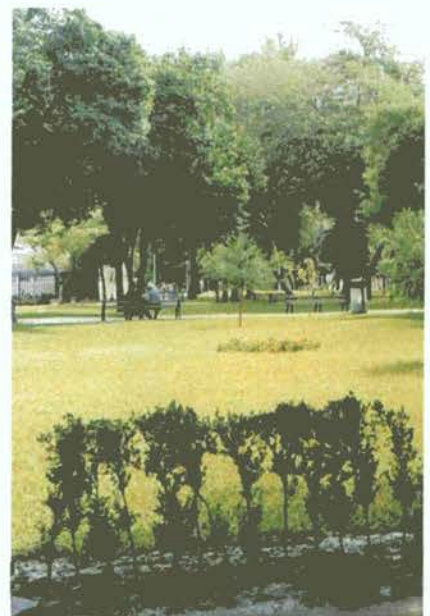


Anonymous, Brazil



MAK —

Mario F. Almaraz, Argentina



Corre Group, Mexico

Coastal and marine zones

The region's coastal zones extend for 64,000 kilometres and cover 16 million square kilometres of maritime territory. In some countries this is more than 50% of the total surface (UNEP, 1999).

PROBLEMS OF COASTAL AND MARINE ZONES

The coastal and marine environment has been damaged by changes to and the destruction of habitats, excessive fishing and pollution. It is paradoxical that many of these alterations are caused by human beings living at great distances from the sea.

There is an evident relationship between the planet's different phenomena; for example, dumping solid and liquid wastes in rivers many kilometres from the coast affects our marine ecosystems since almost all rivers run into the sea. Contributions from St. Lucia and Cuba exemplify this case.

Problem of the St. Lucia waters



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Poor solid waste management, inadequate disposal infrastructure and no garbage recycling are among the problems affecting the marine environment in St. Lucia.

The situation is made worse by illegal dumping, floods and strong rains that carry to the ocean polluting objects made of hydrocarbons such as plastic bags, containers and other synthetic matter that cannot be recycled. All these objects are dangerous because their colours attract different forms of marine life that eat them and then, in most cases, die.

SHANE MACAULDY, ST. LUCIA



Gerardo del Castillo, Mexico



Organismo Group, Brazil



Melecrinis, Mitronov, Romero, Argentina



Gerardo del Castillo, Mexico



What does GEO LAC say about coastal and marine zones?

Because more and more untreated waste is discharged into the region's waters their quality has been getting worse. One of the most significant sources of coastal pollution is the infrastructure that must be built for tourism and industrial activities.

Erosion, caused by deforestation and poor management of agricultural land, is one of the main reasons why shallow coastal waters become degraded. On the other hand, excessive use of fertilisers in agriculture has increased the algae population and eutrophication of coastal lagoons.

Coral reefs all over the Caribbean—and Belize, which has the world's second largest barrier reef—are suffering from progressive degradation in combination with human and natural causes that generally complement one another. These ecosystems are threatened by sedimentation and land-based pollution, excessive exploitation, polluting marine sources and coastal development.

Around 100 million tourists visit the Caribbean each year and account for 43% of its combined gross domestic product (GDP). Investments in tourism provide jobs on the one hand but, on the other, lead to the degradation of the coastal environment.

Port expansion and marine commerce are usually accompanied by an expansion of transportation corridors in coastal areas, as is happening off Argentina, Brazil, Ecuador and Uruguay. All these activities soon bring drastic transformation to coastal areas.

The waters of Chile and Peru support one of the world's five largest commercial fisheries and the world's fastest growing fishery is off the coast of Argentina and Uruguay.

During the period 1985-1995, many South American countries doubled or tripled their marine fishing industries and Colombia quintupled its industry. However, there was then a significant drop in the catch, by 14% in 1997.

A great risk is posed by spilling hazardous substances at sea in accidents involving oil tankers, other containers, oil pipelines and so on. Thirteen oil spills were recorded

Cuba's marine and coastal zones environment



Between North America and South America, in the waters of the Caribbean sea, lies an island of impressive natural beauty that is home to more than 11 million Cubans.

As it is totally surrounded by water, the country has often seen the harmful effects on its coastal and marine ecosystems caused by the existence of some 2,160 sources of pollution, of which only 18% have efficient treatment systems. The most affected sectors are farming, the sugar industry, basic and food industries and human settlements under the direct administration of local governments (CITMA, 2000).

However, tourism—which has developed at a dizzying rate—has achieved a certain harmony with Nature. The island's main tourist destinations are the beaches of Varadero and the Sabana-Camagüey archipelago.

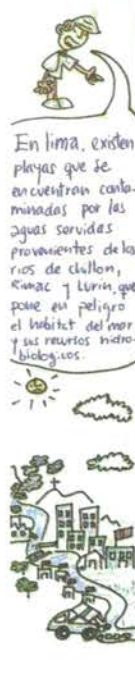
Of the six existing biosphere reserves in Cuba, Buenavista (to the north of the central region) covers a total area of 3,135 km² and includes the marine and coastal zones of an important region of quays (MCTMA, 1998).

Both the government and the people of Cuba believe in sustainable development and this is the official policy. Therefore, untiring efforts are made to recover affected areas and to conserve those that have not yet been damaged by the predatory activities of human beings.

YORDANIS PUERTA DE ARMAS, CUBA
SOURCE: MINISTRY OF SCIENCE,
TECHNOLOGY AND THE ENVIRONMENT

Concentración de urbes en la costa afecta el mar

En las escuelas no se difunde la importancia de este recurso, advierte la Marina



DÍA DE LOS OCEANOS

El mar es un recurso invaluable que está siendo más explotado y presionado de día en día por las actividades que se realizan en las costas que van creciendo a un ritmo que amenaza el equilibrio del ecosistema marino.

Una de las principales causas de este problema es la concentración de las actividades humanas que se da en las zonas costeras. Se está agudizando la tendencia a que la población se concentre en las zonas de la costa, que a su vez se agudiza cada vez más por la presión de las actividades de explotación que se realizan en las costas.

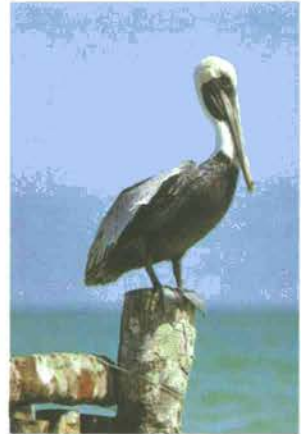
El mar pertenece al patrimonio común de la humanidad, por lo que su explotación debe ser racional, sostenible y equitativa, en el que se considere el bienestar de las generaciones futuras.

Una de las principales causas de este problema es la concentración de las actividades humanas que se da en las zonas costeras. Se está agudizando la tendencia a que la población se concentre en las zonas de la costa, que a su vez se agudiza cada vez más por la presión de las actividades de explotación que se realizan en las costas.

Además del Perú, otros países que sufren de este problema son Chile, Ecuador, Colombia y Venezuela.



PROBLEMA AMBIENTAL. El día Mundial de los Océanos, que se celebra el 8 de junio, busca promover una conciencia de la importancia del mar.



Alberto Cáceres, Mexico

(Coastal urban centres affect the sea) Osver Polo Carrasco, Peru



Poema Mühlenberg, Brazil

EFFECTS OF CLIMATE CHANGE ON MARINE AND COASTAL ZONES

There could be significant changes in marine and coastal zones brought on by global warming. For example, if sea level rises because of a melting polar ice cap, the waters would alter the coast line, invade the land and affect the habitats of animal and vegetable species. Furthermore, coastal communities would disappear and tourist activity, one of the main sources of the region's income, would suffer serious damage because most of its installations are near beaches.

Climate also influences marine ecosystems' balance. For example, *El Niño* has affected coastal areas in Latin America and the Caribbean (especially in Peru) with consequences that are not only local.

Many bays or coastal zones are polluted by close-by industrial activities, examples of which are the industrial and petroleum producing zones of Coatzacoalcos and Minatitlán in the Mexican state of Veracruz.

Rise in sea levels



There is great concern in Guyana, where much of the country's plain lies below sea level, over a possible sea level rise. The plain is important because on it lie the country's main human and industrial settlements.

Protection barriers have been built to keep out the sea, but nobody knows whether they will be strong enough to protect the plain.

There are higher regions but they are undeveloped and it would be a titanic task to develop them and move the population there.

Countries everywhere must take this threat very seriously and adopt measures to do whatever is possible to reverse the process.

ONEKA SCOTT, GUYANA

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POLLUTION OF MARINE AND COASTAL ZONES BY PORT AND INDUSTRIAL ACTIVITIES

Another significant cause of pollution in these zones is shipping, since many vessels (tourist or commercial) dump all their waste

at sea, and industries in ports and coastal zones also pollute marine waters.

CORAL REEFS

Latin America's coral reefs are the world's second most important, after the Great Barrier Reef of Australia. They are mainly found in the Caribbean sea, Mexico, Honduras and Belize, and

share a strip or barrier reefs that extend along the whole eastern coast of the Yucatan peninsula.

Fragile and polluted coastal environments: the case of Paracas Bay



The impact of effluents dumped by fishmeal industries in Paracas Bay is a cause for great concern. Part of the bay is within the Paracas National Reserve (PNR) where biological communities and the production of tortoise shell are affected.

Although contaminants reach Paracas Bay from different sources, most damage is caused by fishmeal plants because they are close to the bay and frequently dump large volumes of waste into it; of great danger too are the chemical composition, degree of toxicity and the organic content of the contaminants.

The consequence of these discharges is massive mortality of fish, invertebrates and algae, usually when large unloadings of anchovies and sardines take place. Another consequence is the accumulation of high percentages of total organic material in the depths which harms bentonite communities and has a general eutrophication effect. If this continues, the result will be a disorganised ecosystem with low marine biodiversity and incapable of taking advantage of the high primary production supported by coastal outcrops.

RAÚL SÁNCHEZ SCAGLIONI, GEA, PERU

Coral reefs



Coral reefs are extraordinary ecosystems where more than 200 species, including fish, lobsters and turtles, spawn and feed, and close to 12% of marine fish breed.

There are three basic types of reefs in Colombia: the atolls, the coastal reefs and the rim or barrier reefs found in the national parks of Tayrona, Utría, Corales del Rosario, San Bernardo, Gorgona Island and in other Pacific and Caribbean zones.

Reefs are ecosystems that protect the coasts against the waves erosive action and also help to preserve marine plains and mangrove swamps.

These ecosystems contribute to the diversity and abundance of life in tropical seas; they have medicinal properties and are used for bone grafts.

They are of great importance to human beings but their indiscriminate use, the collection of coral for sale, oil spills and organic pollution due to poor sewage treatment have destroyed the coral, and the same is true of irresponsible scuba diving and water sports (SMMA, 1999).

CORPORACIÓN GRUPO TAYRONA, COLOMBIA

TOURISM

The seaside and beaches are ideal places to develop tourism, the "smokeless industry" which, however, can be harmful to the environment.

Changes to the natural conditions of coastal and marine ecosystems follow the development of tourism because most installations are located on the coastline, a very fragile area. In many cases waste is dumped onto the beaches themselves and tourists' recreational activities can damage ecosystems like coral reefs.

It is unfortunate that some governments place more importance on developing tourist activities than on protecting Nature, instead of seeking an acceptable balance between them.

Caribbean tourism is a very profitable business. Scuba diving, of whatever type, the use of outboard motors and open sea fishing take place in a marine environment. But the cost of attracting tourists to the islands is catastrophic: competition has made governments market their islands and destroy natural habitats in the name of development while hiding behind the ecotourist shield.

We must ask ourselves if it is worth sacrificing the environment for the sake of this type of development.

A source of income



Tourism is Barbados' highest source of income, which means that avoiding water pollution is a matter of urgency. The most popular tourist sports are located close to beaches: swimming, scuba diving and open sea fishing. If the water is not kept clean, Barbados' economy will be ruined.

TARA GASKIN, KIRAN MATAN, TINA MARSHALL,
SHANIELLE SMALL AND JACLYN WALTERS, BARBADOS

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between 1975 and 1997 with volumes spilt ranging from 50 to 6,000 tonnes. One of the most serious cases was in Rio de Janeiro's Guanabara Bay and caused damage to hundreds of square kilometres of marine and mangrove areas (including a 14,000 hectares protected area, as well as nearly all the nearby beaches). The responsible state enterprise was fined \$28 million, the largest penalty imposed up to now in application of a new law on environmental offences. ■



Cruise ships arriving at Cozumel, Mexico. Iván Jiménez Thomas, Mexico

The marine ecosystem is fragile. While marine biologists, scientists and environmentalists understand the consequences on the aquatic ecosystem of human beings' harmful activities, ordinary people are not aware of how dangerous their lack of respect for and care of the environment can be.



Vero

The beaches of St. Lucia



Because no better disposal options have yet been found, untreated sewage is dumped along the coasts of St. Lucia. Sewage pollutes our beaches, as well as the foods we eat, especially small fish species and crustaceans. As manufactures expand, the water and atmosphere in St. Lucia are being polluted with chlorine, dioxin and other substances considered to cause cancer and genetic defects, as well as other diseases.

SHANE MACAULDY, ST. LUCIA

Bad-mannered holidaymakers



In Valparaiso, Chile, the lack of environmental awareness when it comes to disposing of garbage, the use of public facilities and visitors' bad behaviour and poor hygiene cause damage to the coasts that can only be repaired once the holidaymakers have left.

CORPORACIÓN RENACE, "RED NACIONAL DE ACCIÓN ECOLÓGICA", CHILE

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FISHING

Fishing is also popular in these zones and is the most important commercial activity in many countries. However, the abuse of marine resources has caused an imbalance in the populations of different commercial species, and others with no commercial value are caught in nets and die because of poor fishing methods.

Of the intense fishing activities along the coasts of Latin America and the Caribbean the most important economically are those of the Pacific coasts of Chile and Peru.

Fishing is also very important in Mexico because of that country's large extensions of territorial seas, such as the Gulf of California, the Gulf of Mexico and its stretches of the Caribbean and the Pacific. Until a few years ago, Mexico suffered from a United States embargo on tuna exports because many dolphins were caught in the fishing nets. Now Mexican trawlers have modernised their instruments to ensure these noble mammals are protected, and the tuna embargo has been lifted.

Unsustainable exploitation of marine resources can lead to their depletion and extinction, as is explained in the following text.



Alberto Cáceres, Mexico



Alberto Cáceres, Mexico

Hake in danger



In Argentina the question of the hake is as delicate as it is important. What was thought to be an inexhaustible resource because of its abundance, has now become a problem that cannot be ignored. Although there is as yet no great risk of extinction, if the indiscriminate capture of hake continues, it will end up becoming a rare species and this could cause the risk of its eventual disappearance.

The lack of respect for the few laws protecting hake makes the situation worse because it is losing its habitat, as well as being reduced in numbers and size. It is up to us: either we learn to use this resource that Nature has so generously given us, or we must be prepared to lose it.

AYELÉN AMIGO CATAGENOVA, ARGENTINA

CONNECTION WITH OTHER PROBLEMS OF MARINE AND COASTAL ZONES

Several problems very often come together in a single scenario; poverty, lack of education, irresponsible authorities and a grow-

ing and uncontrolled population result in cases like those related to us by the Grupo CAMA of Salvador, in Bahia, Brazil.

The Tainheiros inlet



Itapagipe, "The rock that advances towards the sea", is situated in the north-east of the city of Salvador, in Todos los Santos Bay, and has a population of 155,000.

Hundreds of families survive in shacks on the water where the conditions are inhumane and there is no sanitation whatsoever.

This is made worse because of the poverty of the community and the total lack of information. Children play and amuse themselves in the mangrove swamp beside the sewage and garbage that come from the shacks themselves, while their parents take no notice. Many of the people who live there eat food they get from the very same swamp.



Ixchel Estrada, Mexico

GRUPO CAMA, BRAZIL

Coastal and marine zones suffer serious damage from pollution whose sources are urban and industrial settlements along the coasts and even at some distance from them. They are also affected by climate change. Entire ecosystems are in danger of disappearing if human beings do not take steps to reverse the damage they cause.



Grupo CAMA, Brazil



Grupo CAMA, Brazil

Land and Food

Land is one of the natural elements that ensures sustainable development and makes a country wealthy. Without it, there would be no food produced and economic activity would be sharply reduced. There is a wide variety of land types in Latin America and the Caribbean but they are all affected by numerous interrelated factors: climate change, forest fires, the spread of agriculture to meet the demands of large cities, the excessive use of agrochemicals, and so on.

Land erosion and desertification reduce the capacity to produce food, lead to loss of biodiversity and to water pollution, while at the same time increasing poverty.



Elizabeth Ramos, Brazil



Gerardo del Castillo, Mexico

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According to GEO LAC, "the world's arable land should be enough to feed present and future populations". In the region, soil degradation caused by human activity, overexploitation, lack of use or care of land bring about important losses in agricultural production, causing an inability to meet population needs.



Elizabeth Ramos, Brazil



Sugar cane, anonymous, Barbados



Poema Mühlemberg, Brazil

There is a historic tendency throughout much of the region to concentrate rural property in the hands of local political bosses or *caciques*. Some of the land is very productive, but most of it is in the hands of large landowners who speculate with it or prevent the farm workers or campesinos from working it.

That is why farmland in some countries loses its productive capacity and very large numbers of people go hungry. For example, Brazil has legislated an agrarian reform process but it is still far from meeting the demands of dispossessed farm workers.

In Argentina, Brazil and Mexico agriculture has been modified to satisfy the constantly growing demands of consumers whose numbers continue to rise. Many people have been displaced to other areas because of natural disasters like floods, or because the land is so degraded it can no longer be cultivated.



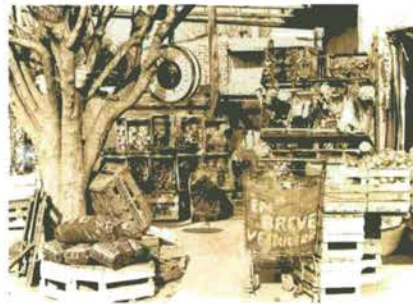
Anonymous

These large numbers of people move towards forest lands (ecologically highly fragile zones) and put a great strain on the region's natural habitat.

The distribution of land is very irregular and enormous extensions have been acquired by large companies (many of them with international capital) that put pressure on rural populations to migrate to the cities because, as agricultural machinery takes their place, they are no longer needed to work the land.

If we do nothing to reverse environmental deterioration caused by deforestation, desertification, degradation of fertile soils, pollution due to excessive or inadequate use of fertilisers, pesticides and other agricultural techniques that affect soil fertility, then the hope of achieving sustainable development will remain just a dream.

The loss of cultivable land not only extinguishes habitats; it also hurts economic activity because, without agricultural products, it is impossible to keep up with the cities' consumption needs.



Cecilia Iglesias, Argentina

As to agricultural techniques, we must consider whether to use natural fertilisers to produce healthy food given that nitrogenous fertilisers and pesticides are very dangerous for both the environment and human beings. Agrochemicals persist long after they have been applied, they are difficult to degrade and small concentrations cause serious damage throughout all the links in the food chain, until they affect human beings and all other living creatures.



Erosion by overgrazing, Roberto Méndez, Mexico

What does GEO LAC say about land and food?



The Latin America and Caribbean region has the world's largest reserves of cultivable land. The region's agricultural potential is estimated at 576 million hectares from a total territory of 1,995 million hectares, or almost 29%.

However, 16% of land in Latin America and the Caribbean has suffered from soil degradation. The impact is relatively greater in Mesoamerica than in South America. Degradation is more severe in arid agricultural land and it is estimated that more than 70% of these lands in the region suffer from moderate or extreme degradation.

Among the main causes of soil degradation are erosion caused by deforestation, excessive grazing and chemical degradation. In general, erosion is the most serious threat, because it is estimated it has reached some 170 million hectares in South America and some 52 million hectares in Mesoamerica.

Deforestation is the main cause of erosion in South America (some 100 million hectares, equal to 40% of the total affected) and the second cause is overgrazing (some 70 million hectares, or 28% of the total). In Mesoamerica, on the other hand, the main cause of soil degradation is poor management of agricultural land.

Losses caused by degradation of original agricultural productive land also vary according to the region. Recent estimates indicate that in Central America this degradation has led to a 37% loss while the global loss for South America has been almost 14%.

Chemical degradation (mainly the loss of nutrients) covers an area of 70 million hectares in South America and 7 million hectares in Mesoamerica (28% and 11% of the affected land, respectively).

Livestock farming (especially cows and sheep) has caused overgrazing and subsequent desertification, particularly in Argentinian Patagonia where it is estimated 35% of the total area (80 million hectares, almost 5% of the South American territory) is in a process of desertification.

In Central America, pronounced slopes, strong rains and inefficient agricultural practices have made erosion the principal reason for the loss of agricultural potential.



Anonymous, Panama

The following text tells what happens when these substances are used.

Pesticides



To improve and maximise food production, human beings invented tools, techniques and compounds that are free from crop-destroying insects.

Giant steps have been taken by the chemical industry in the last 50 years to synthesise various pesticides. The Green Revolution of the 1970s created numerous compounds to fight pests and increase agricultural production. But in the 1990s the negative effects these substances were having on the health of animals and people began to be noticed: loss of fertility, liver infections, immune system, nervous and circulatory problems, alterations in chromosomes, different types of cancer... all were attributed to the use of pesticides.

In 1992, countries attending the Rio Summit proposed to eliminate the persistent synthetic compounds that threatened to accumulate in the marine environment in dangerous levels.

Nevertheless, although developed countries prohibited the use of some pesticides, a number of companies continued to export them to underdeveloped countries (CODE, 2000).

YESENIA HERNÁNDEZ MÁRQUEZ, MEXICO

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Overgrazing, Ixchel Estrada, Mexico

The use of "aggressive" agricultural techniques (agrochemicals, pesticides, burning agricultural land, etc.) has the immediate aim of obtaining huge production volumes; the result is the soil is impoverished and unfit for use in the short and medium term. On the other hand, by using clean agricultural techniques, the same amount of food is produced but of better quality for human consumption, and the environment is not damaged.



The use of pesticides in agriculture.
Anonymous

Desertification, which follows indiscriminate felling, results in the appearance and expansion of barren land and a region's potential biological degradation.



Elizabeth Ramos, Brazil

Victor Sanjinez, Peru
(Water!!!)

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If producers depend on degraded soils, then the social consequences can be very serious, in particular for those who have no other means of subsistence.

Soil degradation has other far reaching environmental and economic repercussions that lead to a sense of insecurity by affecting supplies, stability and prices for farm products. This in turn can cause a drop in farm income and, when it largely depends on agriculture, can hinder the growth of the economy as a whole.

A recent FAO study shows that in five countries in the region between a fifth and a third of their populations do not get enough to eat. These countries, in descending order, are: Honduras, Bolivia, Dominican Republic, Nicaragua and Haiti.

The Food and Agriculture Organisation explains that the effects of food insecurity in those countries include various environmental factors, one of the consequences of which is the inability to produce enough food or to guarantee a regular food supply. Such factors include cold or dry climate, poor soils, erratic rain patterns, pronounced slopes and severe soil degradation. Other factors are low agricultural production caused by institutional, technological and sectorial policy limitations, as well as very low incomes in rural and urban zones. ■

Excavations



In Trinidad and Tobago there are 75 quarries in operation from which about 24,000 m² of material are extracted (EMA, 1997). Excavations, whether authorised or illegal, destroy our national habitat because trees are felled but the companies concerned take no steps to regenerate the forests. Their excavation processes are inefficient and unnecessarily large areas are exploited.

In the 1970s tree felling and excavations on San Fernando Hill destroyed the habitat and local wildlife disappeared. The excavations were finally ended, recovery of San Fernando Hill began and it is now part of the national patrimony.

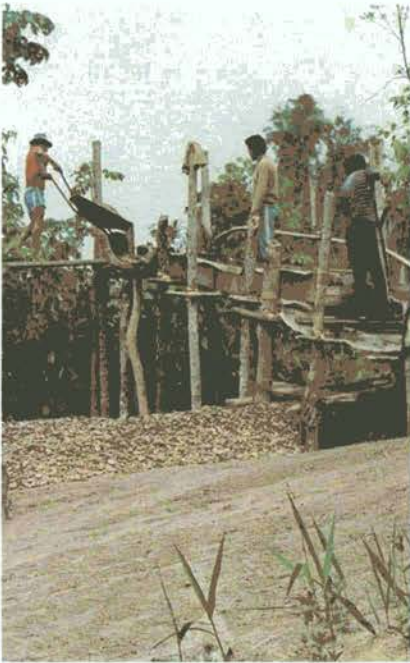
THERESE JABOUR, TRINIDAD AND TOBAGO



Anonymous, Guyana

Mining excavations in Guyana, anonymous, Guyana

As the following text shows, poor soil management is also common in the Caribbean.



Artisanal gold extraction, Javier Kaway Chirinos, Peru

Erosion



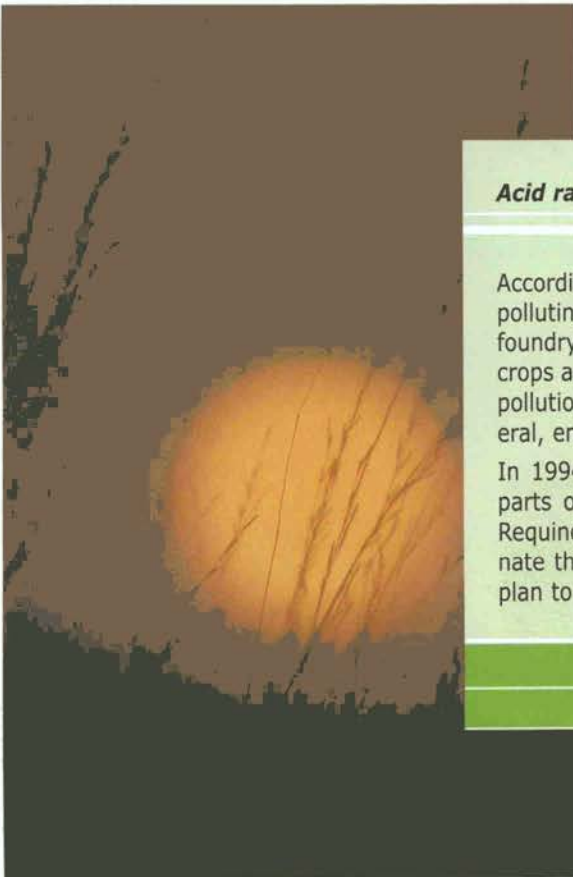
Soil erosion due to poor agricultural practices eliminates the rich layer of humous that forms over time by decomposition processes and microbial degradation, and the consequence is the soil is deprived of valuable crop nutrients. These practices are translated into contaminated soil caused by soil degradation, mining, dumping industrial waste and indiscriminate handling of domestic garbage.

TARA GASKIN, KIRAN MATAN, TINA MARSHALL,
SHANIELLE SMALL AND JACLYN WALTERS, BARBADOS

In many places, intensive land use destroys the soil layer and the resulting erosion causes sedimentation of rivers and streams. As we depend on agricultural products for our own consumption and for export, insecticides are used to repel or kill insects, fungi, weeds and rodents and they are among the main sources of soil pollution.

Other industries also pollute the soil by emitting pollutants in the form of gases which, when mixed with the clouds, cause the polluted water in the atmosphere to fall as acid rain.

The need to produce more food has given an impetus to biotechnology research.



Acid rain on crops



According to farmers in the Chilean province of Cachapoal, the columns of polluting smoke that rise from the Caletones del Teniente-CODELCO foundry are full of SO₂ (sulphurous anhydride) which falls on the zone's crops and poisons them, the soil and water. Besides the harm to health, the pollution reduces vegetable and fruit production, affects quality and, in general, endangers the inhabitants' quality of life.

In 1994 a reserve was created that surrounds the foundry and includes parts of the towns of San Francisco de Mostazal, Codegua, Machalí and Requinoa. Fortunately, the company has made active efforts to decontaminate the region by investing in new technologies and applying an internal plan to reduce the effects of the pollution it causes.

CORPORACIÓN RENACE,
RED NACIONAL DE ACCIÓN ECOLÓGICA, CHILE

The sun sets. Cristian Müller, Argentina

BIOTECHNOLOGY

Intense international discussion is taking place on the use of transgenetic products created by biotechnology.

Transgenetic is the term used to describe an animal or vegetable organism that receives a gene foreign to its species and that

modifies its DNA so that it grows with specific features wanted by the producer or manufacturer. It can make a crop more productive or more resistant to insects or insecticides.

There is opposition to transgenic foods by ecological and consumer groups who believe they are not safe for human health and may cause great environmental damage.



Diego Álvarez, Argentina



Artisanal gold digging, Javier Kaway Chirinos, Peru

The case of Argentina



Argentina has profited from the use of biotechnology in agriculture. It has significantly reduced the use of agrochemicals, increased exports and has the second largest area, after the United States, producing transgenetic products.

Argentina has authorised trade in four types of transgenetic crops: insect-resistant maize; maize resistant to insecticides; soya beans resistant to insecticides; and cotton that resists insects.

The new technology is marketed as the "technology of the future", but it has been adopted without taking the time needed to evaluate its risks and even without giving consumers a chance to express their opinions about it.

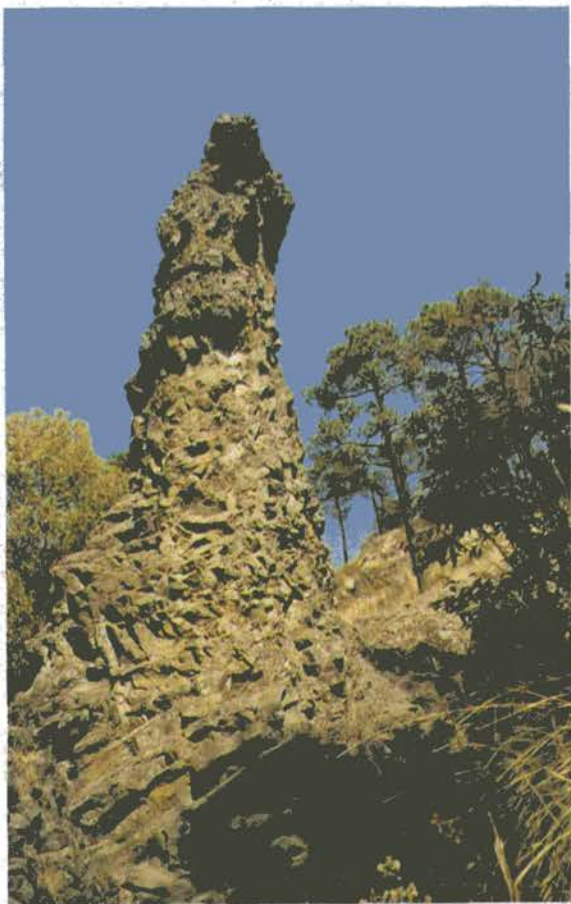
For the time being, Argentina has to adjust to the demands of its foreign markets, but it is important to point out that consumers have every right to know what they are eating.



Poema Mühlenberg, Brazil

If the rate of soil degradation continues in the region, our nations' wealth and productivity will be seriously harmed and basic food reserves, to say nothing of the safety of various generations, will be put at risk.

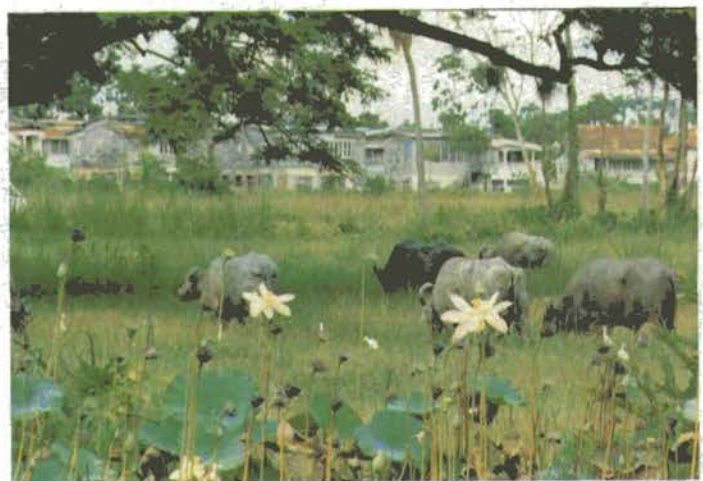
We must guarantee that our land produces enough food to satisfy the needs of the population, both present and future. What is also essential is to ensure its safety for human and environmental health by applying agricultural techniques that do not damage the environment. In addition, we must ensure efficient distribution of products to satisfy the basic needs of all the region's inhabitants.



Manuel Zavala, Mexico



Edgar Rodriguez



Anonymous, Guyana

2

YOUTH IN ACTION

successful projects



what youth think



get connected!



Introduction

Here we are again! Now that we know more about the state of the environment in the region, we want to know what you think, and we imagine you have a lot of ideas and suggestions to make. So we want to share with you the experience of other groups with the same idea: to save life on our planet. We shall talk about their activities and the work they have done to show you what people like you can do, to make you aware that we have the capacity to change the world.

We know that young people, both boys and girls, like to co-operate and participate and that they are dynamic and enterprising. The many organisations and groups already working can help you and your friends to start your own project.

We believe the most effective tools for change are education and action. All we need is for more people to continue to join the sustainable development effort.

The impetuosity and strength of youth can be used to set needed changes in motion. The best part is that we are not alone and it is most gratifying to learn about the great voluntary efforts being made by young men and women in the region. Thanks to the work of thousands of anonymous individuals, youth groups and organisations, we have begun to slow down environmental deterioration. Being young means we do not have to depend on a lot of money to start our projects —our great imagination is often enough!

We would like to join forces and motivate others to do the same. All we need are ideas, a touch of leadership and, above all, love for the environment.

Becoming a friend of the environment is not time-consuming: any effort, however small, helps to save the Earth. You too can be part for the changes that youth are promoting. So come and join the action!

In this chapter you will find ideas you can use to start projects in your community; remember that large projects have small beginnings. Have you ever heard that if you change yourself, you will change the world? Do it, and begin the daily challenge of preserving the environment and maintaining an ecological balance!



Marlene Ladoire, Argentina

HOW DO WE START?

There are three sections to this chapter, the first gives examples of successful projects started by young people in the region. Remember, grandiose actions and large projects are not needed to make positive changes; a little goes a very long way.

Take a good look at the following examples; many are simple, can be repeated at very little cost, are organised in schools and can make a great difference to the community. Think about the ones

you would like to introduce in your school and get in touch with the groups that interest you and share your experiences with them.

The second section is called "Get Connected!"; it introduces some of the region's youth organisations and gives general information about them so that you can join them. In the third section, "What youth think", we present personal experiences of young people concerning the environment.



Successful projects in the region

TO THE RESCUE OF AQUIFERS

We began our project in 1999, after our school taught us how science would be used to treat natural resources. The father of one of our companions was about to dig an artesian well near his house. Because of what we had been taught, we knew that was not the way to treat water sources. We set out to investigate in our region and found there were serious pollution problems with aquifers caused by animal and other organic material wastes, garbage and toxins from agriculture being among the most serious. Since then we have been searching for information about recovery and conservation techniques for water sources and we chose a very simple one called soil/cement.

First of all, we approached farmers and convinced them that, for their own sake, it is very important that they save as much water as possible. We started by clearing a space and digging a small well to locate the water source's origin and then applied the soil/cement technique by building a stone wall around it. When that was done, we disinfected the well with clean water. Finally, we sowed some plants around it to protect the well and make sure it was kept clean so that the water would be fit for drinking.

We helped to preserve more than eight water sources in our region as well as making field visits to tell people about the environment. These efforts went a long way to help improve the quality of life in the area.

As we had very little money to pay for bus fares, many of our visits were made on foot. All our material came from natural resources. We are very happy with the results and want to continue our activities to benefit the people now living in the community as well as future generations. What we did helped to stop environmental problems from getting worse, and it is something that you too can do.

Venga Ser Ciudadano del Colegio Estadual Environmental Group
Amâncio Moro Corbélia, Paraná, Brazil
sergarbin@hotmail.com



Brazil

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BUILDING A SOLAR VEHICLE

We are working on a fantastic group project for which we have to learn about science and technology: we're building a solar vehicle! Can you imagine that in the future we'll have cars that run on the sun's energy? The aim is to develop a motor car that does not use hydrocarbons and can carry both people and goods. The vehicle should have a range of about 70 km and an average speed of 50 km/h.

Solar vehicles are the simplest form of mechanical transport. The most basic version consists of photovoltaic cells, a charge regulator, a bank of batteries, an on/off switch and an electric motor. The idea is to try to take advantage of the sun's energy to convert it into electric energy by charging the batteries and making the motor run.

The vehicle's basic function is to carry two passengers over a fairly extensive area such as an industrial plant, a university campus, etc. At the same time, some accessories could be added to make it suitable to carry goods. The project was co-ordinated by pupils of the faculties of mechanical engineering, industrial design and electronics at the Pontificia Universidad Católica in Peru.



Solar vehicle, Carlos Hadzich, Peru

We hope the project will produce an efficient vehicle to cover medium distances and help to develop new non-contaminating transport technologies, as well as reducing air pollution. If you would like more information, check for a similar project at your education centre, or get in touch with us directly.

Pontificia Universidad Católica
Lima, Peru
garypucp@hotmail.com

THE ORGANIC VEGETABLE GARDEN OF SANTA CATALINA

There are many ways of using natural open spaces; deciding what to do with them requires some ingenuity. Our group has come up with a sustainable project that might even be profitable.

Our youth group "Grupo por una Santa Catalina limpia", in Montevideo, Uruguay, has planted an organic vegetable garden by taking advantage of a small unused empty space in town.

We filled it with earth provided by the Montevideo city authorities and, at the same time, we cleared the land and installed tanks to prepare organic residue fertiliser.

After writing many letters, distributing petitions and making other efforts, several lemon trees were donated that we planted in different parts of the garden; and we also started to grow lettuce, beets, carrots, French beans, zucchini, tomatoes, radishes and cabbage, among other vegetables. These were protected by cylinders made out of non-returnable plastic containers.

We gave seeds to members of the community and encouraged them to follow our example at home. This not only improved their nutrition, but also their quality of life. If the project continues to grow, it could even make money from the sale of products.

We can give advice and assistance to anyone interested in establishing organic vegetable gardens, both family and neighbourhood.

Grupo por una Santa Catalina limpia
Montevideo, Uruguay
guidai@internet.com.uy

WE RECYCLE EVERYTHING IN SIGHT

We love to recycle as much as we possibly can! Six years ago, enterprising young people concerned about the use and reuse of material got together at school and formed a group. What we want to do is make everyone aware —both at school and elsewhere— of the importance of recycling discarded paper, plastic, glass and aluminium.

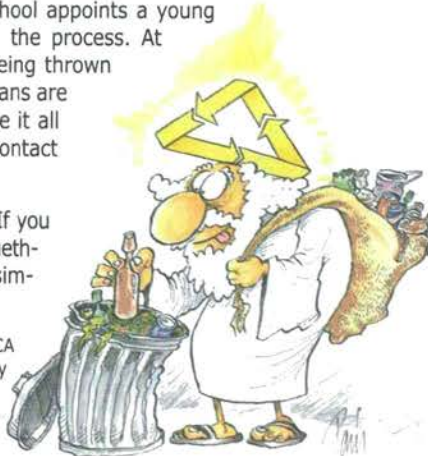
Although we started the project in our own school, it has been so successful that we have already created a model recycling programme so that other schools can follow our example. We also prepared a guide on recycling for teachers to use in their classes. We want people to become so used to recycling that it becomes automatic, that is, for students and the rest of the school community to do their own recycling once they are shown how.

Our programme is designed so that each school appoints a young official "recycler" responsible for overseeing the process. At the end of each day we all collect what is being thrown away; if it is paper, then we compress it; tin cans are compacted and bottles washed. We then take it all to be sold to a company we have been in contact with for some time.

Recycling is both interesting and sustainable. If you have the chance to do it at your school, get together with your friends and teachers and start a similar project.

Auto ECA
Paraguay
dburt@rieder.net.py

Carlos Estevan Paris, Colombia



Youth's ecological awareness



André Barata Silva and Nelson Ladniuk, Porto Alegre, Rio Grande do Sul, Brazil

We are now face to face with a general crisis of civilisation. Human beings have forgotten the significance of values so fundamental to coexistence as thinking before acting. This breaks their symbiotic relationship with the planet and indeed with their own kind, driven as they are by a capitalist and transnational system whose priorities are profit and exploitation that only accentuate the differences between rich and poor.

We believe that a new coexistence paradigm could help to improve the environment. We also believe that we young people are the principal agent for changing society and that is why we have set ourselves the task of finding out what the students at our university know about the ecology. We put questions to them and analysed their answers.

Our conclusion was that most students simply do not think about environmental questions and few of them have even a general idea about the problem. We believe that such ideas do not originate in schools but come from outside, which seems to mean we cannot count on schools to help make any immediate change.

It is easy to blame schools for a lack of environmental awareness and to think that not only is the available information superficial, but that it is being manipulated. However, one thing we must do is to re-think the cause-effect relationship.

WHAT YOU CAN DO FROM SCHOOL

Our secondary school is in the Liniers district of Buenos Aires. For our "Green times" project three of us, together with our geography teacher, organised a workshop on the environment in a neighbouring primary school.

We went to talk to the children about the environment to make them aware how important it is. More than 50 children gathered on the school patio and listened to what we had to say. A question and answer session followed when we showed them photos and told them of the different ways the neighbourhood was being polluted. We used material from the Business School 32 library that has suitable material on pollution written by students in Liniers and Mataderos.

We divided the students into work groups. The groups made posters showing their commitment to the environment and these were exhibited on the school patio, where they would be seen by everyone. Some of our activities involved using an "alphabet soup/discussion" mixture. We also handed out information leaflets and gave the students a token of their participation in the form of a butterfly made out of magazine paper about to be thrown away until pupils of Business School 32 decided to make good use of it and give each child a nice souvenir.

It was a very enriching experience. We managed to pass on the necessary information and saw that everyone took their responsibility seriously. In addition, the seventh grade teachers arranged for their pupils to engage in activities and do research on problems in the city of Buenos Aires. Projects like this could be started in many other places, so why not ask your school authorities to help you to arrange something similar?

Escuela Dr. José León Suárez
Buenos Aires, Argentina
leam@radar.com.ar and grondon1@infovia.com.ar

PAPER MICRO-BUSINESSES

We are members of the Tayrona Corporation Group programme "Youth for the environment, life and peace" and we have organised training workshops in marginalised neighbourhoods in the south of Bogota city. The objective is to unite and integrate the community to get the maximum benefit from natural resources by reusing and recycling and then using them to make paper handicrafts.

So our project was to organise micro-businesses to sell items made from recycled material which meant we had to educate and train the young people involved.

We started by holding awareness sessions in schools, universities and with our own families to make them understand that the project was really important. Little by little, people began to take an active part by donating paper or helping with the training workshops for children, teenagers and women heads of families on how to recycle paper and make the handicraft products.

We then organised paper-collecting campaigns and recruited a lot of volunteers. This led to a very happy association with young adults: they provided the know-how and we provided the enthusiasm.

Once we learnt to make the items, we began to sell them to our neighbours and created a market for them. It is incredible to think that, though we started off with a very small investment, we now have youngsters running micro-businesses that make recycled paper articles.

The project has been so successful because it awakened a social awareness about the importance of reusing and recycling materials such as paper and it provided jobs for women heads of families. It also united the community around the project and helped to change consumer habits because children, young adults and heads of families who know about it continue to buy the handmade diaries and other items made from recycled paper. As it is very simple to do, you can suggest the same type of project to your community. If you would like to know more, by all means get in touch with us.

Corporación Grupo Tayrona
Colombia
grupotayrona@hotmail.com



Argentina



Argentina



Argentina

LET'S SAVE KINGSTON'S PORT

Ours is a coalition founded in 1997 and made up of groups of environmentalists and students in Jamaica. Our objective is to promote the care and protection of the environment in our ports by disseminating information so that people know what has to be done.

Jamaica's port of Kingston is in very poor condition, it has become filthy and is on the point of being destroyed. We decided, therefore, to do something to try to remedy the damage, so various groups and students in the network developed a strategy we call "Let's save Kingston's port".

One of the first things we did was to organise a peaceful protest in a very public place in Kingston to draw attention to how essential it is to care for the port. Then we lit candles and sang hymns because we wanted our message to the community to be a hopeful one. Best of all was that we caught people's attention and those present even included government representatives and members of the media.

Afterwards, a group from our organisation was invited to present a petition to our authorities. We pleaded with them to make it possible once again to swim in Kingston Bay just as our fathers had done. They promised to draw up a plan of action to clean the port. Our group will follow up on this promise and we shall not rest until we are sure that, before much time has passed, the authorities have kept their promise.

Guardians of the Port of Kingston
Student Environment Network
Kingston, Jamaica
senclubjamaica@yahoo.com

TAKING ADVANTAGE OF COMMUNICATIONS

At the end of 1999 a group of more than 20 young people from several countries including Mexico, Venezuela and Cuba got together and created this group. Our first proposal was to facilitate communication between university students in the area to show our concern about environmental deterioration, encourage exchange of scientific-technical information and do research, prepare projects and organise related events.

Time will tell how this regional integration proposal will turn out, but there are now more than 200 young people throughout Latin America and the Caribbean in the network, as well as dozens of expert advisers and members of society in general.

We deal with such diverse subjects as economics and environmental management, biodiversity, politics, environmental rights, sustainable agriculture and environmental education.

One of our most important projects is publishing the ECOTEMAS newsletter, where youth can express their concerns and make suggestions about problems of the environment, and promote their meetings. This material is distributed over the Internet and thanks to REIMA members' efforts a number of copies are printed and put at the disposal, not only of the youngsters themselves, but also of authorities and the public in general. We hope that you too will join our network. All you have to do is get in touch with us at our e-mail address or visit our web site.

Red Estudiantil Iberoamericana de Medio Ambiente
Havana, Cuba
reima_cc@yahoo.com



Delegates to the International Student Environmental Workshop, Havana, Cuba, 1999

The situation in Paraguay



Aida González, Alexis Díaz,
Pedro Florentín, Luis Hermosa, Noemí
Barrios, Karina Meza, Lisa Delmás
Paraguay

Our country has large deforested areas and many contaminants but, worst of all, very little value is placed on our abundant resources.

We know that deforestation is a consequence of the indiscriminate felling of trees by those with economic power so that they can obtain wood and other products.

The "powerful" have factories, large industries, earn millions but pay their workers hardly anything and, as if that were not enough, destroy natural resources like rivers, streams and woods.

What are governments doing about it? The answer is simple: the powerful persuade governments to ignore the damage they do to forests and the water pollution they cause.

And what about laws? Besides resources, many values such as honesty, confidence, respect, etc., have been lost in Paraguay. But there still remains something of the abundance we used to have, and it is our duty to rescue it.

BECOME A REPORTER

There is a newspaper in Barbados called *The Monitor*, published three times a year by the National Council for Science and Technology (NCST). The newspaper spotlights research on the environment and projects prepared by the island's secondary school students. Contributions include poems, photographs, essays and research papers. We invite Caribbean students to send contributions to *The Monitor* so that we can discuss projects on agriculture, biochemical processes, engineering and technological information, environmental science, health and nutrition. All interested students who wish to contribute to the newspaper and tell us of their experiences may do so by writing to our e-mail address.

Barbados
Ncstbar@sunbeach.net

STUDENTS MOBILISE COMMUNITY TO SAVE THE BLUE LAKE

Even though we are young, we have already mobilised an entire community to clean and recover our most important lake. The very famous Blue Lake is close to our school and, long ago, it used to be a beautiful place for the local population's recreation.

Until a short time ago the lake was very polluted with untreated sewage discharged into it from nearby and newly built houses. So, to do something about the problem, and with our school's backing, a group of teenagers between 13 and 17 from the Padre Claudio Morelli State College launched an awareness campaign using posters and leaflets to ask people to help recover the lake.

The theme of our publicity campaign was: "Let's Save the Blue Lake". We made our message known at church services and meetings and asked priests to promote our idea in their sermons, which they did in several local churches. We also persuaded reporters to publish articles in neighbourhood, local and school newspapers. Finally we collected signatures in support of our proposal and these were handed to the mayor.

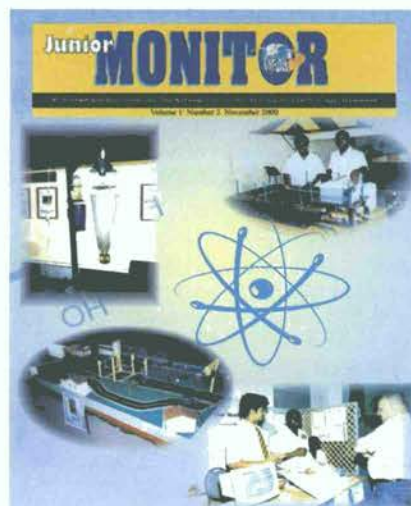
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The results were good and we organised workshops and environmental awareness courses as well as devising strategies to teach people to always keep the lake clean. We mobilised the whole community to join in the cleaning efforts and it was surprising to see how many people, from the youngest to the oldest, joined in. Our success, thanks to the support of all sectors, led to the Blue Lake being declared a municipal park.

We want to tell you that this project started off with an idea in the classroom and all we asked for was the help of our teachers and parents to get it going. It is not hard to do so long as you work as a team; we did not need much in the way of resources because a lot of the material was either given to the school or we collected it.

You can do the same. If there is an endangered zone in your community, organise a brigade in your class, ask for the support and get the help of your friends and families.

Padre Claudio Morelli State College
Umbará District, Parana, Brazil
veraroveridelima@bol.com.br
www.morelli.edu.catar.com.br



Barbados



a) What the Blue Lake used to look like



b) The Blue Lake after it was cleaned

WORKING WITH WORMS

It is surprising how much garbage there is in our neighbourhood. But look what we did: our group put into practice an alternative form of decomposition by using earthworms. After carrying out a number of studies and benefiting from our neighbours' different experiences, we saw earthworms as a solution to the garbage problem. We do not have regular collections and garbage is left in the open air where it attracts flies and becomes a source of infection. Besides this very serious problem, the soil has become arid from the indiscriminate use of synthetic fertilisers.

We set out to search for and collect lots of worms. We started our project with two colonies of 100,000 worms each; we knew that by the end of six months this number would have tripled. The first thing we did was dig a furrow in the soil into which we dumped as much garbage as possible. Then we threw in the worms and waited to see what effect they would have on the garbage. Decomposition started and the process got rid of everything.

Worm culture is beneficial to public health because it minimises the sources of infections, stimulates regeneration of uncultivated land and improves agricultural production. Worm culture is also useful when it comes to food for human consumption because, by using natural products, pests can be controlled and there is less fear of cancerous agents being consumed.

As this is a process that wins ready acceptance, we were able to get our neighbours involved through arranging training courses. In short, the experience of worm culture shows us how to look at Nature in another way and to be thankful for its benefits, of which we should take advantage.

Liberty Youth Group
Huariaca Pasco District, Peru
pasco@coopop.gob.pe

IMPROVING PEOPLE'S QUALITY OF LIFE

With the motto "Improving people's quality of life" first year students at the Dante Alighieri School in Santa Fe, Argentina, started a movement from a wonderful idea thought up by a group of young people concerned about their environment and who wanted to do something to improve it.

Our objective is to make all those of our same age aware of the continuous degradation our environment is suffering so that we can act as agents for change and make our living conditions better. The best way to do this is to make information available.

To reach our objective, in 1999 we organised the First Natural Science Congress where 250 youngsters attended talks on pollution and endangered species. It was such a success that we decided to accept the challenge of organising a second Congress. Why did we think of it as a challenge? Because we increased both its length and the number of participants (more than 400), and changed the closed system of talks to an open system of workshops and questions and answers.

Our group likes challenges so we decided to repeat the experience in other places, setting up regional branches and even a national organisation.

If you would like to form a new branch of the Environment Congress, please get in touch with us through our e-mail address.

Escuela Dante Alighieri
Santa Fe, Argentina
emaildejuanjo@interlap.com.ar



Youth and perspectives on the environment



Brigadas Técnicas Juveniles, Cuba

There is no doubt it is up to our generation to assume the historic responsibility of taking immediate action to achieve an essential balance between development and the environment. It is us, the younger generation, who must provide an impetus for change and work to overcome the new challenges we face, as well as supporting and promoting progressive ideas that will really lead us to a sustainable world.

We believe it is up to us to demand of the international community—and especially the most industrialised countries—the most sacred of our rights, the right to life and one that is not respected in most developing countries. A stop must be put to practices that destroy the environment, a fairer distribution of wealth insured, solutions proposed and investments made in sustainable development programmes.

When there is a real political will, a genuine concern about the fate of our Earth, it is easy to put individualism and self-sufficiency to one side; we can all stop thinking about "me" and the present and start thinking about "us" and the future.

SCHOOL ENVIRONMENT MANAGEMENT AND PROTECTION COMMISSION

"The children went from house to house knocking on doors and telling the people how important it is to recycle solid waste and to use less water and electricity."

With this project we formed the School Environment Management and Protection Commission, an organisation that brings together more than a hundred children and adolescents in the Sancti Spiritu province.

Our project was mentioned in the local radio station programme, the first time a local communications medium had broadcast information on the environment. The children themselves wrote the script and conducted the programme which they called "Blue Planet".

We have taken our message to well attended events at cultural and recreational centres and persuaded the people present to join in our activities on recycling garbage, planting trees or finding out more about the zone's ecology.

To do all this, even though we had very few resources, we prepared and distributed 10,000 copies of printed material including flyers, illustrated leaflets and educational games.

The project has now been spread throughout the whole city of Havana by members of the Inter-American Student Environment Network and the basis is being laid to apply it in countries like Mexico (in the state of Jalisco) as part of the REIMA international collaboration projects.

If you would like more information on the project, apply it in your community or school or receive the material, please get in touch with us; we are at your entire disposal.

Facultad de Geografía. Universidad de La Habana, Cuba
yordanis@geo.uh.cu



Cuba

LET'S CLEAN THE BEACHES!

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We don't want our beaches to get any dirtier! Our organisation campaigns to save the environment by spreading the word and making enquiries to find out just how aware are the people who most often use the beaches in Santa province.

Every day we tell tourists and the general public of the importance of protecting and conserving marine ecosystems. We also seek to measure the degree of environmental awareness and determine the damage pollution might do to those ecosystems.

We constantly work to teach tourists not to leave trash on our beaches. Our best tools are environmental awareness courses, surveys and the work on cleaning beaches done by members of juvenile social organisations and other institutions. And we are now inviting others to join us.

Santa, Peru
osb_nuevo_milenio@yahoo.es

OSB Juvenil Nuevo Milenio



Cuba



Young people from different regional organisations in a beach cleaning operation



RESPONSIBLE CONSUMPTION

This project was developed by the Saywite-PUCP Group, an association of the Pontificia Universidad Católica de Peru dedicated to conserving the environment. A year ago, UNEP asked us to do a study on youth consumption habits: we had to find out just how "consumerist" we had become and, especially, what it was that we consumed.

With a very small budget, we began by developing a strategy to organise workshops for university students where they were told about the impact their consumerism had on the environment, how they could exercise their right to be informed about the products they consumed and what their ingredients were, and how to recycle them.

First of all we made a survey of different environmental organisations and schools to get a sample of what young Peruvians consume; this showed us which products were in greatest demand. All those who helped with the survey then attended an information mini-workshop.

Based on the results of our enquiry, we organised several workshops for representatives of official and non-governmental institutions concerned with consumer rights. We distributed leaflets and posters on the impact of mass consumption products and presented recommendations and ideas to lessen the negative effects of their excessive use. To print the invitations, leaflets and some of the posters we used paper taken from the recycled garbage deposits that are placed throughout the university campus. Besides print, we also used radio to publicise our campaign.

The results of the survey were added to those obtained in other countries. A manual was then prepared, and edited by UNEP, on youth consumer trends and it became an educational tool to teach young people to be less concerned with consumption and become more environmentally friendly.

Campaña de Consumo Responsable de Juventud
Grupo Saywite-PUCP
Lima, Peru
saywite@pucp.edu.pe

RECYCLE AND HELP THE NEEDY

There are many very poor and hungry children in a city as huge as Sao Paulo. A group of 20 of us got together and decided to help them by doing something very simple: we recycled garbage and sold it to help buy school supplies to try to keep them from dropping out.

In less than a month we organised a collection and separation system for the garbage in our own and other nearby schools; we then exchanged the recycled material for school supplies and books.

Each of the group's 20 members is responsible for a specific area of neighbouring schools. Collecting and selection in each of these areas is done every day, at a place decided on beforehand, and the garbage is put into a special container. At the end of the week, each person designated as being responsible helps the school or community volunteers collect, separate —and then make a second selection— the garbage according to five categories: paper, cardboard, plastic (soft and hard), glass and metal.

Besides helping to buy school materials, we also try to work with the children and talk to them about the environment. Through this project we hope to encourage many of them to continue studying and reduce the very high number of school dropouts in the areas surrounding Sao Paulo.

Sao Paulo, Brazil
reciclao2000_bra@hotmail.com

Poema Mühlenberg, Brazil

Relation between cultural diversity and biodiversity

Ayelén Amigo de Cartagena, Argentina

Each of our planet's cultures is totally original and distinguished from all the others and we should appreciate this diversity and learn from what it can teach us. There are some cultures with lifestyles that are closer to Nature and they look upon themselves as being part of the natural environment.

Other cultures, that do not have this close contact, think of Nature and its resources simply as tools. As there can never be any justification to destroy one culture only to replace it by another, we ought to try to learn how to respect and value each of the Earth's many different cultures. What sense does it make to discriminate against people just because they are different from us?

Maybe the only way to preserve Nature's balance would be to find the perfect equilibrium between the different cultures. We must respect Nature and pay honour to life but to do that we must be aware of what is happening and always be mindful not only of the present, but also of the future. And here the best solution is education.

It is crucial that all of us —from the youngest child to the oldest grandparent— understand the importance of protecting Nature and be prepared to do so. Together, so long as we have a common objective, we cannot fail. If we are to coexist and survive, we must keep ourselves informed and aware that the common good must be humanity's present and future objective.



Get Connected!

The following is a list of some organisations that promote youth activities in the region.

THE IWOKRAMA INSTITUTE

Georgetown, Guyana
iwokrama@solutions2000.net

This organisation promotes the conservation and sustainable use of tropical forests to make them profitable while at the same time protecting their ecology and making them socially acceptable to the people of Guyana and the rest of the world. To do so it uses research and entertainment, develops technologies and disseminates information.

Iwokrama has a youth forest rangers programme whose members educate people on how to care for the environment. It also works with indigenous communities living close to the forest. Part of its work includes producing bilingual books, applying strategies to prevent the spread of malaria and to care for wildlife.

The research concentrates on developing a long-term strategy to explore forests to ensure their inhabitants' survival. Iwokrama is now carrying out a study on biodiversity and youth.

GUATINÍ GROUP

Biology School
Universidad de La Habana, Cuba
abarro@bio.uh.cu

Guatíní is the name given by the inhabitants of the island to the tocororo, the country's national bird and with which we, who are students of the Faculty of Biology working to conserve the biodiversity in our country and the region, identify.

One of the main studies we did was on biodiversity in natural areas near Havana. Our objective is to publicise inventories of flora and fauna, as well as to describe new species. In addition, we want to present proposals for protected areas because of the wealth of species they harbour. We are also working on environmental education projects with primary school children.

YOUTHFUL HANDS FOR THE WORLD GROUP

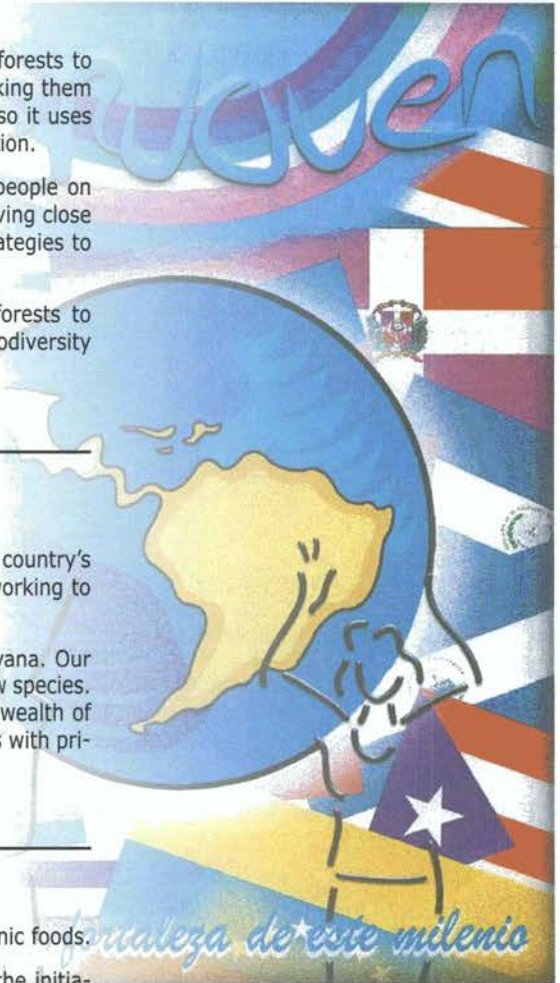
Cordoba, Argentina
admdvs@lasvarinet.com.ar

Our group has a project to publicise the benefits of producing and eating organic foods.

With the agreement of vegetable sellers —who showed particular interest in the initiative— information posters about organic foods were placed in shops and restaurants.

The products come from an experimental vegetable garden tended by student volunteers who also promote them with campaigns in the zone's communications media. They were helped by Social Science students who have a magazine and a school radio station.

Information campaigns are very important, they cost very little and the benefits considerable.



Anonymous, Paraguay

BIOS IGUANA, A. C.

Colima, Mexico
cuitla@volcan.ucol.mx

We are in Colima, a Mexican state on the Pacific coast. Our group is called Bios Iguana, A. C. and we are an organisation that works to protect the environment, as well as in defence of natural and cultural resources.

We are young volunteers who promote community attitudes of respect for and care of wildlife flora and fauna species in danger of extinction.

The following are some of our most important activities:



Mónica Navarro, Mexico

- Forming support groups to help save marine turtles that arrive at the Colima coasts.
- Installing green iguana and black iguana breeding grounds to help repopulate a zone where they were being overexploited.
- Organising the annual iguana festival, a cultural event centred on conserving biodiversity which combines concern for damage to the environment and a number of social, economic, scientific and cultural activities.
- Installing the Iguana Museum in the Biodiversity Cultural Centre, to show how endangered the species is and stress how vital it is to save it.
- Operating the environmental information centre for sustainable development which includes services on how to improve the environment, advice on wildlife reproduction, workshops on environmental education and a biodiversity video library.

If you live near Colima get in touch with us, join us and start an awareness campaign among your friends.

YOUTH GROUP FOR THE UN IN MEXICO

guadalupeyessenia@correoweb.com

Our Youth Group organises talks and lectures in secondary and high schools where we invite young people to care for the environment by forming work groups or joining those that already exist.

We are capable of achieving many objectives; youth is not the future, the future is the here and now, so that our aim is to go out into the streets, schools and shopping malls to invite other young people to protect the environment. A reforestation campaign could be organised that would include a picnic with music as well as food. Invitations could be sent to parties where the price of entry would be a tin can or a cardboard box; another suggestion is to organise courses on how to make things made from discarded material (plastic containers, cardboard, etc.) and draw cartoons calling attention to something relevant with the ecology...There are a great many things that can be done.



Anonymous

A change in my life

Isaac Barnett
Penomé, Coclé, Panama



Hi! Let me be frank: up to now I have never belonged to any ecological group, but a short while ago I joined Panamá Verde.

It is not easy for me to admit, but this summer camp was one of the most important experiences of my life because it gave me the chance to see my country's great diversity of flora and fauna. I also saw how well the different groups attending got along together and learned how important the environment is to us because we all owe so much to nature.

The truth is that there are many youngsters like me who never give the environment a second thought, but now it is up to me to do my bit to make them interested and ensure that their daily activities cause it no harm.

HABITAT ECOLOGICAL FRONT

Universidad Agraria de La Habana, Cuba
rasiel@igate.isch.edu.cu

Our group is made up of students at the Agrarian University of Havana, Cuba. We have developed an environmental culture in this important Cuban university and changed the way of thinking of the agricultural units' producers and administrators. To do this we arrange training workshops, talks, lectures and events during pre-professional field work and at round tables to which we invite farm workers and specialists as well as students.

Habitat members' objective is to recover and increase soil productivity by introducing sustainable agriculture. You can get in touch with us at the Inter-American Environmental Student Network (REIMA).



Teamwork

ECOLOGICAL ACTION YOUTH GROUP

Ecuador
chuchaki@hoy.net

We are an organisation whose concern is social ecology; we defend the right to live in a healthy environment and help communities which face socio-environmental conflicts. Our political weapon is opposition (resistance) to public and private activities and projects that harm the sustainability of indigenous communities, whether rural or urban.

We develop campaigns to decontaminate, reduce consumerism and educate people about the environment. In 1996 we organised the Juvenile Ecological Monitors Programme and, in 1997, the How Youth Think of the Environment Programme. We have co-ordinated actions with other organisations such as the Ecuadorian Rights and Ecology Commission, Peace and Justice Service and the Ecuadorian Assembly for Juvenile Rights.

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PANAMÁ VERDE

Panama
panamaverde@yahoo.com

Panamá Verde is a national programme that works with youth groups all over the country. We prepare projects to conserve national parks, wildlife refuges and protected areas, and work in communities where young people predominate.

By working in the parks we hope that young people will gain more self-respect, acquire habits and abilities to work as teams and develop a respectful attitude towards the environment; we also talk to them on different aspects of conservation because we want them, when they become adults, to continue to be interested.

The objective of our group is to educate young Panamanians to be better citizens and become individuals with leadership qualities that will help them to face the social and environmental problems they encounter in their communities.



Working with youth groups

EXCHANGE AND CLEAN

Monitores Ambientales
Maricá, Brasil
dcarrara@alternex.com.br

Maricá is a beautiful town in the lake region 50 km from Rio de Janeiro where one of the main problems is garbage. We are a group of young people interested in conserving the environment and committed to our town, so we decided to promote a project to tackle the problem. We started by making suggestions, contacting people and looking for sources of finance. We were able to join with chambers of commerce, business programmes and recycling companies to start an project (Exchange and Clean) to exchange

recycled garbage for food. A leaflet was distributed to let people know about the different kinds of garbage that could be exchanged for food.

THE UNESCO CLUB

Westwood High School
Jamaica
Contact: Stewart Town P. O. Trelawny, Jamaica, West Indies

The UNESCO Club disseminates information on what its members are doing to preserve the environment and what they can do in their own school communities. At Westwood school, Jamaica, we promote activities that include students in environmental programmes and work days are set aside when students clean the school.

Each group is responsible for cleaning parcels of land belonging to the school. At the end of the week, the parts cleaned are checked and marks given. This becomes a friendly competition among the school groups, keeps the school clean and develops a sense of pride and wellbeing in the students who help keep their surroundings clean.

REDUCTION AND RECYCLING COMMITTEE (CORRE)

Nuevo Leon, Mexico
jvp@compaq.net

CORRE consists of a group of students in the Faculty of Biological Science at the University of Nuevo Leon who want to help solve the problem of the improper disposal of solid waste.

One of the project's objectives is to place receptacles where paper, aluminium and plastic discarded by the Faculty can be deposited, and then recycling them. Both within the Faculty and outside, we provide information on how important it is to reuse and recycle garbage and we talk of the impact our excessive consumerism has on the environment. We have also held environmental education workshops in primary and secondary schools.

Our most successful experiences have been the cleanliness campaigns in parks and natural areas polluted by garbage left by visitors.

As shown by enquiries we made in our Faculty, the results are very encouraging because 96% of students are ready to co-operate with the recycling programme, and 67% of them would do so because they are worried about the environment. Most of them have encouraged us to keep up the good work.

We are in touch with people and companies who will buy the paper, plastic and aluminium we collect in the Faculty for recycling.

BRIGADA ECOLÓGICA DE CAMARAGIBE

PERNAMBUCO, BRAZIL
brigada_eco@hotmail.com

We are a group of teenagers between 14 and 18 linked to the Social Action department of the Camaragibe Municipality which specialises in socio-environmental questions and undertakes activities in different localities.

Among our activities is donating native plants in danger of extinction to different communities in the city; afterwards, we help them to look after the plants. In downtown streets and the central market we talk to people about the problems they cause by carelessly dumping garbage and explain how to take advantage of it.

We are now preparing texts and illustrations for a book about socio-environmental themes which will be used

A challenge to young professionals

Alejandro Jiménez Cabal
Mexico



I believe it is time we changed our way of thinking and that this change should come from the new professionals, whatever their specialisation. All of them—and especially young university and technological school students—make decisions every day that have some influence on society and the environment. Educational institutions must give us the tools that will allow us to make suggestions to our professors, and to shareholders or investors, offering alternative development options. That is the only way we can bring about a change, for they are the decision-makers who determine society's future.

With more research and an educational approach in this field, universities can become agents for change and decision-makers (doctors, administrators, economists, architects, lawyers, etc.) will no longer have an excuse for not taking into account the consequences their actions have on the environment.

Once we graduate and enter the workforce where projects are planned and decisions made, we shall have the know-how and enough tools to defend our convictions. We shall also be able to present options where we can all be on the winning side and that will not have negative cost-benefit effects. Society, the environment and investors will thank us for it.



Grupo CORRE, Mexico

in schools in the city of Camaragibe. It is meant to make children aware of how to care for the environment, both urban and natural.

CLUB DE JÓVENES AMBIENTALISTAS

Managua, Nicaragua
cluja@netport.com.ni

Our association's mission is to promote action by teenagers and young people between 12 and 30 to take some of the responsibility for solving their localities socio-environmental problems. We are also interested in spreading new ideas concerning sustainable development.

Our great achievement is that every day we become stronger; our efforts are more visible and taken into account when decisions are being made.

Many young people have joined the project and we now have 3,000 members in seven branches throughout the country. We have signed local agreements with candidates for mayor and have begun to co-ordinate joint activities which we soon hope to put into practice. We have made a name for ourselves in national youth and environment spheres and little by little we are beginning to be known in other countries.



Nicaragua



Nicaragua

CORPORACIÓN GRUPO TAYRONA

Colombia
grupotayrona@hotmail.com

One of our organisation's principal lines of action is work with members of youth programmes concerned with the environment, life and peace. The idea is that they become strategic actors in environmental and social processes.

The Latin American and Caribbean Youth for the Environment, Life and Peace Network is one of our projects. This network keeps in touch with young people, youth and environmental organisations and government offices concerned with youth, the environment and education in Latin America and the Caribbean.

We also have a volunteer system that encourages them to adopt values such as social responsibility, solidarity and teamwork through environmental youth service. The volunteers promote the productive use of spare time and channels the youngsters' energy towards solving environmental problems.

We have a training school to instruct them on how to become environmental leaders. They will be able to multiply their efforts in their own regions by getting more people to take part in local social processes and in sustainable development projects. If you would like to be part of this corporation or receive more information, do not hesitate to write to us.



Grupo Tayrona, Colombia

JUVENTUD QUE SE MUEVE

Asuncion, Paraguay
jqmsilva@telesurf.com.py

"Yesterday I was dreaming. There were thousands of young people and we all went out into the streets to clean the city. We not only cleaned Asuncion; after we did so we found we had all been given new and clean hearts."

Juventud que se mueve is a movement that hopes to bring about a cultural change and encourage the population to take steps that will have long-term as well as immediate effects.



Grupo Tayrona, Colombia

In the "A clean Asuncion" programme, young people between 12 and 30 got together to clean Paraguay's capital city. It was a five-stage strategy: "Youth on the move to clean Paraguay", "Youth on the move to put order in Paraguay", "Youth on the move to plant in Paraguay", "Youth on the move for a more beautiful Paraguay", "Youth on the move to accept responsibility for Paraguay".

Juventud que se mueve is an example we could all follow to make changes; it is a long-term vision we want to share with you. Come and join us!

GUYBERNET YOUTH PLATFORM

Georgetown, Guyana
gybnet@networksgy.com
<http://www.sdn.org.gy/guybnet>

Guybnet is a non-profit global information centre. Its objectives are to identify the three most important subjects for Guyana's youth; to ask young people for their ideas on how to help solve their own problems and those of the population in general; and to publish a report based on their findings. The report will be presented to leaders of Guyana's political parties, to civil organisations and international agencies with offices in the country.

RED AMBIENTAL JUVENIL DE MÉXICO (RAJ)

Mexico
raj@redambiental.zzn.com
<http://www.raj.org.mx>

We are a group of young Mexicans who have set up a network to help with environmental projects established by institutions and organisations, or on our own initiative. We are concerned about how the environment is deteriorating and we do whatever we can to stop the process through conservation, education about the environment, research, etc. We want to reduce the damage by adopting the sustainability philosophy. As a network, the main purpose is to create links between our own and other organisations, exchange work experiences and promote youth participation on the environment. We want to influence environmental decision-making by becoming well prepared academically and presenting worthwhile projects. We have already held four national forums and we are constantly organising workshops and training programmes. Visit us at our Internet page: www.raj.org.mx

YOUTH SUSTAINABILITY TALKS: PERUVIAN ENVIRONMENTAL AUTHORITY

Asociación para el Desarrollo Sostenible (ADEESE)
adeese@terra.com.pe

Youth Talks organises lectures for young people, given by institutions and public officials working in ministries, institutes and municipalities (all in the public sector). These events explain the difficulties of environmental management development in Peru, as well as the achievements.

The project seeks to find a means for dialogue that will give young people information and get them to question those responsible for public environmental policies. The authorities can then get a first-hand account of the concerns and opinion of the country's youth. These contributions can be the basis of a permanent exchange of ideas between youth organisations that work on subjects related to sustainable development.

These talks will first take place in Lima, but we hope to share the experience with other cities in Peru.

GRUPO ECOLÓGICO ARTÍSTICO EcoARTE

Brazil
marconi@amazon.com.br

The ecological-artistic group EcoArte was founded in the Brazilian state of *Pará* when several groups presented an exhibition of art about the environment of Amazonia and we became aware that young people could best express their concern about preserving the life of that region through the use of art.

Our group wants to warn everybody that the wellbeing and quality of life of individuals and communities depend on preserving the best possible conditions on the planet. Through the use of art (pictorial or written), youngsters describe their communities and their work is displayed by a travelling exhibition that takes their message to people everywhere it goes.

Environmental Education

GEO Youth Team,
Medellin University,
Colombia



We truly believe that environmental education is a cultural leap and the real solution to problems that cannot be solved simply by establishing and applying laws. However effective legislation might be, it can only result in sustainable development if people are willing to change their attitudes.

If people do change their way of thinking, an environmental awareness may be transmitted to all concerned so that they adopt a protective attitude towards the environment. The success of actions taken in this respect is seen when they are repeated in different parts of the region, when all the young readers begin to get involved and seek information on how to start their own projects.



Environmental Network, Mexico



Grupo EcoArte

COLEGIO DE ESTUDIOS CIENTÍFICOS Y TECNOLÓGICOS DEL ESTADO DE MICHOACÁN (CECYTEM)

Environmental Education Programme
Mexico
norfc@hotmail.com

Our college is a medium-higher education institute that works with young people on environmental education. We organise workshops and lectures on recycling, building and managing composts, preparing videos on environmental themes and making things from discarded garbage. Together, teachers and students organise talks and awareness workshops in our state's very poor communities. We also hold a state ecological forum, go on international camping trips, we have a state network of environmental groups and we manage the Globe Programme.

ECOSAMA POR UNA SOCIEDAD MEJOR

Faculty of Medical Sciences
Sancti Spiritus, Cuba
mayea@escambray.ssp.sld.cu

The principal objective of the Ecology, Health and Environmental Group (ECOSAMA) is to promote an environmental culture, that is to say, to work in order to bring about a change in society's values, ideas, habits and attitudes with respect to the use of natural resources. The group's members are not only students of the Faculty of Medicine, over time colleagues and friends from other universities and environmental groups have joined us.

We have worked on setting up environmental groups in primary schools and on developing research on health and the environment. One of our activities is to design "Ecological centres" with the help of the environment unit in this region and other organisations. Centres without that designation are given special attention by members of the group who train their personnel so that they can join the movement and improve living conditions wherever they are.

We also work to convert small illegal garbage dumps into spaces that can be used by the community. After cleaning up the areas, the children reforest the spaces with the help of the community which then becomes responsible for maintaining the new "ecological park". In addition, we have helped to save energy thanks to talks where we explain the harm done to the environment and the economy by consuming too much energy.

RED NACIONAL DE ECOCLUBES

Chile
ecoclubes@latinmail.com

We want to share with you what we are most proud of: that our network represents 70 groups of children and youth throughout Chile. In addition, we develop and facilitate different local, regional and national activities. One of the most important is that we train ecoclub monitors; this provides an opportunity to exchange experiences where we can talk of the work different juvenile organisations are doing in their communities.

The network motivates youngsters to establish ecoclubs in their sectors and we encourage them to be confident of their own capacity as we are convinced they can become active leaders in building sustainable communities.

We also held the "The national network of ecoclubs foundation meeting" where we set up a national network of juvenile and children's organisations designed to improve local environmental conditions and the quality of life in the communities where the clubs operate.

If you are interested in becoming part of an ecoclub, write to us.



Introduction

As the twenty-first century begins one of the greatest challenges we face is to get the subject of the environment onto society's political and economic agendas.

The many environmental problems which, as we all know, affect every region of the world, are the result of a long gestation process. Throughout history and in all economic systems, human beings have used, neglected and abused the environment, and this abuse is even more evident in the modern world.

Although the Latin America and Caribbean region has many resources it also has a high poverty index. Millions of people with unsatisfied basic needs aspire to improve their quality of life, but their governments take very little part in international development.

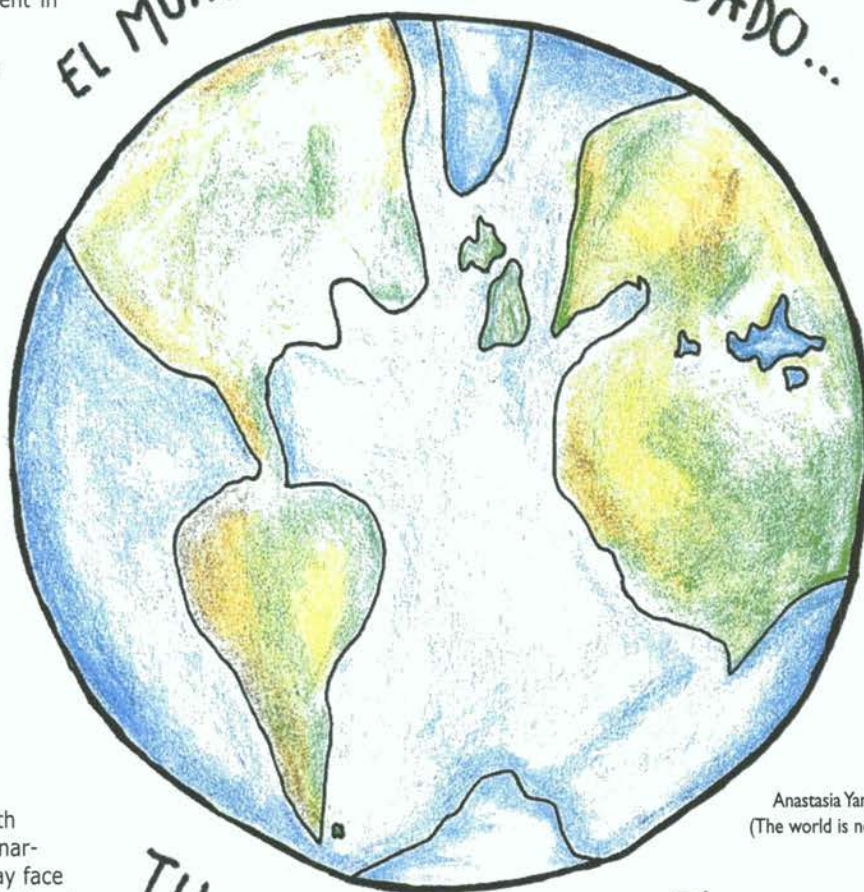
More and more young people like us are becoming concerned about the problem and we are doing all we can to defend the environment. If we are to take the necessary action, it is important that we develop an environmental awareness, unify our forces and recognise that we must take responsibility for the environmental and social problems caused by our attitudes and lifestyles.

In this chapter we want to set forth our view of the future in three scenarios, any one of which humanity may face within 25 years: if we follow present trends, a pessimistic outlook and an optimistic outlook.

The first scenario shows what will happen in our region if estimates based on present trends are correct. The pessimistic scenario shows us what will happen in the region if development does not take account of environmental and social questions. Finally, the optimistic scenario tries to show that we can achieve sustainable development if we never lose sight of how essential it is to protect the environment and reverse the deterioration now taking place.

Within a few years one of these three scenarios will be our reality. It is up to us to decide now which one we want.

EL MUNDO NO ESTA DIBUJADO...



Anastasia Yamila, Argentina
(The world is not a drawing..)

TU FUTURO TAMPOCO.



Anonymous, Cuba

Anónimo

Carlos Haczich, Peru

The region in 2025

Present trends scenario

Governments and societies all over the world will not have taken steps to change our present lifestyles so that in 2025, the economy, politics and society will still be following present trends.

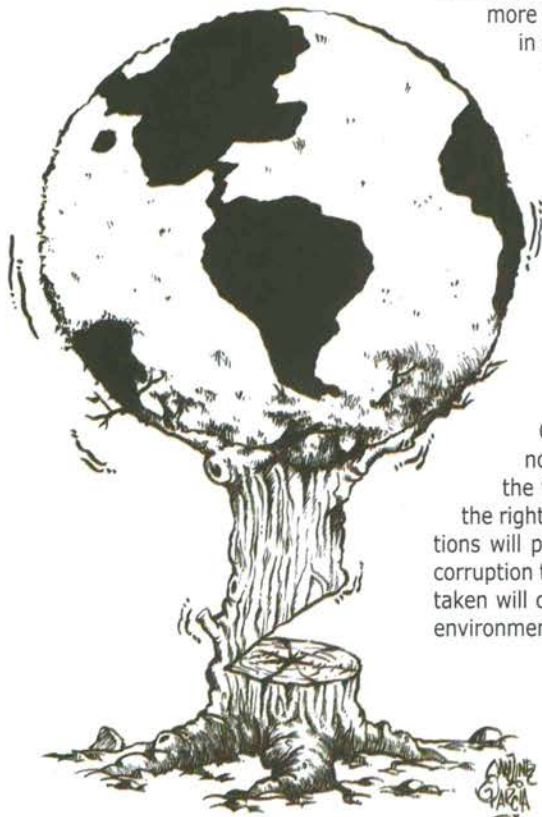
By that time many of us will be between 40 and 50; we will have brought up our children and may well be spoiling our grandchildren. Our lifestyles will have become routine. We will be looking at and pondering the electronic newspaper headlines or our high definition TV newscasts. Maybe it will then dawn on us that we never paid enough attention to what was happening in our world 25 years earlier.

According to the United Nations Population Fund, in 2025 the Earth's population will be 8,000 million (WRI, 2000a). This means that most countries will keep their present demographic growth rate; in the more developed zones it will fall by 0.19% and in the less developed countries by 0.57% (DESA, 2001). As industrialised countries will have very low or even zero population growth, to keep the population from falling they will have to accept immigrants from other countries. It is estimated that in 2025, 61% of the population will be between 15 and 59 years of age (WRI, 2000a).

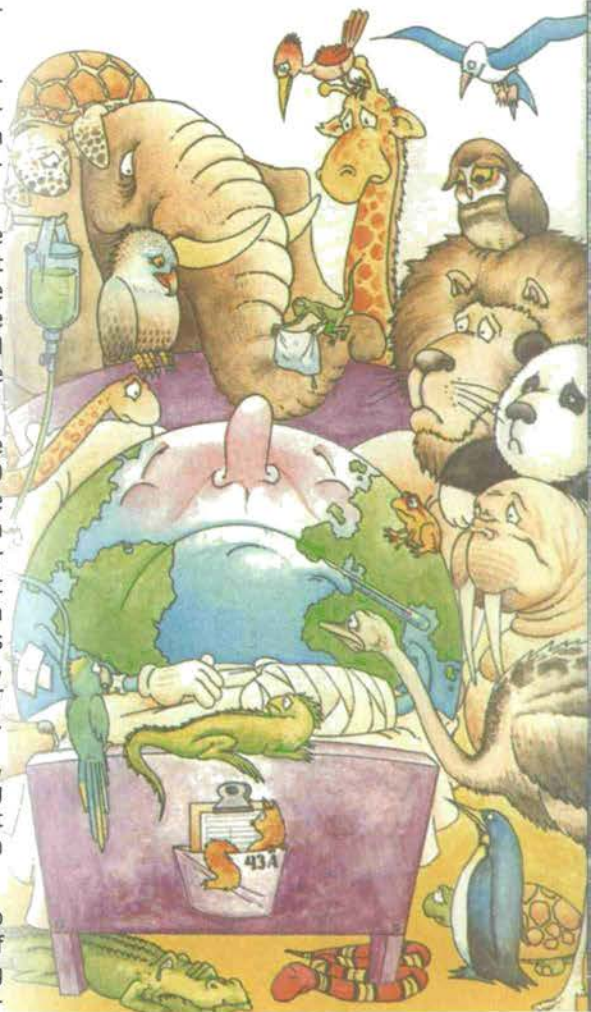
There will be no reduction in the number of people suffering from hunger; after the year 2000 more than 1,300 million people will live in conditions of extreme poverty (on the equivalent of one U.S. dollar a day or less), and by 2050 that number will have risen (WB, 1999). This means more food will be needed, putting an even greater strain on the environment.

Cities will continue to grow, especially in developing countries. Poverty will persist and there will be no drop in delinquency and insecurity.

Our governments' inertia will do nothing to help. The interests of the few will be an obstacle to making the right decisions. Transnational corporations will put pressure on governments and corruption that prevents needed action being taken will cause very serious damage to the environment.



Victor Sanjinez, Peru



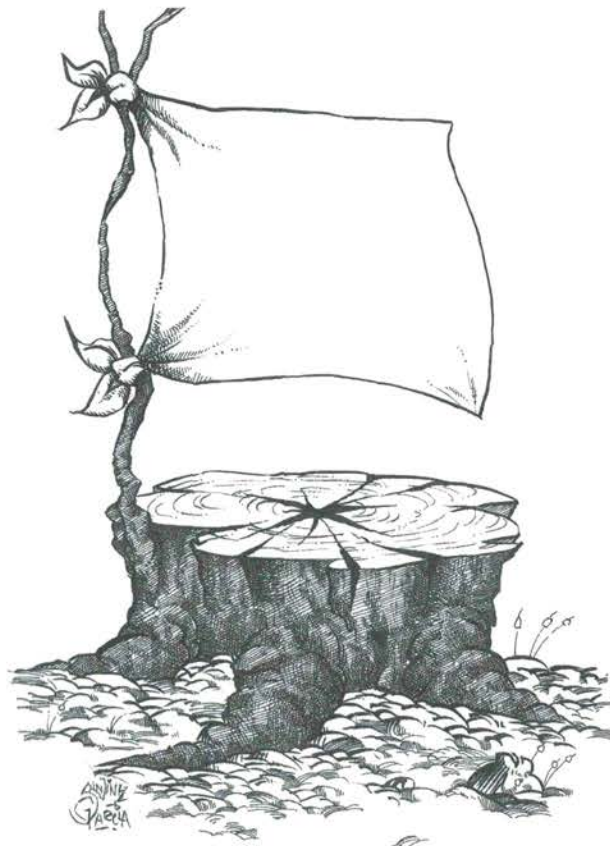
Aldo Portales, Peru

In 2025 the world's youth will face a society that is becoming more and more automated, where virtual communication will replace personal contacts. In industrialised countries and cities, youngsters will concentrate on satisfying their own immediate needs and there will be a notable rise in drug addiction. Rural youth will emigrate to seek their fortune in the cities or in other countries; urban development will grow and living conditions will get worse.

But many concerned young people will organise themselves into groups and become involved in programmes that will try to improve matters.

In 2025, water consumption will keep on rising and present sewage treatment methods will not be able to keep up with demands (UNEP, 2000a). Some regions will also suffer from a shortage of water because groundwater supplies are polluted, and the effect will mostly be felt in large cities like Mexico, Sao Paulo and Buenos Aires.

Primary energy consumption will double. Fuel reserves will fall forcing governments and corporations to seek new sources of energy. A result will be an increase in fossil fuel consumption, emissions of carbon dioxide (CO₂) will also double (UNEP, 2000b).



Victor Sanjinez, Peru

Some progress will be made on environmental education but much will remain to be done, and immediate and forceful measures will have to be taken to ensure future sustainability.

IMPACT ON THE ENVIRONMENT

FORESTS

If present trends continue, large extensions of tropical forests (Amazonia included) will be lost, bringing changes in rainfall and more drought and other climate phenomena will occur, harming the region's economy and environment.

The pressure of soil use changes to expand agriculture and food production will also hurt forests. Natural forest fires will increase because of more frequent heat waves; animal and vegetable species will die out.

The only way to preserve wooded areas and forests will be to create more protected natural areas and biosphere reserves.

URBAN ZONES

The cities of Mexico, Sao Paulo and Buenos Aires will keep on expanding and putting ever greater pressure on the environment. In addition, many towns will become huge urban centres.



Gerardo del Castillo, Mexico



Gerardo del Castillo, Mexico

People will live crowded together because waves of immigrants will keep arriving in search of work.

The gap between rich and poor will become wider because there will be fewer opportunities for growth, and those that exist will be accessible only to certain sectors of society. Water supplies will be increasingly scarce in urban centres and solid and liquid wastes will cause more environmental damage.

ATMOSPHERE

The effect of increased consumption of fossil fuels will be more carbon dioxide emissions into the atmosphere and a rise in the planet's temperature.

This higher temperature will cause hurricanes, droughts and a rise in sea level. Caribbean islands will suffer from coastal erosion and floods. As a result, swamps will be lost.

If present trends continue, the ozone layer will make a good recovery because the ban on using and producing articles that contain chlorofluorocarbons (CFCs) will start to show a positive effect.

NATURAL DISASTERS

Because of increased carbon emissions, in some places climate change will cause phenomena such as heavier rainfall that leads to floods, while other places will suffer from drought. Food shortages and forest fires will follow these natural disasters.

On the other hand, there will be more efficient earthquake warning systems and less loss of life.

LAND AND FOOD

As the population continues to grow with no reduction in poverty, more land will be used to produce food and the expansion of agriculture will cause soils to lose fertility and become arid. Population mobility and migration will destroy more forests in the region and increase the loss of animal and vegetable species.

Biotechnology could be one option to produce food but discussions will continue about its safety, and so will the controversy about genetic manipulation.

The debate will centre on establishing preventive mechanisms to avoid risks of genetically modified organisms (GMOs) that might cause "pollution" or "erosion". Objections to such mechanisms have been raised by the United States, Canada, Australia, Argentina, Chile and Uruguay (The Miami Group) because they might interfere with international trade. The Cartagena Protocol on Biosafety, which establishes preventive and information mechanisms as well as agreements on transporting, managing and using such organisms, was finally adopted in January 2000.

As well as biotechnology risks, the worst threat to biodiversity will continue to be the exploitation of certain species and the destruction of their habitats. There will be a big drop in the number of many organisms because of agricultural expansion in tropical and semiarid regions where trees are felled and swamps destroyed.



Barbados



Brazil



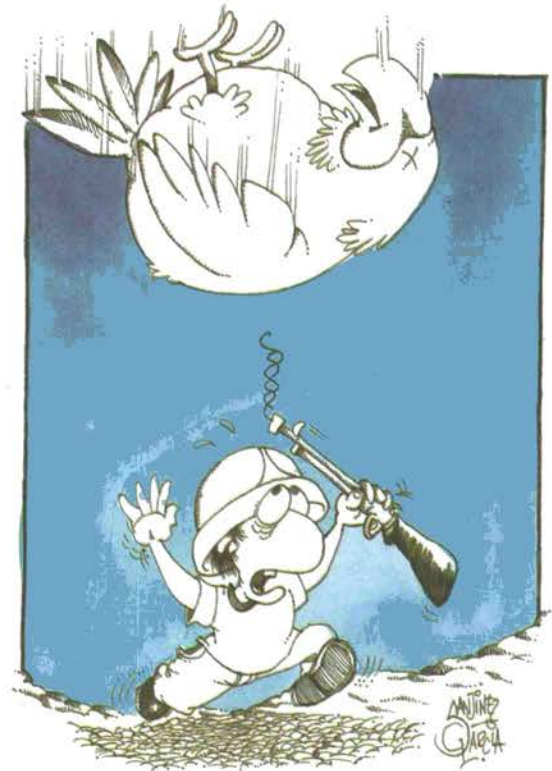
Anonymous



Alberto Cáceres, Mexico

MARINE AND COASTAL ZONES

People will turn to the seas in their search for food. Increasing tourism, international trade and expanding trade routes and ports, will also alter marine ecosystems.



Victor Sanjinez, Peru

BIODIVERSITY

Biodiversity will probably be one of the most affected aspects because people need more space to develop and this will cause alterations in natural zones.

Because of increased fuel consumption, zones where oil reserves have been found will have to be explored, inflicting harm on marine and coastal zones and on forests. These areas will be damaged by the use of industrial oil extracting machinery, by building refineries and the waste they generate, and by disasters such as spills and leaks that often happen in these installations.

WATER

Increased populations and urban growth will require enormous volumes of water. It will be more difficult to bring enough water to cities and, because there will be more industry, the supplies will be even more polluted than they are now.

Access to drinking water will become a sign of one's social class. Water will no longer be free or even cheap and will become just one more service we have to buy.

OTHER IMPORTANT MATTERS

Diseases transmitted by vectors and water are sensitive to climate change and this increases the risk of infection by, among others, malaria and dengue fever.

Climate change reduces production of crops and food; many people will suffer from malnutrition, especially children in society's poorer sectors.



Victor Sanjinez, Peru

Pessimistic scenario

If there is no change in humanity's destructive mentality and we keep on acting as if natural resources were inexhaustible, Earth will teeter on the edge of the abyss and our future will become a nightmare.

CONTEXT

In 2025 there will be more than 8,000 million people living in the world. Our region's population will have increased by 85%, far above the forecast of a 37% growth rate for that year according to estimates by the United Nations Population Fund. Cities like Mexico, Sao Paulo and Buenos Aires will show excessive expansion and poverty will be greater than ever. If there were 200 million people in the region classified as poor in 2000, by 2025 the number will have risen to 450 million and hunger will be the main consequence.

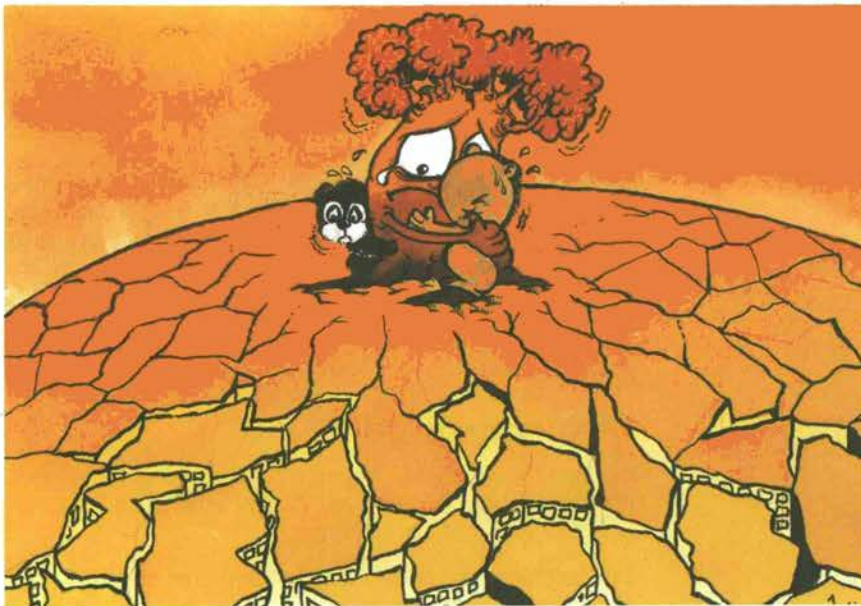
Because of the tremendous pressure on natural resources, there will not be enough food to meet demand; although more hunger will ensue, there will be no cultivable land left because of growing urban sprawl.

The large extent to which natural resources have been degraded will unleash serious social and political conflicts. Ownership of specific resources will lead to political disputes between countries and make the application of international legislation more difficult.

IMPACT ON THE ENVIRONMENT

FORESTS

Many forests will be destroyed, mainly in Amazonia. Our region will be left without green areas. Deforestation will cause fatal epidemics because the rise in global temperature will make tropical diseases spread.



Álvaro Portales, Peru

URBAN ZONES

City life will become chaotic. There will be violent behaviour inside homes and out on the streets. Air pollution levels will become intolerable because of more industry, more motor vehicles in circulation and a lack of an environmental conscience. Health systems will be unable to attend to growing demand and the most common sicknesses will be caused by stress, heart attacks and other "urban diseases".

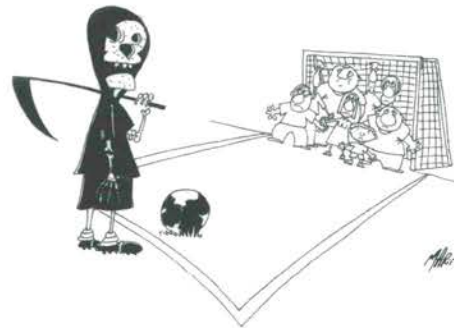


María Goreti, Brazil

Victor Sanjinez, Peru



Victor Sanjinez, Peru



Mario Almaraz, Argentina



Victor Sanjinez, Peru

There will be problems with water and gas supply systems, as well as drainage; disasters will occur such as large explosions due to gas leaks and drainage networks, that can no longer meet the needs of the growing urban population. There will be water and food shortages and people will have to leave towns to forage for food.

An alarming amount of garbage will be produced and thrown onto the streets because there will not be enough deposits.

Noise pollution will be so extreme that people will have to use ear plugs and the incidence of deafness will rise. People will forget what silence was like.

ATMOSPHERE

Only fossil fuels will be used instead of renewable energy sources (solar, wind and natural gas). Pollution by greenhouse effect gases (methane, water vapour, CO₂, CO and CFCs) will cause the Earth's temperature to rise sharply. The depletion of the ozone layer will seriously damage people's eyes and skin (with cancer a main concern), so that nobody will be able to go outdoors without using sun block and special protective clothing will have to

be worn. The sky will be grey instead of blue and only those who can buy air purifiers will manage to survive.

NATURAL DISASTERS

One result of climate change in our region will be that there will be more natural disasters like *El Niño* and *La Niña*. High temperatures will also bring more forest fires until there is nothing left to burn.

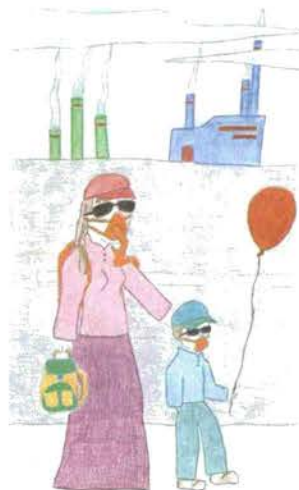
The sea will invade coastal towns and Caribbean islands while other places will suffer from prolonged droughts forcing the inhabitants to flee. Earthquakes will destroy cities killing millions of people.

MARINE AND COASTAL ZONES

Global warming will raise marine temperatures so that the sea will no longer be a source of food. Polar ice will melt and the runoff from glaciers will raise the sea level. Floods will make entire coastal cities disappear, including those that have many of the world's most important ports and shopping malls. Those who manage to survive the disasters will have to emigrate.



Elizabeth Ramos, Brazil



Jessica Velero Padilla, Mexico



Cecilia Iglesias, Argentina



Iván Prado, Peru

LAND AND FOOD

Getting food will be a serious problem because production will not be able to keep pace with population growth; while population grows geometrically, food production only grows arithmetically. Hunger will reach unimaginable levels and even the rich will not know if they will be able to eat from one day to another.



¿Daremos ver a nuestro mundo así, tóxico y contaminado sin espacios verdes?



Anonymous

Anonymous

Urban development will mean there is less land to grow crops. Intensive agricultural techniques will continue to be used making the soil unproductive and causing it to be polluted by toxic wastes. No longer will there be a struggle for land, because there will be no suitable land left to fight over.

BIODIVERSITY

There will be no native species left in the region as the most important biodiversity reserves will have been exploited and depleted. The region's wealth of biodiversity will be exhausted by the advance of globalisation and the destruction of the original environment.

WATER

Many countries will face water shortages. Some will try to use recycling systems but with poor results. Very few countries will have access to a potable water supply; those that do will privatise it so that consumers will have to pay dearly for it.

Future regional and world wars will not be for power or territory, but for drinking water.

OTHER IMPORTANT MATTERS

Besides the terrible environmental problems, as people lose hope social problems like drug addiction, suicides and depression will become worse.

OUR WORLD

*Please tell me what our future holds;
will it be bright, beautiful, clean,
or will it be dark and uglier than we can imagine?
Tell me, for I want to know
so I can do something about it.
Though you might think it useless,
I love my world
and lose sleep worrying about the future.
So I tell you my friends
that what I did, I did for you,
for you and all those like you.
So it's not the world you should worry about
but yourself and what you are worth.
It is the heart that is worth keeping;
just let the wind spread your love
all over the world,
all it needs is for you to love one another
and respect one another
and you'll see what a better world it will be.*

JAVIER ALEJANDRO GORBARÁN, ARGENTINA



Anonymous



Elizabeth Ramos, Brazil



Anonymous, Barbados



André Campagnaro, Brazil

THE JOURNEY

Drip, drip, drip... one drop of water after another fell in the half-lit room. Frightened, she ran to call the "Emergency service". In the blink of an eye the men were already there to fix the terrible drip. Just a little longer, and the damage would have been irreparable. Calmer now, she set about filling her oxygen tank for the next 24 hours; meanwhile, she pressed the only button that let her communicate with the outside: the Internet. When it was running, the machine gave her all the information about pollution: air, water, acid rain, etc., all once vital to her. Bored between the four walls that were her home, she surfed the Internet searching for something of interest. Suddenly there appeared before her a page full of strange and unknown words. It said: "Learn about the past: light, Nature and oxygen Take a trip in the latest ships, model 2999. The most famous black hole in the galaxy will take you on the journey of your dreams". She did not hesitate for a minute and started to think how she could pay for such an adventure (worth several litres of water and oxygen) while she looked at the screen, spellbound. A voice kept saying "Inhabitant 3516 took a trip into the past through the galaxy's black hole but he suffered a terrible accident: his tanks emptied." She was afraid she could not make the trip because her tanks had to last for the next 500 days. But nothing mattered if there was still a ray of hope. She put on her outside suit (she wore it twice a year), with the special protection against the ultraviolet rays that had become so terribly dangerous since the ozone layer disappeared.

When she opened the door, a ship floated in front of it. She boarded it. A cabin full of controls was waiting to take her to her uncertain destination. She sat down and soon asked herself if she was doing the right thing. She had lived her life in a room, without a family, an experimental clone (like so many others) in a world (if it could be called that) which had been destroyed, airless, with little water and totally polluted. Forced to stay indoors, with no other love than that she got from her virtual machine, she eked out the water so that she could survive. Forced to forego freedom. To obey authoritarian dictators in control of the few lands not yet submerged. Why? Why be content with what she already knew? And what if it were true? If there were a past world where the sun still shone through leaves and trees to enter windows? Did she have to continue with this life even though she knew a better and happier one could be found that she had not enjoyed simply because she did not know it existed?

She then made up her mind and stretched her hand towards the button that said "Travel". A light appeared in the depths of that emptiness into which the ship entered only to disappear. And the first flower burst through that soil, the fruit of what she had been doing in the past, to change her future.

ANONYMOUS, MEXICO

95

The picture we want to see



A clean city, cared for by both authorities and inhabitants, with functional houses and bridges and a good quality of life: an efficient drainage system, enough clean water, public safety. A healthy urban space with sanitation, a good place for children, promising a better future and a society without social differences.

ELAINE CRISTINA R. SANTOS AND FABIANO C. SILVA BELEN, BRAZIL

Optimistic scenario

If we make the right choices and act quickly, perhaps by the year 2025 we can live on a planet where respect and love will be the most valued principles in a society committed to Earth's present and future. If we promote the responsible use of natural resources, we can make it possible to ensure a long existence for humanity and the well-being of all species.

Family planning will help birth rates to fall and the population will stabilise. People will have decent housing and eat healthy food. Their children will be taught to respect their surroundings and they can satisfy their basic needs without damaging the environment.

Peace will be reflected in a collective social conscience. Everyone will have a function to perform and all work will be considered equally important. Social differences will almost disappear and the poorest will no longer go hungry.

All policies, laws and government structures will give priority to the environment, because, once we understand we are all part of a whole, we will be more inclined to protect Nature. Society will also take an active part and make its voice heard. Non-governmental organisations will work with the government to try to solve problems.

The environment will be a very important part of education and students will be taught to develop their special personal abilities and to grow to their full potential as human beings.

The communications media, to which almost everybody has access, will be committed to society, will devote space to the environment and become its principal defenders. They will sound the alarm when anyone deviates from the social norm of coexisting in harmony and in balance with Nature. They will set out to change consumer habits and put a brake on consumerism. They will keep consumers informed so that they know which products will not harm the environment.

With the help of technology and science, people will slowly build a cleaner world and will value life over material possessions.



Cristian Müller, Argentina



Alberto Cáceres, Mexico



Ángeles Perea, Argentina

The wealthy will share their riches with others so that everyone has a fair share. The economy will keep growing thanks to new ways of distributing wealth. Benefits will be shared equally among workers, so there will be no vast differences in social classes.

The business sector will help to protect the environment. All industries will use proper technologies and will not pollute just to increase production; what they produce will be of very high quality and will not damage the planet. Waste will be properly handled and treated so that, when it is returned to the natural environment, it will do no harm to ecosystems.



Ángeles Pérez, Argentina

IMPACT ON THE ENVIRONMENT

FORESTS

There will be numerous protected natural areas and parks. Each country will preserve its natural zones and set aside more space for resources and protected areas. At the same time, destroyed areas will be recovered. Reforestation will be a priority in many countries; thanks to improved social conditions all over the region, and there will be far fewer social problems.



Anonymous, Guyana



Marcela Ruiz, Mexico

Industries will stop depending on lumber so that it and the products made from it will cease to be needed and trees will no longer have to be cut.

URBAN ZONES

Migration to urban centres will fall off, reducing pressure on urban resources. Cities will be well administered and their infrastructure will permit them to provide clean water supplies and good public transport. Air pollution will be reduced because, thanks to technology, better motor cars will be produced. To prevent pollution, there will be stricter emissions control regulations for industry.

Besides having to face severe fines, businesses will have become more environmentally aware. There will be recycling programmes throughout the region and educational programmes



A society that participates in the proper handling of solid waste.
Elizabeth Ramos, Brazil



Julio Carrión, Peru

will teach people how to dispose of their garbage. Severe penalties will be imposed on those who carelessly dump garbage and official garbage dumps will be better administered so that they cause much less damage to the environment

ATMOSPHERE

Polluting gas emissions will be greatly reduced. Instead of fossil fuels, alternative sources of energy will be used like the sun and the wind. Cleaner and more advanced sustainable energy policies will be applied.

NATURAL DISASTERS

There will be fewer natural disasters like floods, hurricanes and drought caused by global climate change, and those that do occur will be less intense because dangerous gas emissions will be controlled. When they do occur, their effects will be made less catastrophic because of the use of better alarm systems. Cities in dangerous areas will have better evacuation methods.



Barbados, anonymous



Emmanuel Boyce, Barbados



Florencia Asnaldo, Argentina
(We should take care of the Earth...)

LAND AND FOOD

In 2025, thanks to the adoption of timely measures, Earth will be capable of satisfying the food needs of its growing population. The responsibility will be shared by all governments as they design and apply sustainable food policies.

People will learn of the virtues of organic crops and, thanks to the great demand, farmers will change their production techniques and use organic fertilisers. This will improve the quality of the soil and aquifers and they will gradually become less and less polluted until they finally recover.



Gerardo del Castillo, Mexico



Marcela Ruiz Barba, Mexico

There will be more greenhouses and soil erosion will slow down. Much research will be done on biotechnology and ethical standards will be imposed on how information is disseminated.

COASTAL AND MARINE ZONES

The tourist industry and tourists themselves will be more respectful of the environment. They will understand how important it is to make sustainable use of marine resources and sports. Fishermen will improve their techniques and respect closed seasons and breeding specimens.

There will be strict regulations on building close to coasts, as well as on dumping garbage and sewage at sea. Ocean pollution will drop and it will be rare to find poisoned marine fishes or animals.



Gustavo Soriano, Mexico

BIODIVERSITY

More research will be done on little-known species and all forms of life, as well their habitats will be respected.

Illegal trafficking in species will end because there will be no demand for such things as coats, wallets and boots made from the skins of endangered animals. Populations of threatened species will grow and they will continue to be protected and monitored.

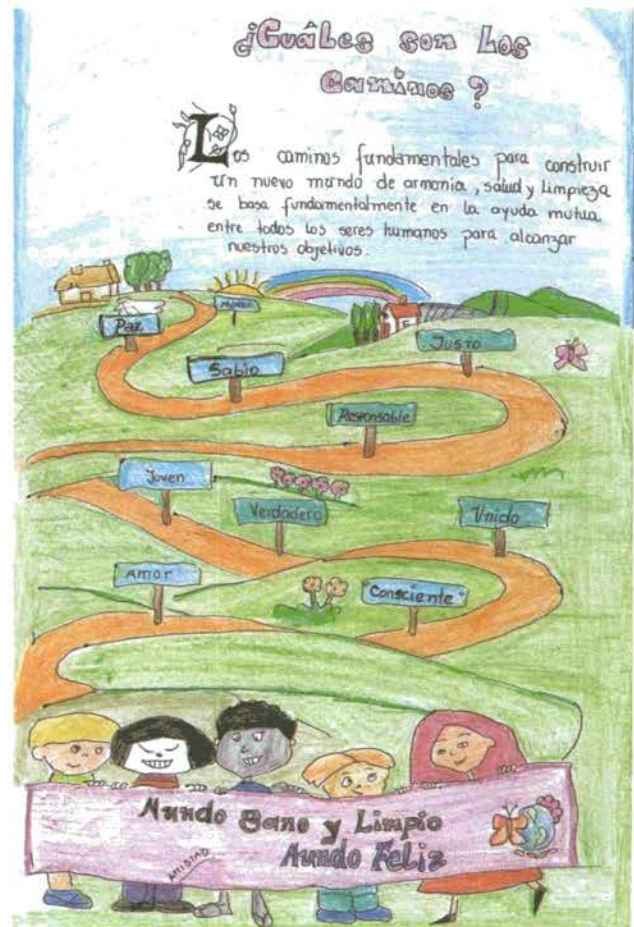


Gerardo del Castillo, Mexico

WATER

There will be strict regulations about the use of water and everyone will have access to it. New technology will allow large volumes to be saved. Many houses will have showers and toilets that use less water.

We shall be more aware of the water cycle and how it affects human activity. Dumping garbage in rivers, canals and other water systems will be strictly prohibited. Furthermore, industrial processes will be compatible with protecting our aquatic ecosystems.



Anonymous
(A healthy and clean world)

Conclusion

Environmental problems are not isolated, because damage in one zone causes multiple global consequences.

Human beings will always suffer from a deteriorating environment, whether as onlookers or as the cause of it. Many ecological problems originate in the region's poverty; so it is very important that environmental education be accompanied by fair and respectful economic development.

Society's consumer habits put excessive pressure on the environment and cause it to change and become degraded.

Natural disasters cannot be prevented, but their impact on people can be lessened if we undertake vulnerability studies and promote policies designed to protect the population against them.

Governments and society must change their way of thinking when it comes to relating to the environment. It is a challenge to all of us, especially the region's youth. Measures must be taken to reverse the damage and change living conditions as well as consumer habits. We must also begin to recover damaged areas and promote conservation of those that have managed to escape human beings' voracious appetites.



Glossary

- Acid rain.** Phenomenon produced by a concentration of nitrogenous and sulphurous gases in the atmosphere which, when combined with humidity and cloud water, falls to earth as rain and causes corrosive effects.
- Agrarian reform.** Redistribution of cultivable land, often to landless peasants.
- Anthropocentrism.** Considering human beings as the most significant entity in the universe.
- Aquifer.** A water-bearing stratum of permeable rock, sand, or gravel.
- Arid.** Dry, sterile soil where vegetation cannot grow.
- Atoll.** A coral island, consisting of a reef surrounded by a lagoon.
- Bentonite.** A type of clay
- Biodiversity.** Biological diversity in an environment as indicated by numbers of different species of plants and animals.
- Biomass.** The amount of living matter in an ecological unit determined by area or volume. From the energy point of view, it is the amount of biological material expressed as a unit of measure (kilogram, tonne, etc.) that may be burnt to produce energy.
- Biota.** The flora and fauna of a region.
- Biotechnology.** Applied biological science to create or modify products or process for specific uses.
- Campesino.** A Latin-American farm labourer.
- Carbon sinks.** Regions capable of absorbing large quantities of carbon dioxide.
- Cataract.** Clouding of the lens of the eye or its surrounding transparent membrane.
- Climate change.** Environmental phenomenon whose main effects are warming of the surface of the earth, increased rainfall, etc. Mostly caused by human activities.
- CO.** Carbon monoxide.
- CO₂.** Carbon dioxide.
- Conservation.** Whatever is designed to protect resources, particularly those that are renewable. It does not mean banning the use of resources, but of promoting their rational use to benefit the greatest number of people while at the same time favouring their renewal.
- Chlorofluorocarbons (CFCs).** Molecules of chloride, fluoride and carbon used in, for example, refrigerators and air conditioners.
- Decibel.** Unit used to measure the intensity of sound.
- Deforestation.** Process of environmental deterioration consisting of destroying and eliminating vegetation in a determined geographic area.
- Desertification.** The process of transforming once flourishing land into desert or arid land.
- DNA.** Any of various nucleic acids that are usually the molecular basis of heredity.
- Drip irrigation.** Irrigation by allowing water to slowly drip onto plants.
- Ecosystem.** Biotic community (vegetable and animal) inhabiting a determined geographic area and all the non-biological conditions (soil, climate, humidity, temperature, etc.) that characterise them.
- Effluent.** Something that flows out.
- Endemic.** Belonging or native to a particular place.
- Environment.** Atmosphere. The complex of physical, chemical, and biotic factors (climate, soil, and living things) that act upon an organism or an ecological community and ultimately determine its form and survival.
- Environmental awareness.** Measure of how much the inhabitants of a locality know about their surroundings and their degree of concern, interest or concern about present environmental problems.
- Environmental impact.** Possible alteration to the environment as a result of human activities or external influences.
- Environmental problem.** Combination of anomalous situations known as problems that effect the environment and hinder the harmonious interaction between society and Nature.
- Epidemic.** Disease that attacks various people at the same time and in the same place.
- Eutrophication.** Increase of nutritive substances in freshwater lakes and reservoirs which causes an excess of phytoplankton.
- Exotic species.** Animals or plants introduced to a new environment, different from their original one; they may be dangerous to native species.
- Extinction.** Gradual or total disappearance of an animal or vegetable species from natural causes or as a result of human activities.
- Food chain.** Succession of organisms that constitute a continuation of food energy from one organism to another; the cycle in which organisms hunt or are hunted by others.
- Fossil fuels.** Fuels (carbon, gasoline or natural gas) that originate in the organic remains of plants or animals that lived millions of years ago.
- Fragile ecosystems.** Ecosystems in which living conditions are at the limits of tolerance or where the risk of destruction is very high.
- Glacier.** A large body of ice moving slowly down a slope or valley or spreading outward on a land surface.
- GMO.** Genetically modified organism.
- Greenhouse effect.** The absorption by the atmosphere of infrared radiation or heat. The gases that cause the greenhouse effect are almost all composed of natural compounds: water vapour, carbon dioxide, methane and nitrous oxide, which make the Earth habitable. Human activity has increased the concentration of these natural greenhouse gases while at the same time adding new and powerful gases that absorb the infrared radiation, causing rapid climate changes.
- Hake.** Any of several marine food fishes related to the Atlantic cod.
- Heavy metals.** High density metals that are frequently toxic to human health, for example, zinc, lead and mercury.
- Hectare.** Measure of area that contains 10,000 m² (about 2.5 acres).
- Hydrocarbon.** An organic compound containing only carbon and hydrogen and often occurring in petroleum, natural gas, coal, and bitumen.
- Irrigation.** Practice of watering crops by artificial means.
- Land reform.** See agrarian reform.
- Land tenure.** The right to use and possess land.
- Leach.** Remove elements from soil by percolation.
- Leachate.** A solution or product obtained by leaching.
- Liana.** Woody vine or climbing plant of tropical rainforests that root in the ground.
- Lifestyle.** The typical way of life of an individual, group or culture.
- Livestock.** Farm animals kept for use or profit.
- Mangrove.** Tropical tree that grows in swamps and sends out many roots.
- Marginalised zones.** Areas with serious environmental problems, usually taken to mean the very poor areas on the outskirts of cities.
- Natural disasters.** Serious and unforeseen events, natural catastrophes worsened by human activity. Examples are: earthquakes, volcanic eruptions and floods.
- Natural protected areas.** Special areas that countries set aside as protected, or as reserves, to prevent their destruction and conserve their plants, animals and ecosystems.

Outcrop. The part of a rock formation that appears on the surface of the ground.

Ozone layer. An atmospheric layer of heights of about 20 to 30 miles that is normally characterised by high ozone (O_3) which blocks most solar ultraviolet radiation from entry into the lower atmosphere.

Pesticides. Substances of chemical or biological origin used to protect some plants against diseases or pests.

pH. A measure of acidity and alkalinity of a solution that is a number on a scale where 7 represents neutrality, lower than 7 indicates increasing acidity, and higher than 7 indicates increasing alkalinity.

Photovoltaic. Relating to, or utilising the generation of a voltage when radiant energy falls on the boundary between dissimilar substances (as two different semiconductors).

Photovoltaic process. Converting solar light into energy.

Phytoplankton. Diminutive aquatic plants; source of food for fishes.

Plantlet. A small or young plant.

Pole. Extremity of the axis of rotation of a sphere, such as the Earth.

Poverty. The lack of means to satisfy basic needs.

Presbyopia. A loss of vision making it difficult to focus sharply.

Protocol. Amendment or addition to a treaty or convention.

Quarry. An open excavation from which building stone is usually obtained.

Residue. What remains when a process is finished.

Sanitation. A combination of work, techniques and facilities designed to establish, improve or maintain healthy conditions.

Scrubland. An area covered with small, stunted vegetation or trees.

Sediment. Solid fragments of inorganic material from eroded rocks and carried by water, wind or ice.

Slash-and-burn. Felling and deliberately burning trees to clear land, especially for agriculture.

SO₂. Sulphur dioxide.

Stratosphere. The part of the Earth's atmosphere that extends from about 7 miles above the surface to 31 miles.

Subsoil. The stratum of weathered material that underlies the surface soil.

Sustainable. That satisfies the needs of today while ensuring future generations will be able to satisfy their needs.

Sustainable development. Development designed to satisfy present needs while permitting future needs to be safeguarded.

Swamp. A wetland dominated by woody vegetation.

Symbiosis. The living together in more or less intimate association or close union of two dissimilar organisms.

Tectonics. A branch of geology concerned with the structure of the crust of a planet, like Earth, with the formation of folds and faults in it. Usually used to refer to earthquakes.

Thermal inversion. Natural phenomenon where the lower layers of air are colder than the higher layers so that they become stagnant. In some places, like cities, atmospheric contaminants do not disperse as they should, causing damage to health.

Topoclimatic. Relation between climate and land elevation.

Transgenic. Having chromosomes into which one or more genes from a different species have been incorporated either artificially or naturally (e.g. transgenic mice).

Troposphere. The lowest, densest part of the Earth's atmosphere where most weather changes occur and temperature generally decreases rapidly with altitude and which extends from the surface to the bottom of the stratosphere.

UV-B rays. Solar radiation (ultraviolet rays) that may be either beneficial or potentially dangerous. UV rays from one part of the spectrum (UV-A) make plants grow and are used in some medical and dental procedures; ultraviolet rays from other parts of the spectrum (UV-B) may cause skin cancer or otherwise damage tissue. The atmosphere's ozone layer forms a protective shield that partially prevents UV rays from penetrating to the Earth's surface.

Watershed. A region or area bounded peripherally by a divide and draining ultimately to a particular watercourse or body of water.

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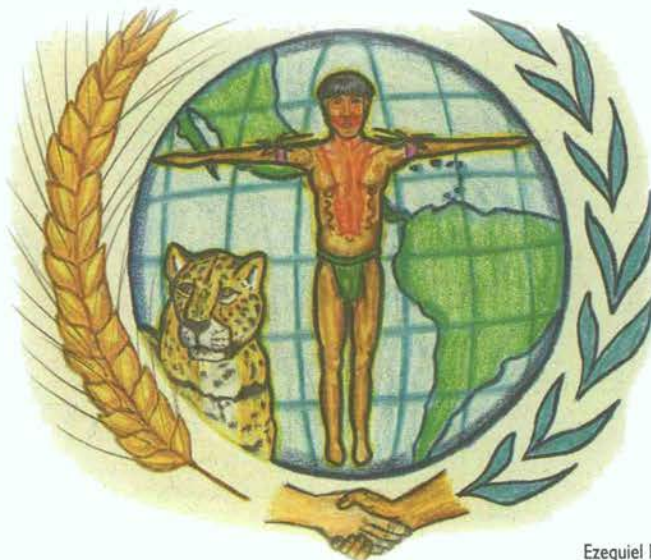
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List of Participants

Argentina

Adelaida Borgiattino, Adrián Castellucci, Adrián Miloé, Ayelén Amigo Cartagena; Mario F. Almaraz, **Escuela de Comercio Nº 19 "Juan Montalvo"**: Adrián Risso, Adriana Carrizo, Adriana Papandrea, Adriana Papandreo, Agustina Gazza, Alex Martín Manovkian; Alexander Rivella, Alfredo Luna, Amanda Zenón, **Amigos de la Tierra**: Ezequiel Ignacio Miodownik, Ana D'aveta, Ana Sosa, Analia Eyras, Anastacia Yamila, Andrea Girardini, Andrea Grondona, Angélica Barros, Ariel Grunblatt, Ariel Silvero, Belén Fernández Cordón, Sol Ganim, Belkis D'Aveta, Bettina Díaz, Bibiana Bunetti, Carlos Arnedo, Carlos Bergia, Carlos Buitrago, Carlos Gallardo, Carlos Sosa, Carolina D'Amico, Carolina Freedman, Cecilia Cevallos, Cecilia Cuebras, Cecilia Farrome, Cecilia Oggero, Cecilia Ossa, Cecilia Palacios, Celeste Navarro, **Centro Ambiental "La Escalera"**: **Asociación Ecologista Nueva Tierra**: Joaquín Navarro; **Centro de Observación de la Naturaleza**: María Lara Cataldi, César Bassano, César Cativas, Christian Ortiz, Cintia Escudero, Cintia Ledesma, Griselda Bazano, Cintia Pinotti, Cintia Sartini, Claudia Elinger, Claudia Fiore, Claudia Peralta, Cristian Condo; **El Club de los Pibes Verdes**: Cristian Vázquez, Cristian P. Muller, Cynthia Dabul, Daiana Melgarejo, Damián Cardozo, Daniel Anvaria, Santiago Calatayud, Daniel Buero, Daniel García, Daniel Mesa, Daniela Sueldo, Diego Abba, Diego Rosetto, Diego Sotelo, Dimitri Igorievich, **EEM Nº 1 Escuela Esteban Echeverría**: Adrián Villegas, Eliana Alfano, Elizabeth Navarro, Emanuel González, Emilia Bertola, Emiliano Figueredo, Enrique Torres, **Escuela de Comercio Nº 32**: Guadalupe Maro, **Escuela Normal Superior Nº 6**: Cecilia Romero; Estefanía Dealbera, Eugenia Raviola, Evangelina Audisio, Evelyn Chesaux, Ezequiel Dipetta, Ezequiel Miodownik, Fabián Molina, Facundo Fuks, Federico Conde, Federico Rosales, Fernando Astrada, Fernando Bryner, Fernando Marenchino, Fernando Ruiz, Fiorenza Ginocchi, Florencia Barotto, Florencia Maro, Florencia Stellavato, Francisco Damián Cañete, Franco Ferrari, Franco Martínez, Franco Paternóster, Gabriel Voza, Iván Cevallos, Gabriela Julio; Gabriela Segovia, **Geosalvadores Argentinos del 2000**: Mariana Clavet, Gieco Muller, Gimena Vinaccia, Gisela Racino, Gisella Ariana del Pardo, Giselle Bellumma, Gonzalo Launichak, **Grupo Puelche**: Yanina Pellicano, Guillermo Martínez, Hernán Alassia, Horacio Pereyra, Horacio Roland, Ignacio Oggero, Ingrid Zacarías, **Instituto Educativo Ser**: Gonzalo López del Monte, **Instituto San Luis Gonzaga**: Walter Prebetera, Iván Navales, Iván Rojas, Javier Borbarán, Javier Chaglasian, Javier Dash, Javier Gorbarán, Jéscica Becerra, Jéscica Cuello, Jéscica Depetris, Jéscica Oglialoro, Jimena Garrido; Jimena Sánchez, Joaquín González Muñoz, Jorge Hatsen, Jorge Rossa, José Alejandro Ramos, José Saez, Cintia Torres, Juan José Galeano, Juan Manuel Pacheco, Juan Manuel Domínguez, Juan Pablo Di Massa, Juan Pablo Goszko, Julieta Guerrero, Karina Gutiérrez, Karina Serjoshian, Laura Carbonell, Laura Gimbernát Müller, Laura Heredia, Laura Ruesja, Laura Yannay, Leonardo Carmona; Leonardo Devalle, Leonardo Goddard, Lionel Wisnia, Lis Segala, Ana Muro, Lorena Palacios, Lorena Villalba, Luca Martín López, Lucas Maya, Lucas Pariggi, Luciana Litmanovich, Andrea Torres, Vergalito; **CENS núm 11**: Iván Cevallos, Luciano Baravalle, Luis Crema, Luis Lazzari, Luis Miguel García, Luis Piatti Daniela Testa, Magali Monserrat, Magdalena Salleras, **Manos Jóvenes por el Mundo**: María Florencia Larghi, Marcelo Giani Juan Cruz, Marcelo Tondosey, Marco Antonio Niraval Huairoto, Marcos Malaspina, Marcos Trucco, María Cecilia Varrone, María de los Ángeles Pérez, María de los Milagros Juncos, María Delia Mauriño, María Florencia Fernández, María Florencia Guida, Sabrina Zarlenga, María José Barragán, María Lourdes Espinola, María Lucrecia Pettinari, María Soledad Medina, María Luz Benedetti, María Luz Cagliero, Mariana Hortmann, Mariana López, Mariano Cracogna, Mariano Etcheverry, Mariano Leanza, Maricel Paci, Mariela Rotondo, Marina Covey, Marisol Ricciardelli; 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Chile

Jorge Espinosa, **Red Nacional de Ecoclubes**, Gabriel Pozo, Magali Oñate, Luis Barreto, Nicolás Binfa, **Red Nacional de Acción Ecológica, CODEJU**.

Colombia

Grupo GEO Juvenil (Universidad de Medellín), **Grupo Tayrona**, Juan Diego Valenzuela, Adriana Valenzuela, Juan David Alzate, Ana María Cadavid, Julián Ibarbo Gil, Andrés Bahamon, Cristina Zapata, Diego Alejandro Peña, Luzmila Álvarez, Andrés Saldarriaga, Alejandro González, Maria Fernanda Delgado, Carlos Esteban París.

Cuba

Brigadas Técnicas Juveniles, Dianisbel Hernández Guzmán, Edelsy Carmona Lescay, Yareisy Valera Marrero, Lemay Entenza Tillmán, Hermes Farfán, Yinelys Bermúdez Souza, Adrián Álvarez Adán, Yanisley Guilarte Roja, Eugenio Landeiro, José E. González Modedir, Yordanis Puerta de Armas, Karina Serrano Reyes, Yanet Cazañas, Enrique Dalmau, Joan Manuel Veloso Campo, Otto Manuel Andrés Ramos, Ángel Luis Mayea Reyes, Rasiel Bello Llanes, Michel Martínez Cruz.

Guatemala

Catalina Casanova.

Guyana

Oneka Scott, Natalie King, Carah Ann.

Haiti

Groupe OFVDL, Organisation Populaire pour le Relievement de Chardonnières (O.P.R.C.).

Honduras

Guillermo Cobos.

Jamaica

Mavoy Smith, Aldane Maragh.

Mexico

Alejandra Herrera Monroy, Alejandra Ramírez Martínez, Alejandro Callejas, Alejandro Jiménez Cabal, Alicia Lerma de Luna, Álvaro Romero Flores, Alyn Sánchez Meza, Ana Lucía Serna Morales, Antonio Alejandro Alanís Peña, Bárbara D. Sánchez González, Bethzabée Velázquez Martínez, Brenda Cristina Rodríguez Blackaller, Carolina Villarreal Romo, **Centro Marista de Estudios Superiores**, César Cruz Rojas, **CORRE**, Christian Esteban Beeton, Christina D. Lima Da Costa, David Lara, Eileen Muller Guerra, Emiliano Robles, Erika Alonso R., Ernesto Pedro Pérez, Esperanza Salazar Zemil, Ethel Zapata, Francisco Vargas, Gabriel Betancourt Alvarado, Gabriela Alejandra Banda Leal, Gabriela García Garza, Germán Aguilar Campos, Gustavo Soriano, Ixchel Estrada, Hortencia Armendáriz, Ina Farfán, Iván Jiménez, Jéssica Valero Padilla, Jorge Alberto Lobo de la Garza, Jorge Ronzón, José Tomás Castrejón Durán, Julia Mogas, Laurandrea González, Linabel Segovia, Loretta Serrano-González, Luis Felipe Espinosa del Valle, Luz Elena Saldaña, Magdalena Lagunas Vázquez, María Antonieta Vázquez, María José Espinosa, María José Rocha Guevara, María Luisa Lobo Gómez, Mario Benítez Arciniega, Maritza Aurora Morales Casanova, Marcela Ruíz, Mauricio Bonilla Padilla, Michelle Pozas Treviño, Mindahi Bastida, Mónica Alejandra Nava Chaveznava, Mónica Elisa Sánchez C., Mónica Gabriela García García, Mónica Garza Treviño, Mónica Navarro, Nora de la Garza Balli, Olga Isadora Martínez, Óscar Ramírez, Patricia Eugenia Elizondo, Rodolfo Macossay Cuevas, Sarai L. Acosta Martínez, Silvia Alejandra Garza, Tania Alejandra Rendón Acosta, Uriel Baruch Castro Solís, Valentina Ramos, Verónica Leal Montemayor, Yesenia Hernández Márquez.

Nicaragua

Club de Jóvenes Ambientalistas, Indira Silva Miranda, Cristel Silva Miranda, Ana Ligia Dávila, Alejandra Martínez, Ronald Gutiérrez.

Panama

Adalberto Camaño, Vidal Castillo, Ennio Arcia T., Emilio R. Espino R., Isaac Barnett.

Paraguay

Tea Xuxana Ferreyra, **Colegio Internacional**, Elena Zorrilla, Cristina Giménez, Alexis Díaz, Alicia Correa, Gabriela González, Magdir Ramírez, Juan Manuel Cabral Monzón, Andrea Rotela, Anabella Rotela, Johnatan Losento, Tharias Molias, **Juventud que se Mueve, Grupo Auto Eca**, Natalia Sotomayor, Carlos Casanovas, Verónica Vidal, Patrick Hergard, Jorge Borgi, Fernando Frachi, Vicente Palacios, Eduardo Pereira, Andrés Lesme, Viviani Alvarenga, Carmen Ballasch, Carla Risso, Enrique Giménez, Andrea Grenno, Guillermo Manuel Suoto Ortiz, Andres Adrián Samaniego Molas, Guillermo Fabián León Peña, Fernando Daniel Ortiz Stanley, Morgan Liu, Helen Pekholtz, Sol Quiñónez, Óscar Aguirre, Tiffany Ríos, Noel Luccini, Andrea Wehrle, Gabriela Franco, Edgar Fernández, Ricardo Lledo, Ernesto Grenno, Jazmín Saldívar, Jennifer Caniza, Estefanía Ortiz, Desirée Barrail, Diego Britez, Laura Solís, Florencia Bogliaccini, Cinthia Núñez, Verónica Acosta, Luis Orue, Juan Ángel Martínez, Lisa Delmas, Liza Legal, Giselle Figueredo, María Nasta, Fernando Andrada, Luis Bernal, Diego Canatta, Enrique Grenno, Pablo Jorge Lamar González, Emma Zanotti, Marcelo Nicora, Lizzi Toerreani, Francisco Arias, María Eugenia Halley, Natalia Rojas, Juan Andrés Campos Carvera, José Miguel Bonnin Cadogan, María Pia Addieri Fadul, Maia Mia Gallenao Sosa, Eliana María Ballash Mercado, Amanda Karin Nahir Gomex, Matías Brizuela, Renzo Ferrari, Fabián Figueredo, Hugo Gerhmann, Manuel Rivarola, Fernando Ugarte, Daniel Villante, Diego López, Martín Ibarra, Martín Benítez, Carlos Casati, Mauricio Amigo, Gabriela Pérez Brun, María Elena Heisecke Campos, Viviana Ruiz Díaz Vittone, Pablo Cabrera, Winston Stanley, Patricia Ynsfran, José González, Darío Prieto, Gabriela Sotomayor, Marina Da Re, Victoria Vago, Leticia Mendoza, Juan José Manchini, Francisco Gómez, María José Britos, Giannina Dagogliano, Martín Fois, Rodrigo Samudio, Karina Esculies, Verónica Ovelar, Adriana Pérez, Paloma Fernández, Giselle Benítez, Jade Ferreira, Pedro Lloret, José Méndez Cardozo, Nadine Fanego, Mónica Lee, Azucena Morena, Silvia Zelada, Daniel Urbietta, Valeria Gutiérrez, Mariana Frachi, Silvia Mongelos, Ana Sáez, Laura Cohenca Abadi, Graciela Yang, Ruth Schwartzman Cohenca, Isel Desirée Villashoa, Melina Pekholtz, Jazmín Torrents, Montserrat Romero, Rocío Martínez, Silvia Ibarra, Jennifer Kim, Anna María Benitz Rickmann, Marcela Núñez Zarza, Alejandra Fretes Modesto, Miguel Ángel Guillén Mateu, Silvia Lorena Centrón Viñales, Zulma Belen Barrail Halley, Gabriel Franco Torres, María Ovelar Duarte, Julio Estaban Mendora Ortega, Erich Jacobo, Raúl Dumas, Rodrigo Ovelar, Ricardo Sasiain, Saúl Segovia, Juan Samaniego, Juan Bueno, Guillermo Urbietta, Mauro Galleano, Montserrat Cruz, Rodrigo Frachi, Gabriel Fadlala, Jéssica Dautreleau, César Ricardo Cruz Escobar, Carla Andrea Risso Maidona, Gabriela Peres Brun, Ma. Elena Musisecke Canipos, Viviana Ruiz Díaz Vittone, Alice Carolina Romero

Acronyms

CEO Caribbean Environment Outlook.

CI International Conservation.

C.I.H. Executive Secretary of the Inter Jurisdictional Co-ordination Commission of the Hidrovia Paraguay-Paraná Programme.

CODE Oaxaca Commission on Ecological Defence, Mexico.

CONABIO National Commission on Biodiversity Awareness and Use, Mexico.

EMA Environmental Management Authority, Trinidad and Tobago.

EPA Environmental Protection Agency (USA).

FAO Food and Agriculture Organisation of the United Nations.

GEO Global Environment Outlook.

IADB Inter-American Development Bank.

IISD International Institute for Sustainable Development.

ILDES Southern Cone Sustainable Development Leadership Initiative.

IPCC Inter-Governmental Panel on Climate Change.

ITESM Higher Education Technological Institute, Monterrey, Mexico.

MAG Ministry of Agriculture and Livestock, Paraguay.

MCTMA Ministry of Science, Technology and Environment, Cuba.

MERCOSUR South American Common Market.

MMA Ministry of the Environment, Colombia.

NCST National Council of Science and Technology, Barbados.

OTO Technical Ozone Office, Cuba.

PAHO Pan-American Health Organisation.

REIMA Inter-American Student Environmental Network, Cuba.

SEMARNAP Ministry of Environment, Natural Resources and Fisheries, Mexico.

UNDP United Nations Development Programme.

UNEP United Nations Environment Programme.

UNESCO United Nations Educational, Scientific and Cultural Organisation.

WB World Bank.

WRI World Resources Institute.





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GEO for Youth in Latin America and the Caribbean
The most important report
regarding **youth** and the **environment** in the region

This book, the result of the efforts and enthusiastic participation of hundreds of young people from all corners of Latin America and the Caribbean, is a report on the state of the environment in the region, in addition to being a real source of inspiration for people and institutions to contribute to the safeguarding of the environment.

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