



GREEN LEAF

CAPACITY BUILDING WORKSHOPS FOR ENVIRONMENTAL CLUB SUPERVISORS

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Environmental Clubs have played a vital role in promoting awareness and stewardship for the environment in Guyana. Over the years, the EPA has aided in establishing approximately one hundred (100) affiliated environmental clubs ranging from schools, communities and even local NGOs. The majority of these clubs, without a doubt, are school-based. In our efforts to promote the establishment and continuity of such clubs in schools, the Agency has been coordinating workshops targeting specifically the volunteer teachers that work with these clubs. So far, two (2) workshops have been successfully executed for the month of March and April.

The first workshop was held in Linden targeting teachers from the Linden Foundation Secondary, Mackenzie High, Wismar Secondary, Wisburg, Harmony and New Silvercity Secondary Schools on March 2, 2012. A second workshop was then held,

this time, targeting Schools along the West Coast of Demerara namely: West Demerara Secondary, Uitvlugt Secondary, Stewartville Secondary, Leonora Secondary, Zeeburg Secondary and Parika-Salem Secondary Schools. Participants were exposed to key topics such as programme planning cycle using active participation, planning an environmental activity and fundraising, during the workshop.

A total of twenty (20) teachers have benefited from these training workshops. Participants should now be in a better position to execute their roles as Environmental Club Supervisors by being better able to plan and coordinate activities within their clubs. The Agency will continue to support its affiliated environmental clubs through these workshops. To that extent, plans are already underway for a third workshop targeting Secondary Schools in Georgetown in April.

Editorial Note

Energy is essential for sustainable development, yet one in five people on the planet lack access to basic electricity. Furthermore, there is wastage of energy in developed countries. 2012 marks the International Year of Sustainable Energy for all, where the global focus will be placed on access to reliable and clean energy for all people. Throughout the year, efforts will be made at all levels to increase not only awareness about the importance of renewable energy, but to make a conscious effort to increase the use of renewable energy sources. By investing in alternative energy sources, governments not only get to save billions of dollars that can be invested in social development, but they also join in the global effort to fight climate change, by providing energy that is much cleaner and more efficient. The private sector is also key in developing new technologies that will enable us to make greater use of our renewable energy sources and provide incentives to make these accessible to all.

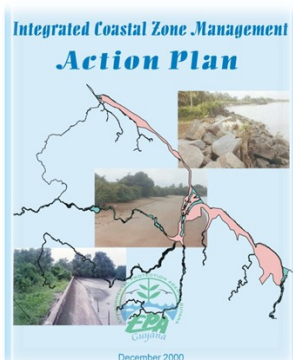
It is not up to governments and regional bodies to take action when it comes to conserving energy; individuals hold the greatest power when it comes to change. When it comes to protecting the environment, every positive action counts. Be aware of how you use energy and take small, positive steps to conserve energy in your daily routine.



Top: EC Supervisors' Workshop in Linden
 Below: Workshop for West Coast Demerara EC Supervisors

EPA'S YOUTH ESSAY COMPETITION

Integrated Coastal Zone Management (ICZM) can be defined as *'The planning and coordinating process, which deals with development and management of coastal resources that focus on the land/ water interface'*. In Guyana, there is need for ICZM due to the absence of a comprehensive integrated framework for policy planning and management. This is manifested in the numerous social, economic and ecological stresses that impact on the coastal zone. Further, the National Environmental Action Plan 1994, has recognized that improved coastal zone management is necessary and requires an integrated approach. As such, the Environmental Protection Agency (EPA) in accordance with the Environmental Protection Act, 1996, was given the mandate to coordinate an Integrated Coastal Zone Management Programme.



It must be noted that the fragility and vulnerability of the coastal zone and the importance of coastal zone management is yet to be recognized (ICZM Action Plan, 2001). In this regard, coastal zone management has been identified as a major environmental issue to be addressed within the National Environmental Education and Public Awareness Strategy, 1999.



In an effort to promote awareness and education of coastal management, the EPA launched its inaugural Youth Essay Competition on March 02, 2012 targeting University of Guyana students. This contest seeks to provide an opportunity for students to share their views on coastal management, thereby supporting the Agency's role in promoting Environmental Education. In addition, this competition endeavours to raise

awareness and support for a long-term Integrated Coastal Zone Management programme. By raising awareness on the nature and extent of the issues, it is expected that the general public will provide greater support for programmes aimed at improving the environmental quality of the coastal zone.

For 2012, the essay topic is centered on the issue of coastal degradation and the role of youths in finding solutions to the myriad of environmental issues along the coast. Consideration has also been given to this topic owing to the dormancy of ICZM public awareness in Guyana. Moreover, it is expected that this competition will foster greater interest in ICZM among youths, and possible recommendations emerging can be utilized by the Agency to improve the ICZM programme in Guyana.

University of Guyana students were invited to submit essays responding to the following questions:

- *How has coastal degradation affected you, your family, your community, or your country?*



- *With ever-increasing coastal development, how can Integrated Coastal Zone Management (ICZM) reduce conflicts related to the myriad of activities occurring along the coast of Guyana?*
- *What actions can you recommend for strengthening ICZM in Guyana?*

The winner of the 2012 EPA Youth Essay Competition will be granted a three (3) months Internship opportunity at the EPA, within the Environmental Management Division. Further, the winning entry will be published in both the Green Leaf and at least one local newspaper, and the winner will be invited to participate in the EPA's Annual Green Walk and Environmental Camp, as well as receive a participatory certificate and trophy.

The deadline for submissions is May 02, 2012, and the winning entry will be declared on May 21, 2012.

BOOSTING TOURISM BY PROTECTING OUR WETLANDS

Every year, World Wetlands Day is celebrated on February 02. To celebrate the observance this year, the Environmental Protection Agency conducted a week long outreach to students visiting the Nature School at the Zoological Park



Students of Two Brothers' Primary witnessing the presentation.

from January 30 to February 03. A total of one hundred and ten (110) students were reached over this period. The students showed great enthusiasm towards learning about wetlands. Through an interactive presentation, students learned about the Ramsar Convention and the history of Wetlands Day, what a wetland is, their importance, and the threats faced by these dynamic ecosystems.

Students were especially amazed to find out about the plants and animals that wetlands support. More so, in keeping with

the theme for World Wetlands Day – **'Wetlands and Tourism'**, students learnt about the different tourism activities that take place in wetlands and the negative ways in which tourism can affect wetlands. They were encouraged to do their part in the protection of wetlands by disposing of wastes properly, reducing the use of pesticides and fertilizers when farming, and support local efforts to protect wetlands such as our mangroves.

To reinforce what they learnt during the presentation, students completed a 'Wetlands Word Twister' to be awarded special tokens. The EPA would like to thank Ms. Yolanda Nunes, Nature School teacher for accommodating officers during this week-long exercise.

Students of Wales Primary participating in a session



THE ROAD TO RIO

The city of Rio de Janeiro will be hosting the United Nations Conference on Environment and Development, also popularly known as the 'Earth Summit' or 'Rio Summit' for the second time. The Conference will take place on 04-06 June, 2012 to mark the 20th anniversary of the 1992 meeting of the same name, and the 10th anniversary of the 2002 World Summit on Sustainable Development (WSSD) in Johannesburg.

The objective of the Conference is to secure renewed political commitment for sustainable development, assess the progress to date and the remaining gaps in the implementation of the outcomes of the major summits on sustainable development, and address new and emerging challenges.

The Conference will focus on two themes: (a) a green economy in the context of sustainable development and poverty eradication; and, (b) the institutional framework for sustainable development.

The Environmental Protection Agency as the lead agency for the Rio Project, has started preparations for the Rio Conference. A draft National Report has been prepared, and the first national stakeholders consultation has been held.



RIO+20
United Nations
Conference on
Sustainable
Development

Rio de Janeiro, Brazil • 4-6 June 2012

BIOMES OF THE WORLD

Biomes are defined as “the world’s major communities classified according to the predominant vegetation and characterized by adaptations of organisms of that particular”(Campbell). In other words, the term biome was developed to describe areas on earth that have similar climate, plants and animals, hence a biome is really a type of ecosystem that covers a large area.

TYPES OF BIOMES

Since biomes are determined mainly by climate, animal and plant types, various types of biomes can be found throughout the world. At present it is known that eight types of biomes exist on earth and these are:

- Marine biome;
- Tundra biome;
- Desert biome;
- Savannah biome;
- Grassland biome;
- Tropical rainforest biome;
- Deciduous biome; and
- Coniferous forest biome

Of the eight types of biomes that exist, only four can be found in Guyana (marine, grassland, savannah, and tropical rainforest biomes).

The continents of North America and Africa are some of the places where all of the eight biomes can be found.

IMPORTANCE OF BIOMES

Biomes are important because they are made up of the complex set of relationships that exist among plants, animals and the environment. Since biomes are relatively large areas it would mean that within a particular biome (with its’ different climate) there dwells specific animals and plants that are adapted to life in that particular biome only. An example of this is found in the marine biome which houses aquatic mammals such as whales and dolphins. It is also the home to kelp (sea weed) which is a plant that grows in the ocean.

Each biome in its own way contributes a high degree of uniqueness that makes it distinct from another biome. For each biome, there exists a characteristic climate and this is one of the most important feature of a biome because it determines the animal and plant life that would live within the biome. Biomes are definitely our major life support systems because they contain all of our food sources such as the plants and animals that dwell within them.

GUYANA’S BIOMES

MARINE BIOME

The marine biome is the largest of all the biomes, covering three fourths of the earth’s surface. It also provides the world with a great

amount of food. For Guyana, our marine biome would be as you would guess in the ocean. and major water ways.

SAVANNAH BIOME

A savannah biome as many would guess can be found in the Rupununi Savannahs of Guyana. The climate in the savannah biome stays about the same from month to month. The rainfall each month varies , sometimes the savannah gets plenty of rain and sometimes it gets very little .Grasses and small plants dominate the savannahs and tree growth is sparse only in areas of deep soil, or where cracks permit tree roots to the meager water table.



GRASSLAND BIOME

Grasslands are often the transition from desert to forest. Near the forest where rainfall is abundant, trees grow intermixed with tall grasses. Trees are limited to river and stream basins. What is so unique about the grassland is how open and continuous the area is. It seems as though the grassland is an endless ocean of grass. As you move away from the forest rainfall decreases and soil change occurs and stretches of treeless tall grass is evident. In Guyana this type of biome can be found in Orealla and Siparuta areas in Berbice and the Rupununi Savannah.

TROPICAL RAINFOREST BIOME

Tropical rainforest cover about 6% of the earths total surface. They are located mainly at the equator. The rainforest climate is warm most of the year and has a lot of rain throughout the year. Although the rainforest occupies a small land mass on the earth. They are home to the largest number of plant and animal species. It is believed that the tropical rainforests of the world may hold 90% of earth’s plant and animal species. Most of Guyana’s forest is considered tropical rainforests.

THREATS TO OUR BIOMES

As always, the most significant threat to our biomes is the activities of man. Over the years, biomes, especially marine biomes, have been subjected to oil spills and water pollution that cause severe destruction to animals and plants. There is also the ever growing problem of deforestation. It has been determined that rainforests are disappearing at about 32 hectares per minute, day and night.

We need to curb the bad practices of water pollution and over harvesting of our natural resources so as to maintain the continued use for many years to come.

KIDS CORNER

ENERGY

Energy Facts

What is Energy? Energy is the ability to do work. Taking your dog for a walk, eating, and doing homework are ways you use energy. There are so many different ways we use energy everyday:

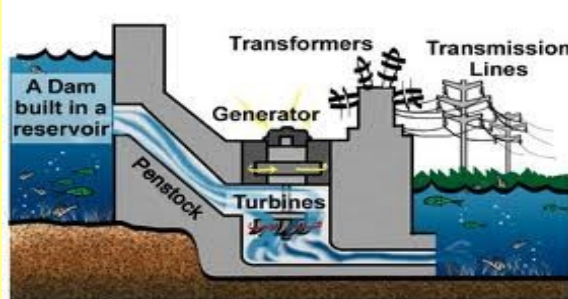
- Playing video games on the computer;
- Watching television; and
- Turning lights on in your house.



What is Electricity? Electricity is a form of energy. Electricity is generated when millions of electrons move around and create force fields that create energy. Electric power companies, like the Guyana Power and Light, make the electricity and transport it to your home.

How Electricity Works

The diagram to the right depicts how electricity is produced at a power plant and the means of how it is transported to our homes for use.



Energy Savings

Saving energy is one of the best ways to conserve natural resources. There are many things you can do at home to help your family become more energy efficient.

1) Turn off lights, computers, TV and other electrical appliances when you aren't using it.



2) Replace regular light bulbs with energy saving Compact Fluorescent Light Bulbs (CFL's)

3) Don't leave the refrigerator door open. Cold air escapes and this uses a lot of electricity.



4) Taking a short shower instead of a long bath can help save energy.

5) Plant a tree. Trees create shade around your house and help keep it cool.



Experiment

Colors and Light

Question:

Do some colors absorb more sunlight than others?

Possible Hypotheses:

All colors absorb the same amount of sunlight.

Some colors absorb more sunlight than others.

Materials:

Four tall clear glasses

Water

Food coloring

Immersion thermometer



Procedure:

1. Fill the glasses with the same amount of cold water. Record the temperature

of the water.

2. Add 20 drops of red food coloring to one glass, 20 drops of yellow to one glass, 20 drops of one green coloring to one glass and 20 drops of blue to one glass.

3. Place all four glasses in a sunny place for 15 minutes.

4. Record the temperature of the water in all four glasses.

Analysis and Conclusion:

Did the temperature of the water change? Which water got warmest? What did you learn about colors and light?



Rules for Energy Safety

1. Always ask a grown-up for help when you need to use something that uses electricity.

2. Don't yank or pull cords from a wall. Pulling cords can damage the outlet, the appliance or the plug.

3. Ask a grown-up to put safety caps on all unused electrical outlets. This can also help save energy by stopping drafts.

4. Keep electrical appliances away from water. Water and electricity don't mix. Most electrical accidents in the home happen when people use electricity near water.

5. Watch out for power lines. Never touch a power line, especially if there is one that may have fallen.

ENVIRONMENTAL AUTHORISATIONS

The Environmental Management Division (EMD) grants Environmental Authorisation for various projects submitted to the Agency. This is done after a site visit is conducted to assess the potential or current environmental impact of the project. Large projects are usually required to submit an Environmental and Social Impact Assessment (ESIA) or Environmental Management Plan (EMP). Noise permits for various events and operations are also granted by the Agency.

A total of eighty-one (81) Applications for Environmental Authorization, were received for the quarter. Twenty-five (25) of the Applications were for new projects, sixteen (16) were for existing projects, thirty-seven (37) were for renewal of Environmental Authorizations, and three (3) were for the variance of Environmental Authorizations were received during this period.

A revised EMP was submitted by Bauxite Company of Guyana Inc for a Bauxite Mining - Cocorite, Block 38, located at Ituni Creek, Upper Berbice River.

Thirty-four (34) Applications for Noise Permits were received and issued for this period.

A total of twenty seven (27) site visits for new projects were conducted, and one (1) verification visit for existing projects/operations.

Compliance/renewal audits were also conducted for twenty-one (21) operations that were issued with Environmental Authorizations.

The Agency granted forty-six (46) Environmental Authorizations during this period. Eighteen (18) Environmental Permits and one (1) Construction Permit were granted for new projects and twenty-six (26) Operation Permits and one (1) Letter of Authorization were granted to existing projects.

The Division continues to process the other applications received during this period to determine whether these projects will be required to conduct Environmental Impact Assessment (EIA) or prepare an Environmental Management Plan (EMP).



EQUIPPING STAFF FOR EXCELLENCE

The human resource of the Agency is considered its most valuable asset. As such, the Agency constantly seeks opportunities to enhance the skills of the corps of dedicated officers. During the first quarter, members of the team benefitted from training, and participated in workshops, seminars and meetings.

In February, Mr. Rayner McAndrew of the Natural Resources Management Division (NRMD) and Mr. Deuel Hughes of the Education, Information & Training Division joined colleagues of sector agencies for training in the BioSafety Clearing House Phase II. They concurred that they have gained knowledge on the requirements for importers and exporters when dealing with Genetically Modified Organisms. Mr. Rayner McAndrew also benefitted from an MSC Fisheries Certification Workshop which basically informed stockholders about the programme and requirements that Guyana should meet if it decides to be a part of the programme.

Ms. Melissa Leonard, Administrative Assistant with NRMD, was the lone participant from the EPA this time around at the Professional Secretarial training session. She enthused that she is now much more equipped to execute her tasks in an efficient and professional manner.

In preparation for Rio+20, Ms. Stacy Lord and Ms. Diana

Fernandes, also of the NRMD were honoured to be part of the National Multi-Stakeholder Meeting during which they were able to gain knowledge about Guyana's activities in the area of sustainable development since the 1992 'Rio Summit'.

Ms. Chuvika Harilal of that Division also represented the Agency at the Latin America Capacity Building Workshop for the implementation of the CBD Programme of Work on Protected Areas with distinction. She disclosed that the workshop was intended to strengthen signatories ability to implement the programme in their countries.

A team from the Agency including Ms. Diana Fernandes of the NRMD, and Ms Teijvarti Persaud and Ms. Nalissa Persaud of the Environmental Management Division (EMD), made valuable contribution at a session intended to raise awareness on how communities use their ecosystem to empower communities at the Prioritisation of Ecosystem Services for Guyana's MRV Workshop.

Mr. Rae Smith, Ms. Karen Alleyne, Ms. Aretha Forde were happy to be the Agency's representatives at a seminar on 'the Environment and the Atmosphere' where they found the natural environment and the principles of Christianity are inter-related.

UPCOMING ACTIVITIES



The EPA initiates and undertakes continuous activities to ensure that the concept of environmental stewardship reaches across all parts of Guyana. Having successfully achieved the set goals in this regard for the first quarter of the year, planning and coordination have already begun to guarantee a varied and participatory approach to events planned for the next quarter.

The interesting mix of activities planned for April–June 2012 include the following:

Activity	Theme	Target Group	Date
Earth Day	'Mobilize the Earth'	School-based Environmental Clubs	April 22
International Day for Biological Diversity <ul style="list-style-type: none"> Youth Forum– Essequibo Art Competition (20 primary schools in Regions 3 & 4) Exhibitions (National Library, Guyana Post Office lobby & Anna Regina Multilateral School) Panel Discussion (NCN 11) 	'Marine Biodiversity'	Selected schools and general public	May 22
World Environment Day <ul style="list-style-type: none"> Green Walk (Georgetown) Ride for the Environment (Linden & Essequibo) Panel Discussion (NCN 11) Annual Environmental Camp 	"Green Economy: Does it include you?"	General public and Environmental clubs	June 5 <ul style="list-style-type: none"> June 3 June 10&16 Airing June July
Environmental Clubs Supervisors Training		Environmental Club Supervisors– Region 4	April 26



WILDLIFE SPOTLIGHT

Did you know?

The Four Eyed Fish (*Anableps anableps*)

The Four-Eyed Fish, *Anableps anableps*, is truly an amazing creature. With eyes that rise above the top of the head and the pupil in each eye horizontally divided in two different parts, the fish is allowed to be able to see clearly below and above the water. They are a genus of fishes in the family Anablepidae belonging to the order Cyprinodontes, small, often colorful livebearing fish with complex behaviors.

These fishes inhabit both freshwater and brackish water habitats, but always in very shallow water, foraging on the muddy and sandy areas covered with water as the tide moves forwards and backwards. They originated from lowlands in Central America and live in the mouths of rivers from Guyana to Venezuela.

Four-eyed fishes range in colour from a transparent silver to light bronze with a thin line running down the backbone area of the fish. They are normally about 30 centimeters long with the maximum length being 32 centimeters.

The eyes are the amazing feature of these fishes. Four-eyed fishes do not actually have four eyes. A narrow band of epithelium divides the upper and lower halves of their eyes. Each half has a separate pupil, iris and cornea, but the retina is divided. Both halves of the eye use the same lens, with the upper light path traveling through the short axis of the lens, while the lower light path travels through the long axis. This dual use of the lens corrects for the different behavior of light in air and in water, with the underwater lens face more strongly curved. The underwater half of the eye projects an image to the upper half of the retina, while the part of the eye above water projects to the lower retina. The upper eye must be occasionally wetted to prevent dehydration, but when the fish is completely submerged, the image from the upper half of the eye is out of focus.



These fishes spend most of their time at the surface of the water. They feed by diving down and skimming algae and whatever organic detritus they can find on the substrate. To avoid being taken by predators, these fishes periodically rise to the water surface, using their distinctive split eyes to look out for both aerial predators (such as seabirds) and aquatic predators (such as bigger fishes). When they are not feeding, the four-eyed fish will rest on the substrate, often in such shallow water that their backs are barely covered. This keeps them relatively safe from aquatic predators, but should they see an aerial or terrestrial predator coming towards them, they will quickly dart back into deeper water. Their diet mostly consists of terrestrial insects which are readily available at the water surface; however, they may consume other foods such as invertebrates, diatoms, and small fishes.

Four-eyed fishes seem to be designed for asymmetrical mating and are live bearers. In females, a single large scale covers the cloaca and opens either to the left or to the right. In males, the anal fin is adapted as a funnel for sperm transfer, and similarly extends either to the right or the left of the body. Fertilization is internal, and males and females have to be appropriately matched. Right-handed males outnumber left-handed males about 60:40 with about the same proportion of the appropriately structured females. Development is viviparous, with the young nourished by nutrient diffusion across the reproductive tract of the female. The fry are retained until they reach a length of about 45 mm. Probably because of the size of the young fish at "birth" only 14 to 20 embryos develop from a brood. Sexual maturity occurs at about 9 months.

"Four-eyes" are social fishes and stay in groups. They coexist reasonably well with other fishes, provided their counterparts are peaceful and non-territorial. While they are not predatory as such, very small fish may be snapped at (and this includes their own offspring).

About Our Logo...

Our logo is the Passion Fruit leaf. Yellow Passion Fruit (*Passiflora edulis flavicarpa*) is native to the Amazon. The passion fruit plant produces beautiful flowers and a sweet – tart fruit. It was named by the Spanish missionaries in South America. Passion Fruit is widely grown throughout the tropics and subtropics. The leaves are used in traditional medicine to settle edgy nerves. They are also used for colic, diarrhea, dysentery and insomnia.

THE GREEN LEAF

The Green Leaf is published quarterly by the Environmental Protection Agency, Guyana.

This publication is intended to promote awareness on the work of the Environmental Protection Agency.

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