2ND PHILIPPINE ENVIRONMENT SUMMIT

Mainstreaming Innovations for Sustainable Development

February 20-22, 2018; Waterfront Hotel, Lahug, Cebu City

I. THE SUMMIT

The 2nd Philippine Environment Summit: *Mainstreaming Innovations for Sustainable Development* was held last February 20-22, 2018 at the Waterfront Hotel, in Lahug, Cebu City. It had an average of 1,181 participants with an average of 261 or 22% from government, 492 or 42% from the academe, 140 or 11.9% from private sector, 140 or 11.9% from non-government and people's organizations, 21 or 1.81% from media, 60 or 5% exhibitors, 13 or 1.10% organizers, 32 or 2.7% resource persons, and 24 or 2% service providers. Having multi-sectoral representatives was a clear demonstration of "*Greening together, Growing better*," as envisioned by the convenors of the event, Green Convergence for Safe Food, Healthy Environment, and Sustainable Economy (GC) and the Department of Environment and Natural Resources (DENR).

DAY 1 (February 20, 2018)

The first day started with the Pambansang Awit and with an interfaith prayer that sought the Creator's guidance in rectifying the degradation of His Creation caused by humans. The inter-religious prayers were led by **Fr. Pete Montallana**, a Catholic priest and Chair of the Save Sierra Madre Network; **Wahida Abdullah**,

representing the Muslims and **Juhra Kiman** of the Yakan Tribe, representing the indigenous peoples.

It was followed by the Hall of Famer Sinulog Dancers, the **San Diego Dance Troupe**, that gave a historical perspective of the coming of the Spaniards to the Philippines and Cebu's popular festive event, the Sinulog, held every January.

Angelina P. Galang, Ph. D., Founder and President of Green Convergence, gave the Opening Remarks. She gave a background on the 1st and 2nd Philippine Environment Summits and asked all to work together to achieve triple bottom line for the country – protect the integrity of nature, obtain a sustainable economy and ensure social justice. She called on the students to allow their youthful optimism to carry forward these objectives on a personal basis by enhancing their awareness and understanding of the environmental impacts of their personal lifestyle. Dr. Galang concluded her talk enjoining all to actively participate in developing resolutions that will mainstream the various innovations presented during the Summit.

DENR **Secretary Roy A. Cimatu** was the Keynote Speaker. He mentioned the previous Philippine Environment Summit and acknowledged some notable guests and participants present. He also accentuated on the actions, status and accomplishments undertaken by DENR; particularly on Solid Waste Management, Protected Area and Ecotourism, Water Quality, Geohazard Assessment and Mapping, Coastal and Marine, Biodiversity Conservation, and Air Quality. Furthermore, he stressed on the recently talked about environmental issue in Boracay and his pursuance of cleaning the area in a span of six (6) months.

POWERPOINT PRESENTATION

Republic of the Philippines
Department of Environment and Natural Resources

2nd Philippine Environment Summit

Sec. Roy A. Cimatu

Waterfront Hotel, Cebu City
February 20, 2018

1st Philippine Environment Summit

SOLID WASTE

- Assisted 321 Local Government Units (LGUs) in the proper closure and rehabilitation of open and controlled dumpsites
- Reached 138% of its target in solid waste management in Manila Bay Region and adjacent areas

PROTECTED AREAS and ECOTOURISM

- Reached 135% in the management and protection of protected areas and ecotourism development
- Protected Area Management Boards (PAMBs) approved 997 resolutions in 2017

PROTECTED AREAS and ECOTOURISM

- 100% completion rate of protected areas managed and protected
- 108% Blue or Green Brigades or volunteers engaged
- 103% ecotourism facilities maintained and rehabilitated

NATIONAL GREENING PROGRAM (NGP)

- Planted 1.86 million hectares from 2011 to 2017 or 113% of the target
- Generated 4 million jobs from 2011-2017

WATER QUALITY

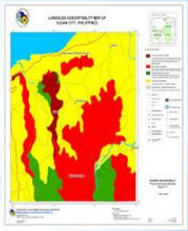
- Monitored 106% firms for their compliance with Clean Water Act
- Adopted new esteros and water bodies has reached 109%

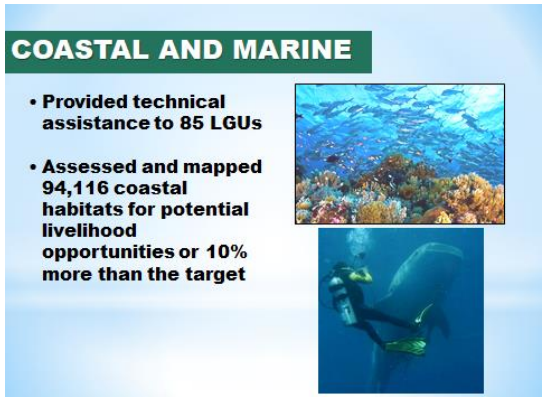
WATER QUALITY

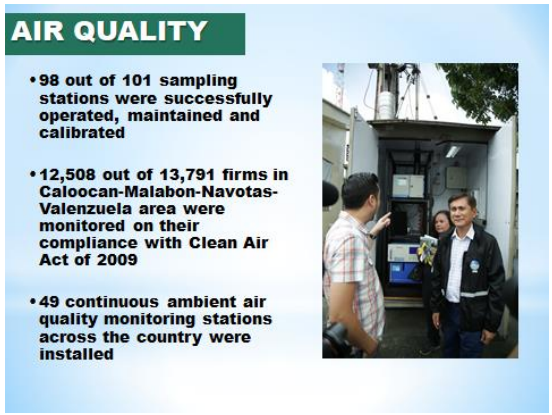
- 32 WAQMAs nationwide were operationalized
- Formulated 2016 General Effluent Guidelines

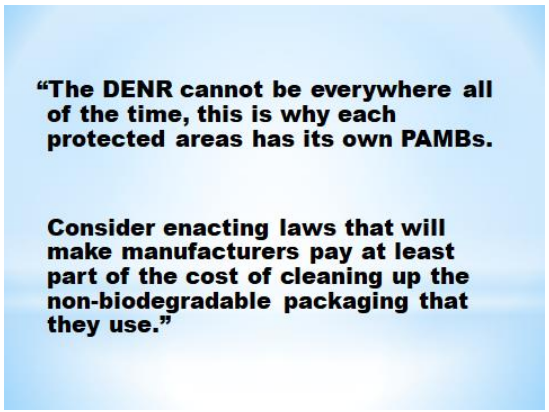
GEOHAZARD ASSESSMENT AND MAPPING

- Updated 1:1,000 scale geohazard maps of 21 LGUs
- Completed detailed subsurface assessments of 15 LGUs
- Geospatial Data Infrastructure Program: 100% system analysis, 96% program development









Mr. Junard Catingub discussed that climate change is everybody's concern and that various organizations had creative initiatives to promote environment preservation and conservation. Green Convergence's own initiative is the official launch of its virtual library. The virtual library is simple, easy-to-use and can be accessed through the mobile and desktop versions. DENR Sec. Cimatu led the launch and navigation of the virtual library.

Sec. Cimatu led the guests to the opening of the exhibit area. Booths were officially opened. Visits to the booths led to discovery of products, technologies that promote safe food, healthy environment and sustainable economy.

Day 1 Morning Session was hosted by **Lou Bonnevie**, Founding President of Earthday Jam Foundation and **Engr. Christine Marie Ilagan Gohetia**, Faculty member of Computer Engineering of University of San Carlos.

The morning session ended with a **Press Conference** with DENR Secretary Roy Cimatu, Undersecretary Miguel Cuna, Green Convergence President Angelina Galang, Ph. D., and UN Convention on Migratory Species Secretary Bradnee Chambers spending time with media. Environment issues on ecotourism cites- Boracay, Panglao, El Nido, forest fire incidents in Mt. Pulag and other environmental issues focused in Cebu were discussed.

During the Open Forum, DENR Secretary Roy Cimatu gave an update on DENR's efforts in Boracay. Twelve (12) teams have been convened to do information campaign, inspection and to investigate on the problem of illegal discharges into the sea. Violators will be given 2 months to correct their system, otherwise their establishment will be closed. Similar investigation will be done in El Nido, Palawan and Panglao in Bohol.

There was also an inquiry on the National Greening Program in Cebu with a budget of PhP 2M. Assistant Regional Director, Forester Edward Ting, responded that around 85,000 hectares have been reforested throughout the four (4) provinces in Region 7. Those in Cebu are newly established plantations, thus, their impact will be felt in due time. A suggestion was raised to plant fruit trees to be a means of livelihood for communities. Sec. Cimatu informed media that there is already an NGP road map where zoning areas for bamboos, fruit trees and mangroves are identified. Moreover, Undersecretary Cuna confirmed that a mechanized seedling facility will be installed each in Cebu, Siquijor and Negros.

Another issue that was raised was on the conversion of Bantayan Island into a disposable and alienable (A&D) land as filed through a bill by Congressman Benhur Salimbangon. The island was declared and classified as timberland wilderness area by former President Marcos; however, it is now populated. Secretary Cimatu responded that DENR has done its role; however, conversion of land classification from timberland wilderness area to disposable and alienable land takes time because it needs the pronouncement of Congress. He likened this to Dinagat Island in Surigao. People have built structures on land that is not classified as A&D. DENR's role is limited. The main responsibility belongs to Congress.

The grass fire in Mt. Pulag involving Cebuano trekkers was also discussed. Sec. Cimatu explained that grass fires in mountains like Mt. Pulag are difficult to control because of the strong wind, being 7,000 – 8,000 ft. above sea level, with prevalent dry cogon grass in the area. Simple accidents while cooking could spark fire and easily raze grasslands. The situation is aggravated by the lack of accessible water, or of any fire extinguisher. Sec. Cimatu had instructed the Regional Director to anticipate such accidents, come up with controls, and institute appropriate policies for trekkers and tourists to avoid similar accidents from happening. Usec. Cuna added that charges have been filed against the trekkers in violation of Presidential Decree 705. In addition, the area has been temporarily closed to trekkers.

The press conference ended with Dr. Galang promoting the use of native tree species in reforestation activities. To learn more and to appreciate the benefits of native trees, GC produced Philippine Native Trees 303 Up Close and Personal, where trees are presented in a personal and friendly, non-technical manner that makes reading interesting, entertaining and educational at the same time. Sec. Cimatu, on the other hand, recalled the pristine natural resources of Cebu being his first assignment way back in the 70s. He recalled his enjoyable memories of clean, beautiful beaches, coupled with bananas and "*tuba"* in Talisay; however, Cebu has changed. He enjoined Cebuanos to appreciate, care and rehabilitate their God-given resources.

Ms. Abrenica

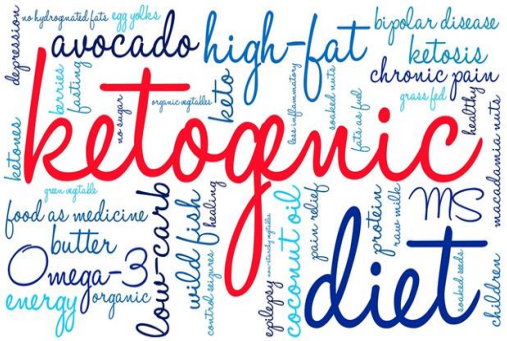
The afternoon was energized by five (5) breakout sessions discussing a variety of topics. **Session A on Sustainable Plant-based Manufacturing Industries** was chaired by **Brenette Abrenica**, Director of Community Extension Services of University of San Carlos and moderated by **Dolores Saldivia** of Cebu Doctors' University. Session A had three (3) speakers.

Ms. Saldivia

1. **Topic: Bio Chemicals from Coconut**
   by Emerson John Tiu Ng
   Applications Manager, Chemrez Technologies

Mr. Emerson John Tiu Ng presented how his company maximized the profitability of coconut oil by creatively working on its carbon chains to produce: (1) the highly-in-demand MCT, crucial for the popular Ketogenic Diet that controls body weight and simultaneously boosts energy for athletes, and (2) the Bio Active Lubricant for efficient engine performances without negative sulfuric effects, the main cause of acid rain.

POWERPOINT PRESENTATION



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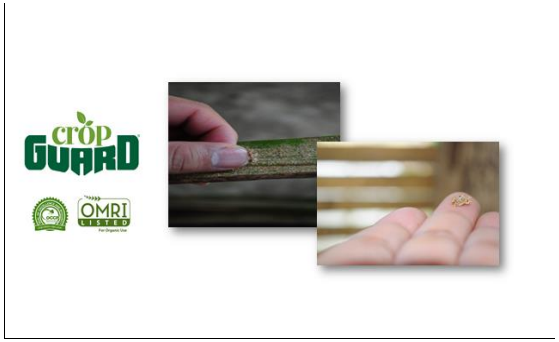


CHEMREZ TECHNOLOGIES

"Innovation distinguishes between a leader and a follower."

Steve Jobs

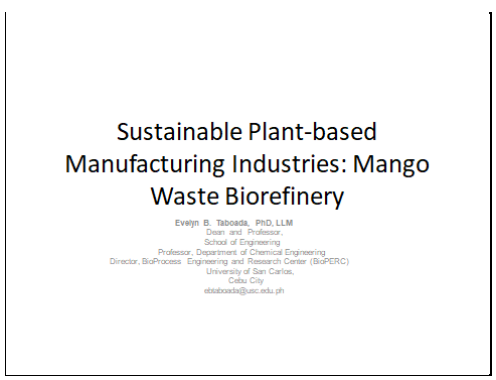
2. **Topic: Zero Waste Mango Industry**

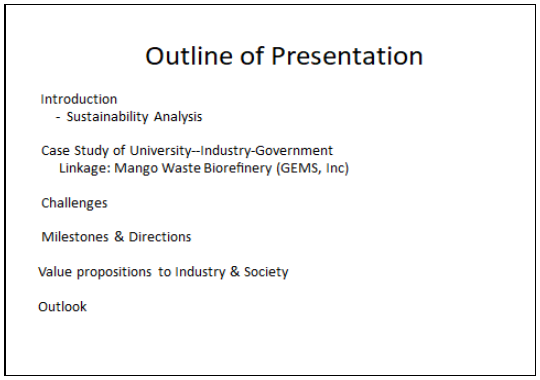
by Dr. Evelyn Taboada

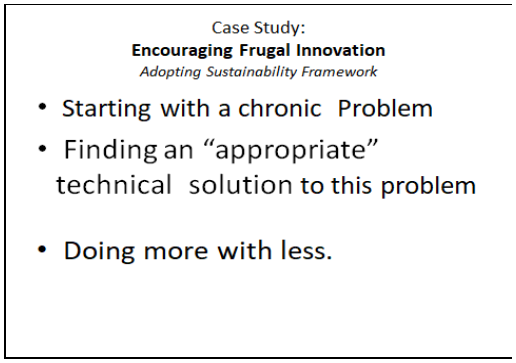
Dean, College of Engineering, University of San Carlos (USC)

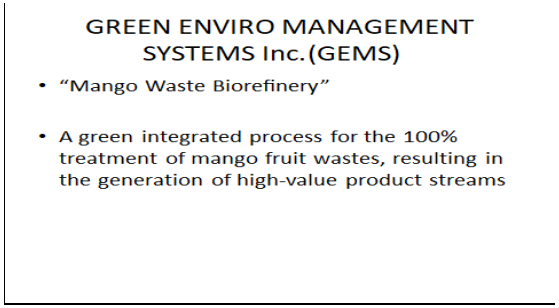
Dr. Evelyn Taboada presented how Mango waste can be used as a renewable resource. She explained how University of San Carlos pursued to solve and manage food wastes, initially converting mango seeds, husks and peels into flour and compost. Through a partnership among USC, government and investors, a start-up company named, Green Enviro Management Systems (GEMS), was created where mango waste was converted into flour, tea, butter, pectin, polyphenols, feed mix and fuel bisquets – a demonstration of a successful ratio of 100% waste converted into 100% products. By 2020, GEMS will make its initial public offering. With USC's exit, it will continue to engage in Waste-to- resource Conversion studies using other fruits or vegetables.

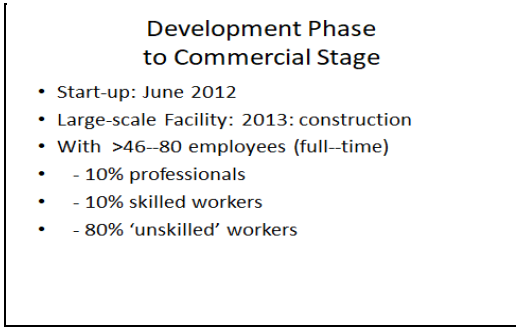
POWERPOINT PRESENTATION











Mango Waste Biorefinery

covered by USC IP (e.g. Patents) Portfolio licensed to GEMS,Inc.

Mango PEELS Mango SEEDS	Integrated processes for treatment, conversion & recovery	SOLID FUEL (BRIQUETTES) FEED MIX FLOUR &TEA
	(semi--refined) (refined)	BUTTER PECTIN POLYPHENOLS
Utilities Auxiliaries	(fermentation) (biocatalysis)	Special Fine chemicals
100% WASTE	INTEGRATED PROCESSING TECHNIQUES	ZERO WASTE

Development of a Variety of Recipes using Mango Flour!

- Mango pandesal
- Bread sticks
- Mango bar & Energy bar
- Mango Tea

NO CHOLESTEROL, NO TRANS-FAT, NO GLUTEN!

Mango flour (MF) is made from the mango fruit of Philippine variety. Naturally rich in vitamins, minerals, dietary fiber, polyphenols(anti-oxidants), and digestive enzymes, it is a healthier option for your baking and cooking needs. The flour is processed mildly from fresh mango kernels to preserve its beneficial and nutritious ingredients. It is also **unbleached** to retain its natural food color. **Polyphenols** in MF are anti-aging & anti-cancer agents; in addition, high **anti-oxidant activity** helps strengthen the immune system. The **beneficial dietary fiber and digestive enzymes** in MF also help facilitate efficient food intake and digestibility.

In your baking and cooking adventures, you can explore the nourishing benefits of Mango Flour by using it as is or combining it with all-purpose flour as desired.

Mango Flour

Technical Specifications & Nutrition Facts

CONTENT	Per 100 gms
Total fat	5.9 g
Saturated fat	3.0 g
Trans fat	0
Cholesterol	0
Protein	7.3 g
Carbohydrates	78.9 g
Calories	398
Total sugars	4.5 g
Total dietary fiber	17.5 g
Vitamin A	Less than 50 IU
Vitamin C	6.2 mg
Vitamin E	1.3 mg

CONTENT	Per 100 gms
MINERALS	
Sodium	398 mg
Calcium	140 mg
Iron	41 mg
Potassium	9 mg
Magnesium	529 mg
Phosphorus	72 mg
Zinc	7.3 mg
POLYPHENOLS (antioxidants)	≥ 100 mg
Antioxidant activity	≥ 80,000 µmol TEAC*
Digestive enzymes	300,000 units
* TEAC = *Trolox Equivalent*	Anti-oxidant activity

ADVANTAGES OF THE PROCESS TECHNOLOGY

100% treatment of waste ➡ zero waste ➡ minimize disease- carrying pests
Efficient and environment-friendly waste management strategy
Generation of a range of high-value product streams with global market
Economy of high scale of processing; yields & productivity are high
Green technology for production system (Solar Drying Facility); Briquette as a renewable energy; solar energy system installation

DISADVANTAGES OF THE PROCESS TECHNOLOGY

Relatively complex technology, requires customized machinery (new process); continuous R&D
Strict regulatory requirements on product standards
Requires big investments for the manufacturing facility

APEC--IPEG DELEGATES VISIT

BIO-REFINERY PLANT Aug. 22, 2015

- "The USC plant is one of our ITSO success stories which illustrate the very best of government and private sector partnership in the area of IP. We plan to replicate this model at scale to benefit more universities and research institutions across the country. We are hoping that this visit will result in stronger policy support for IP commercialization for academic institutions," said Atty. Allan B. Gepty, Deputy Director General / OIC DG of the Intellectual Property Office of the Philippines (IPOPHL) and head of the Philippine IPEG delegation.

Training-workshop and Participation in World Trade Shows

- March 29 – April 2, 2016 : Training--workshop on the Commercial Baking if Breads using Mango Flour in Johannesburg, South Africa.
- 2016 : SIAL PARIS Food Innovation
- 2017-18 : Winter Fancy Food Show, San Francisco California, USA
- 2017 : Natural Product Expo West, Los Angeles, California, USA
- 2017 : ANUGA in Cologne, Germany

MILESTONES & DIRECTIONS : USC & GEMS

2012	2013	2015-17	2018-19	2020 ONWARDS
Incorporation Pilot Plant Set-up Prototypes Development Stage	Construction of Facilities	Production Marketing Promotions More R&D Certifications Technology Licensing - PH - ASEAN - Others (SA, MX)	Sustaining its Profitability Further Research & Innovation Product Development	Expansion Sustainability InitialPublic Offering (IPO) Exit strategy

SUMMARY:
Value Propositions and
Relevance to Industry & Society

1. Waste Recycling
2. Resource Management
3. Value Creation & Intensification
4. Job creation & Workforce Assimilation

★ Revenue Generation (Sustainability)

3. Topic: Hibiscus Based Livelihood of Dumagats in Tanay, Rizal

by Elizabeth de Castro
Convenor, Earth Day Network

Elizabeth de Castro presented how Earth Day Network, in partnership with Shumei Natural Agricultural Farms and other stakeholders, helped the Dumagats process Roselle into high value products for livelihood. Roselle is a Hibiscus variant that grows in the Philippines requiring low care maintenance. It is valued for its medicinal, nutritional and personal care properties can be sold fresh or dried or could be processed into food supplements, tea, jam, jelly and personal care products like soap and shampoo. Roselle can be grown in pocket spaces without interfering on biodiversity; conversely, it enhances biodiversity because of its ability to attract birds, bees, while maintaining the integrity of the soil and sequestering carbon emissions.

Roselle-based Community Industry

"PROTECTING BIODIVERSITY THROUGH DEVELOPING COMMUNITY-BASED SUSTAINABLE USE OF NATURAL RESOURCES."
2nd Philippine Environment Summit
February 20-22, 2018
Cebu, Philippines

Elizabeth P. De Castro, Ph.D
Convenor, Earth Day Network

Antonio De Castro
Project Director, Shumei Natural Agriculture Farm, Philippines

Project Implementors

- Earth Day network
- Shumei Natural Agriculture Farms, Philippines

In partnership with
Sukatan Dumagats LN
University of Rizal System

Funded by
- United Nations Development Programme (UNDP) Small Grants Program
- Global Environmental Facility (GEF)

Sierra Madre Mountains

– Largest remaining primary rainforest in the Philippines
– Home of many critically endangered and endemic Philippine flora and fauna
– Threatened by activities such as illegal logging, slash and burn agriculture, charcoal-making, contamination of water tables and rivers from use of synthetic chemical-based fertilizers and pesticides, climate change
– Home for different indigenous groups (Aetas, Dumagats)

Project Goals

- Protect biodiversity of the area by enabling indigenous communities and small farmers to benefit from the natural rsources of their environment so that they will appreciate, protect and nurture these resources
- Provide alternative sustainable livelihood and enterprise development towards improving their income and quality of life

Roselle- Hibiscus Sabdiriffa

Native, gumamela (a las dose)

Very prolific, grows well in the Philippines

Popular Internationally

- Flor de Jamaica in Mexico
- Carcadai in Egypt, Middle East, Africa
- Sorrel in Jamaica
- Popular in Thailand, Malaysia, Taiwan, Singapore, Viet-Nam

Benefits to Dumagats

- Organic/natural agriculture farming
- Low –cost
  - No fertilizer
  - No pesticides
  - Minimal labor
- Low maintenance
  - No till
  - Rainwater irrigation
- Very prolific, good harvest
- Good commercial potential
- Food source

Biodiversity benefits

- Native to region
- Requires no fertilizers or pesticides
- Requires no plowing or irrigation
- Attracts birds and bees
- Alternative to destructive livelihood practices
- Maintaining integrity and quality of the soil
- Positively affects carbon sequestration

Medicinal Benefits

- Regulates blood pressure
- High source of vitamin C
- In India used for shampoo and skin
- Lowers cholesterol

Daraitan, Tanay, Rizal (Quezon)

Part of CADT area (Certificate of ancestral domain title), 15000 hectares

Project Outputs

- **Technical training and assistance**
  - Organic/natural agriculture
  - Processing of roselle into commercially viable product
  - Packaging of roselle products
  - Marketing (Roselle Festival)
  - **Community participation**
    - -gender mainstreaming
    - Indigenous peoples sensitivity
    - Knowledge management

Seed germination

Delivery of Seedlings

Intercropping

Kakawate (for dog soap)

Turmeric

Intercropping

- Possible mulberry (long-term, fruits in 2-3 years

Assistance from Shumei Japan

1st Dumagat harvest

Processing Facility

Interfaith blessing of processing facitliy

Dehydrator

Dried Roselle

Dried Whole roselle

Marketing

Dumagat Cultural presentation

Shumei Taiko Drumming

Native cooking style with bamboo

Showcase of products at roselle Festival

Local marketing

Product development

Issues and Challenges

- Climate Change
  - Droughts and floods
  - Internal organizational issues within Sukatan
    - Change in leadership
  - NCIP
    - Delays in approval process
  - CADT
    - Land Grabbing

Future workshops

- Essential oils
- Soap making
- Packaging
- Marketing

Roselle soap

Essential oil distilling

Culinary Hibiscus-cured salmon

|Recipe for hibiscus cured salmon

- **Ingredients**
- 1 pound salmon fillet
- 3 Tbsp kosher salt
- 3 Tbsp sugar
- 1 Tbsp dill
- 1/4 cup cooked hibiscus flowers
- Peel from one lemon
- Mix all the ingredients and cover salmon with it. Cover with plastic wrap and refrigerate overnight (10-18 hours). After refrigeration, rinse with cold water, pat dry, and slice diagonally. Serve with pepper, dill, lemon and eat with bagels, labne, avocado, salad, whatever you wish. Don't wait too long to eat it! It will keep fresh for about 2-3 days.

Roselle Wine

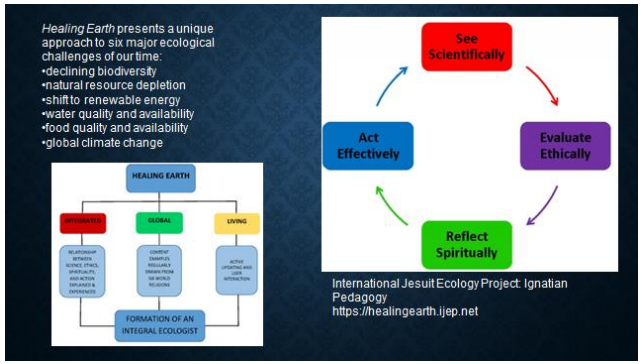
All breakout sessions concluded with a workshop to discuss possible projects and areas of collaboration to mainstream innovations discussed. They are found at the end of the Summit report.


Ms. Fuentes

Session B, Healing the Earth through Environmental Technologies was chaired by **Julie Otadoy, Ph. D.,** a Biology professor of University of San Carlos and was moderated by **Rosalinda Fuentes** of Let's Do It Philippines. Dr. Julie Otadoy gave a brief introduction on how science and technology help Earth recover from anthropogenic degradation. She described emerging green technologies like thermos-depolymerization that turns carbon-based waste materials into oil; desalination that removes salt and other minerals from seawater to provide potable water; hydrogen fuel cell that is a pollution free alternative to fossil fuels; biotechnology, solar energy, and ocean thermal energy. The Session had four (4) speakers.


Dr. Otadoy

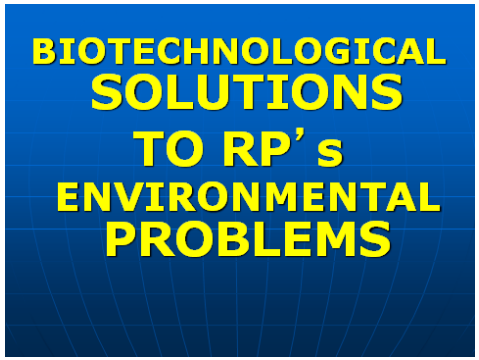
POWERPOINT PRESENTATION OF JULIE OTADOY, Ph. D.

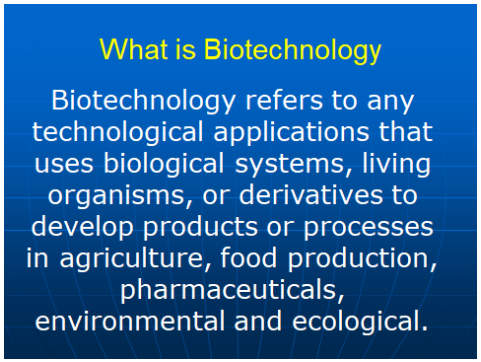


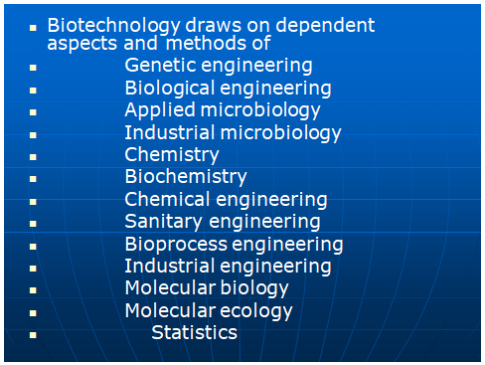
1. Topic: **Environmental Biotechnology**
   by Edgar Maranan
   Chairman, Greenvironment

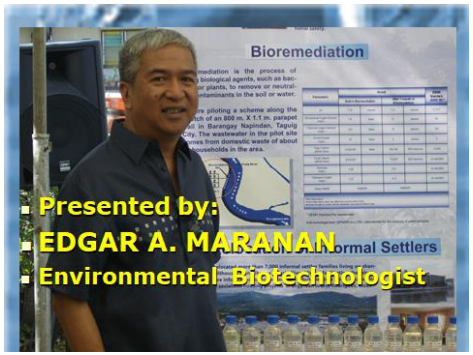
Edgar Maranan gave a general orientation on various kinds of biotechnology and explained how each helps heal the environment. He continued to focus on bioremediation, the process of using carefully selected, naturally-occurring non-pathogenic microorganisms to attack, degrade and neutralize toxic and hazardous waste from contaminated soil, wastewater and decaying river systems. He introduced his own creation, the eM23, a set of carefully selected microorganisms that break down and remove the foul stench of garbage leachate. To prove the success of his eM23, he showcased pilot projects all around the country that benefited from his biotechnology program. Some of them are : Clark Integrated Waste Management Center, Treatment of Infected Smuggled Meat, Biomethanation Project of Metro Manila Garbage, Treatment of Rejected Wyeth Milk, and Bioremediation Pilot Project in Barangay Napindan, Taguig City.

POWERPOINT PRESENTATION









What is BIOREMEDIATION?

Bioremediation uses carefully selected, naturally-occurring, useful, non-pathogenic microorganisms to attack, degrade and neutralize toxic and hazardous waste from contaminated soil, wastewater, & decaying river system.

- Acetobacter
- Kluyveromyces
- Aspergillus
- Saccharomyces
- Bacillus
- Lactobacillus
- Rhizopus
- Trichoderma
- Actimomycete
- Pennicillium

CLARK INTEGRATED WASTE MANAGEMENT CENTER

Still the ONLY Sanitary Landfill in the Philippines fulfilling all requirements of the "Ecological Solid Waste Management Act" Republic Act RA 9003

No. 1
EMERGENCY SITUATION

METRO CLARK SANITARY LANDFILL

- Bioremediation of the 13,000 cubic meters of accumulated garbage leachate.
- Carefully selected microorganisms were unleashed to degrade pollutants and neutralize stinking garbage leachate.

Up-plug flow Anaerobic Filtration system for the treatment of garbage leachate

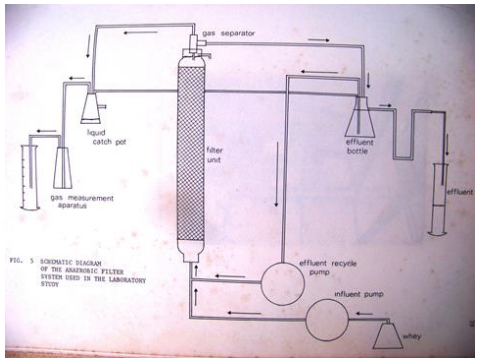


FIG. 5 SCHEMATIC DIAGRAM OF THE ANAEROBIC FILTER SYSTEM USED IN THE LABORATORY STUDY

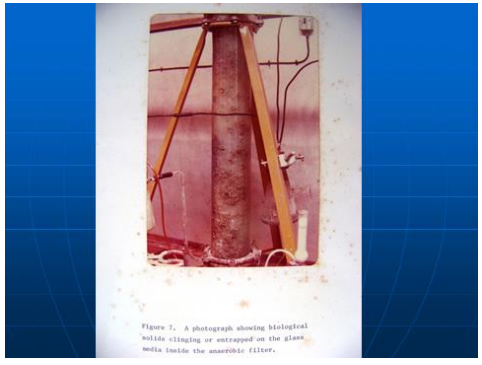


Figure 7. A photograph showing biological solids clinging or entrapped on the glass media inside the anaerobic filter.

No. 2

EMERGENCY SITUATION

TREATMENT OF **TONS OF INFECTED SMUGGLED MEAT** CONFISCATED BY THE BUREAU OF CUSTOMS

TONS OF INFECTED MEAT
apparently smuggled with political patronage and confiscated by the Bureau of Customs.

JAN 10 2007

JAN 10 2007

JAN 10 2007

JAN 10 2007

JAN 10 2007

JAN 10 2007

JAN 10 2007

JAN 10 2007

No. 3

BIOMETHANATION PROJECT

METRO MANILA GARBAGE

to be converted into energy

No. 4

EMERGENCY SITUATION

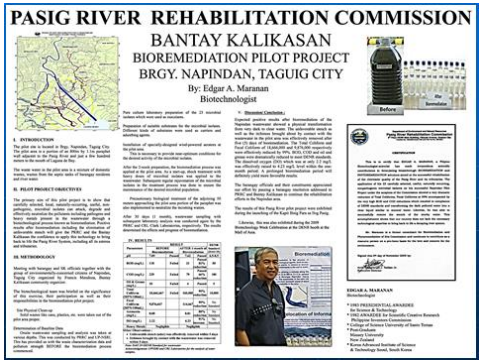
TREATMENT OF **TONS OF WYETH MILK** REJECTED AND ORDERED FOR DUMPING BY THE FOOD AND DRUGS ADMINISTRATION

BFAD ordered the recall of some **four million units** (cans or cartons) of Wyeth infant milk formula after government investigation showed that "various lots" in the firm's warehouse had rust and molds.

TREATMENT OF TONS OF Wyeth milk rejected and ordered for dumping by the Bureau of Food and Drugs (BFAD) Administration but too dangerous to enter the ecosystem. Once more, the application of biotechnological tools was applied for the proper disposal of the contaminated milk.

No. 5
EMERGENCY SITUATION

PASIG RIVER BIOREMEDIATION PROJECT


PASIG RIVER REHABILITATION COMMISSION

BANTAY KALIKASAN
BIOREMEDIATION PILOT PROJECT
BRGY. NAPINDAN, TAGUIG CITY
By: Edgar A. Maranan
Biotechnologist

The United Nations Human Development Programme (UNHDP) has tagged the Pasig River as **one of the world's most polluted rivers** as published by the Philippine Inquirer (November 11, 2006), citing that 150 tons of domestic waste and 75 tons of industrial wastes are still being dumped at a daily rate today.

BIOREMEDIATION PILOT PROJECT IN BRGY. NAPINDAN, TAGUIG CITY

Edgar A. Maranan
Biotechnologist

- **DESCRIPTION OF AREA**
- The pilot site in Brgy. Napindan, Taguig City is 800m X 1.1m parapet wall. The wastewater in the pilot area is from domestic wastes of about 79 families.

NAPINDAN BIOREMEDIATION

Twenty three (23) desirable and useful microbial isolates will attack, degrade and effectively neutralize the pollutants.

Summary of Water Quality Data

Parameters	Result				DENR Standard
	Before Bioremediation		After 1-month of Bioremediation		
pH	7.09	Passed	7.62	Passed	6.5-8.5
BOD (mg/L)	118	Failed	21	Passed 82% reduction	50
COD (mg/L)	229	Failed	79	Passed 66% reduction	100
Oil & Grease (mg/L)	30	Failed	4	Passed	5
Total Coliform (MPN/100mL)	18,666,667	Failed	160,000	99% reduction	10,000
Fecal Coliform (MPN/100mL)	9,876,667		114,667	99% reduction	No Standard
Ammonia (mg/L)	0.08		0.01	88% reduction	No Standard
DO (mg/L)	2.22		4.23	91% increase	No Standard
Heavy Metals	Negligible		Negligible		

Other Observations:
- Unfavorable stench (odor) was effectively removed within 5 days
- Itchiness brought by contact with the wastewater was removed within 5 days

Discussion:

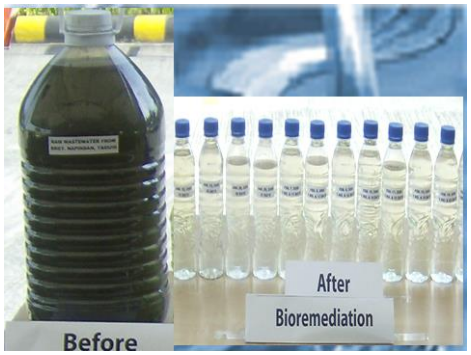
- Expected positive results after bioremediation of the Napindan wastewater showed a physical transformation from very dark to clear water. The unfavorable stench as well as the itchiness brought about by contact with the wastewater in the pilot area was effectively removed after five (5) days of bioremediation. The Total Coliform and Fecal Coliform of 18,666,000 and 9,876,000 respectively were effectively reduced by 99%. BOD, COD and oil and grease were dramatically reduced to meet DENR standards. The dissolved oxygen (DO) which was at only 2.2 mg/L was effectively raised to 4.23 mg/L level within the one-month period. A prolonged bioremediation period will definitely yield more favorable results.

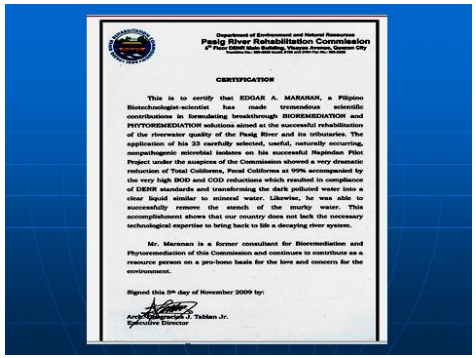
What contributes to Pasig River pollution?

5 percent - river encroachment

35 percent - industrial

60 percent - domestic





Department of Environment and Natural Resources
Pasig River Rehabilitation Commission
4th Floor DENR Main Building, Visayas Avenue, Quezon City

CERTIFICATION

This is to certify that EDGAR A. MARANAN, a Filipino Biotechnologist-scientist has made tremendous scientific contributions in formulating breakthrough BIOREMEDIATION and PHYTOREMEDIATION solutions aimed at the successful rehabilitation of the riverwater quality of the Pasig River and its tributaries. The application of his 23 carefully selected, useful, naturally occurring, nonpathogenic microbial isolates on his successful Napindan Pilot Project under the auspices of the Commission showed a very dramatic reduction of Total Coliforms, Fecal Coliforms at 99% accompanied by the very high BOD and COD reductions which resulted in compliance of DENR standards and transforming the dark polluted water into a clear liquid similar to mineral water. Likewise, he was able to successfully remove the stench of the murky water. This accomplishment shows that our country does not lack the necessary technological expertise to bring back to life a decaying river system.

Mr. Maranan is a former consultant for Bioremediation and Phytoremediation of this Commission and continues to contribute as a resource person on a pro-bono basis for the love and concern for the environment.

Signed this 5th day of November 2009 by:

Andrew Villacorta Jr. Tablan Jr.
Executive Director


PASIG RIVER BIOREMEDIATION TO TAKE 18 MONTHS -- EXPERT

KLIMA BERDE

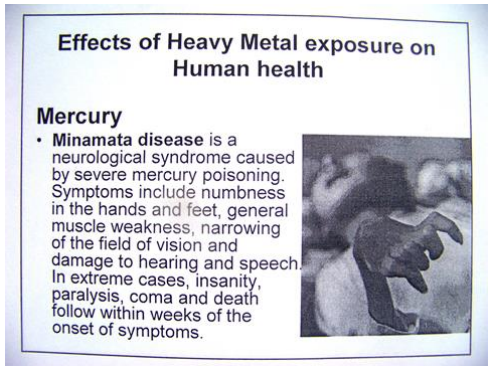
NO. 2 VOL. 1
OCTOBER 31, 2009

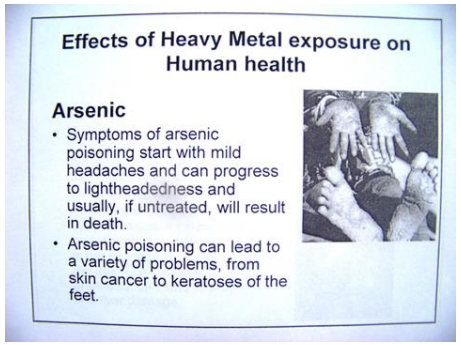
OFFICIAL NEWSPAPER OF THE 1ST PRO-ACTIVE ON CLIMATE CHANGE LEADERS, INC

No. 6

EMERGENCY SITUATION PILOT PROJECT

BIOREMEDIATION FOR THE ERADICATION OF HEAVY METALS IN THE MARILAO-MEYCAUAYAN-OBANDO (MMO) RIVER SYSTEM

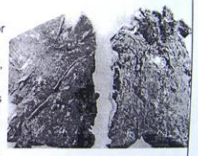




Effects of Heavy Metal exposure on Human health

Chromium

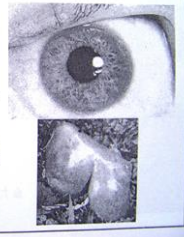
- Breathing in high levels chromium(VI), such as in a compound known as chromic acid or chromium(VI) trioxide, can cause irritation to the nose, such as runny nose, sneezing, itching, nosebleeds, ulcers, and holes in the nasal septum. These effects have primarily occurred in factory workers who make or use chromium(VI) for several months to many years. Long-term exposure to chromium has been associated with lung cancer in workers exposed to levels in air that were 100 to 1,000 times higher than those found in the natural environment.



Effects of Heavy Metal exposure on Human health

Copper

- A Kayser-Fleischer ring. Copper deposits are found in the iris. This is an indication that the body is not metabolizing copper properly.
- An inherited condition called Wilson's disease causes the body to retain copper, since it is not excreted by the liver into the bile. This disease, if untreated, can lead to brain and liver damage.



Effects of Heavy Metal exposure on Human health

Cadmium

- **Itai-itai disease** (literally: "ouch-ouch" disease) was the documented case of mass cadmium poisoning in Toyama Prefecture, Japan. The cadmium poisoning caused softening of the bones and kidney failure. The disease is named for the severe pains (Japanese: 痛い *itai*) caused in the joints and spine.

Effects of Heavy Metal exposure on Human health

Manganese

- **Manganism** or **manganese poisoning** is a toxic condition resulting from chronic exposure to manganese. In initial stages of manganism, neurological symptoms consist of reduced response speed, irritability, mood changes, and compulsive behaviors. Upon protracted exposure symptoms are more prominent and resemble those of idiopathic Parkinson's disease

Effects of Heavy Metal exposure on Human health

Nickel

- The most common harmful health effect of nickel in humans is an allergic reaction. Approximately 10-20% of the population is sensitive to nickel. A person can become sensitive to nickel when jewelry or other items containing nickel are in direct contact and prolonged contact with the skin.
- The most serious harmful health effects from exposure to nickel, such as chronic bronchitis, reduced lung function, and cancer of the lung and nasal sinus, have occurred in people who have breathed dust containing certain nickel compounds while working in nickel refineries or nickel-processing plants.

Effects of Heavy Metal exposure on Human health

Zinc

- Zinc is an intestinal irritant, and the first sign of zinc poisoning is usually intestinal distress. This includes vomiting, stomach cramps, diarrhea, and nausea.

▪with BLACKSMITH INSTITUTE, ENVIRONMENTAL MANAGEMENT BUREAU-DENR

BLACKSMITH INSTITUTE
ENVIRONMENTAL MANAGEMENT BUREAU - DENR
BIOREMEDIATION PILOT PROJECT
BRGY. LIPUTAN, MEYCAUAYAN, BULACAN

- **BIOREMEDIATION** - is a biological intervention wherein carefully selected, naturally-occurring, useful, non-pathogenic microorganisms are used to attack, degrade and neutralize the pollutants including pathogens and heavy metals in the wastewater, decaying river water systems and contaminated soil.
- **DESCRIPTION OF THE AREA**
- The pilot ite in Brgy. Liputan, Meycauayan, Bulacan is about 153 sq.m. at approximately over 1 meter in depth. The water in the pilot area is from the Marilao-Meycauayan-Obando system.

Discussion:

Expected positive results after bioremediation of waters from the MMO showed a physical transformation from dark to clear river water. The unfavorable stench of the river water in the pilot area was effectively removed after five (5) days of bioremediation. The dissolved oxygen (DO) which was at only 0.1 mg/L was also effectively raised to 3.39 mg/L level within the 15 day period.

A prolonged bioremediation activity of an additional 15 to 30 days will surely yield a more amazing reduction of the heavy metal content of the MMO river systems.

All the results and MMO river water samples of this pilot project before and after bioremediation were exhibited during the World Water Quality Day Celebration in Marilao, Bulacan last April 19, 2009.

Effluent Standards: Toxic and Other Deleterious Substance
(Maximum Limits for the Protection of Public Health)[a]

DENR DAO-35

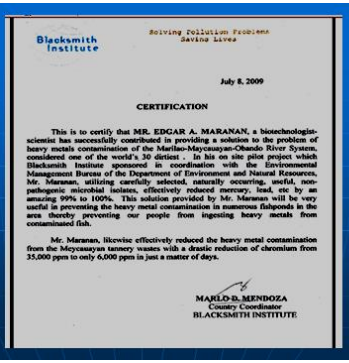
Parameter	Unit	Protected Waters Category I		Protected Waters Category II		Inland Waters Class C		Marine Waters Class SC		Marine Waters Class SD	
		OEI	NPI	OEI	NPI	OEI	NPI	OEI	NPI	OEI	NPI
Arsenic	mg/L	[b]	[b]	0.2	0.1	0.5	0.2	1.0	0.5	1.0	0.5
Cadmium	mg/L	[b]	[b]	0.05	0.02	0.1	0.05	0.2	0.1	0.5	0.2
Chromium (hexavalent)	mg/L	[b]	[b]	0.1	0.05	0.2	0.1	0.5	0.2	1.0	0.5
Cyanide	mg/L	[b]	[b]	0.2	0.1	0.3	0.2	0.5	0.2	-	-
Lead	mg/L	[b]	[b]	0.2	0.1	0.5	0.3	1.0	0.5	-	-
Mercury (Tot.)	mg/L	[b]	[b]	0.005	0.005	0.005	0.005	0.005	0.005	0.05	0.01
PCB	mg/L	[b]	[b]	0.003	0.003	0.003	0.003	0.003	0.003	-	-
Formaldehyde	mg/L	[b]	[b]	2.0	1.0	2.0	1.0	2.0	1.0	-	-

Heavy Metals in River waters	Results		Percent Reduction
	Before Bioremediation	After 15 days Bioremediation	
Mercury (Hg) mg/L	0.51	0.0001	99.9%
Copper (Cu) mg/L.	4.57	<0.04	99.1%
Lead (Pb) mg/L	0.11	<0.01	90.9%
Cadmium (Cd) mg/L	0.02	0.003	85%
Arsenic (As) mg/L	0.08	<0.02	77%
Nickel (Ni) mg/L	0.088	<0.03	65%
Cromium (Cr) mg/L	0.025	<0.01	60%
Manganese (Mn) mg/L	1.317	1.1	16.4%

Other Observations:
•Unfavorable stench (odor) was effectively removed within 5 days

Laboratory analyses were performed by UP Biotech and CRL Laboratories (Clark).

HEAVY METALS in sediments (MMO)	BEFORE bioremediation	AFTER 15 Days of Bioremediation	PERCENT REDUCTION
Mercury (Hg) mg/L	< LOD	ND	
Cadmium (Cd) mg/L	< LOD	ND	
Nickel (Ni) mg/L	< LOD	ND	
Lead (Pb) mg/L	189.51	ND	100%
Manganese (Mn) mg/L	854.34	287	66.4%
Zinc (Zn) mg/L	324.79	137	57.8%
Copper (Cu) mg/L	162.13	74	54.3%



Blacksmith Institute

Solving Pollution Problems Saving Lives

July 8, 2009

CERTIFICATION

This is to certify that MR. EDGAR A. MARANAN, a biotechnologist-scientist has successfully contributed in providing a solution to the problem of heavy metals contamination of the Marilao-Meycauayan-Obando River System, considered one of the world's 30 dirtiest . In his on site pilot project which Blacksmith Institute sponsored in coordination with the Environmental Management Bureau of the Department of Environment and Natural Resources, Mr. Maranan, utilizing carefully selected, naturally occurring, useful, non-pathogenic microbial isolates, effectively reduced mercury, lead, etc by an amazing 99% to 100%. This solution provided by Mr. Maranan will be very useful in preventing the heavy metal contamination in numerous fishponds in the area thereby preventing our people from ingesting heavy metals from contaminated fish.

Mr. Maranan, likewise effectively reduced the heavy metal contamination from the Meycauayan tannery wastes with a drastic reduction of chromium from 35,000 ppm to only 6,000 ppm in just a matter of days.

MARLO D. MENDOZA
Country Coordinator
BLACKSMITH INSTITUTE

OBSERBASYON

Sa 26 taon kong karanasan sa ilog Meycauayan-Marilao bilang isang mangingisda at fish pond operator ngayon ko lang nakita ang mga sumusunod na mga pangyayaring naobserbahan ko na resulta ng tinatawag na "bioremediation" o paglilinis at pagtanggal sa polusyon sa ilog ng Marilao-Meycauayan.

1. Luminaw ang marumi at maitim na tubig ng Marilao-Meycauayan
2. Naging masigla at mabilis ang pangingitlog ng mga isda na nagreresulta sa mabilis na pagdami nila. Naobserbahan ko rin ang mabilis na paglaki ng mga isda. Siguro na-kondisyon sila dahil naalis ang polusyon sa tubig.
3. Naging mabilis at marami ang natural na produksyon ng natural na pagkain ng isda.
4. Nawala ang amoy ng mabahong tubig ng Marilao-Meycauayan river
5. May pag-asa pa palang buhayin ang ating patay at polluted na ilog na inabuso natin ng napakaraming taon pag ginagamitan ng ganitong klaseng paraan kagaya ng bioremediation.

-EFREN C. PANTANILLA
Brgy. Liputan, Meycauan, Bulacan
March 26, 2009

No. 7

PHYTOREMEDIATION
PROJECT AT PASIG RIVER

.Our project on Phytoremediation which is the finishing step of bioremediation will make full utilization of our **ENHANCED MILLIONAIRE' S VINES** (Cissus Sicyoides of the family Vitaceae)

. These vines planted along the banks of the Pasig River system will continuously provide not only its aesthetic contribution but more importantly the extraction of pollutants and toxic substances from the river waters.

No. 8
EMERGENCY SITUATION

BIOREMEDIATION PILOT PROJECT (TANNERY WASTES), in MEYCAUAYAN, BULACAN, with BLACKSMITH INSTITUTE, ENVIRONMENTAL MANAGEMENT BUREA-DENR

RESULTS			
PARA-METERS	BEFORE BIOREME-DIATION	AFTER INITIAL TREATMENT	PERCENT REDUC-TION
Chro-mium	35,000 ppm	6,000 ppm	83%

No. 9

EMERGENCY SITUATION

TREATMENT OF HAZARDOUS WASTES FROM A PAINT MANUFACTURING COMPANY IN BATAAN EXPORT PROCESSING ZONE

No. 10
EMERGENCY SITUATION

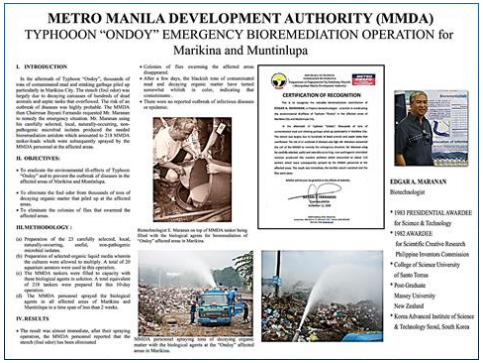
PILOT PROJECT FOR FASTFOOD CHAIN, IN THE TREATMENT OF THEIR WASTEWATER

PILOT RESULTS			
PARA-METERS	BEFORE BIOREME-DIATION	AFTER BIOREME-DIATION	PERCENT REDUC-TION
BOD	1,640 mg/L	159 mg/L	90%
TSS	685 mg/L	37 mg/L	91%
OIL AND GREASE	3,100 mg/L	-0- (zero) Not detected	100%
pH	4.1	6.8-7.2	

ANALYSIS BY NCA LABS

No. 11
EMERGENCY SITUATION

EPIDEMIC PREVENTION SPRAYING OF USEFUL MICROBIAL ISOLATES TO FLOODED AREAS OF MARIKINA AND MUNTINLUPA



METRO MANILA DEVELOPMENT AUTHORITY (MMDA)
TYPHOOON "ONDOY" EMERGENCY BIOREMEDIATION OPERATION for Marikina and Muntinlupa

I. INTRODUCTION

In the aftermath of Typhoon "Ondoy", thousands of tons of contaminated mud and stinking garbage piled up particularly in Marikina City. The stench (foul odor) was largely due to decaying carcasses of hundreds of dead animals and septic tanks that overflowed. The risk of an outbreak of diseases was high. Mr. Misterio Mananan, the then Chairman Bayani Fernando requested Mr. Maranan to remedy the emergency situation. Mr. Maranan using his carefully selected, local, naturally-occurring, non-pathogenic microbial isolates produced the needed antidote which amounted to 216 MMDA tanker-loads which were subsequently sprayed by the MMDA personnel at the affected areas.

II. OBJECTIVES:

- To evaluate the environmental ill-effects of Typhoon "Ondoy" and to prevent the outbreak of diseases in the affected areas of Marikina and Muntinlupa.
- To eliminate the foul odor from thousands of tons of decaying organic matter that piled up at the affected areas.
- To eliminate the colonies of flies that swarmed the affected areas.

III. METHODOLOGY :

(a) Preparation of the 23 carefully selected, local, naturally-occurring, useful, non-pathogenic microbial isolates.
(b) Preparation of selected organic liquid media wherein the microbial isolates were grown. A total of 20 aquarium aerators were used in this operation.
(c) The MMDA tankers were filled to capacity with these biological agents in solution. A total equivalent of 216 tankers were prepared for this 10-day operation.
(d) The MMDA personnel sprayed the biological agents in all affected areas of Marikina and Muntinlupa in a time span of less than 2 weeks.

IV. RESULTS

- The result was almost immediate, after their spraying operation, the MMDA personnel reported that the stench (foul odor) has been eliminated
- Colonies of flies swarming the affected areas disappeared.
- After a few days, the blackish tons of contaminated mud and decaying organic matter have turned somewhat whitish in color, indicating that contamination.
- There were no reported outbreak of infectious diseases or epidemic.

CERTIFICATION OF RECOGNITION

EDGAR A. MARANAN
Biotechnologist

- 1993 PRESIDENTIAL AWARDEE for Science & Technology
- 1982 AWARDEE for Scientific Creative Research Philippine Inventors Commission
- College of Science University of Santo Tomas
- Post-Graduate Massey University New Zealand
- Korea Advanced Institute of Science & Technology Seoul, South Korea

REPUBLIKA NG PILIPINAS
TANGGAPAN NG PANGULO
Pangasiwaan sa Paggagamitan Ng Kalabihang Mayaila
(Metropolitan Manila Development Authority)

METRO GWAPO

CERTIFICATION OF RECOGNITION

This is to recognize the valuable bioremediation contribution of EDGAR A. MARANAN, a Filipino biotechnologist - scientist in eradicating the environmental ill-effects of Typhoon "Ondoy" in the affected areas of Marikina City and Muntinlupa City.

In the aftermath of Typhoon "Ondoy", thousands of tons of contaminated mud and stinking garbage piled up particularly in Marikina City. The stench was largely due to hundreds of dead animals and septic tanks that overflowed. The risk of an outbreak of diseases was high. Mr. Misterio answered the call of the MMDA to remedy the emergency situation. Mr. Maranan using his carefully selected, useful and naturally-occurring, non-pathogenic microbial isolates produced the needed antidote which amounted to about 216 tankers which were subsequently sprayed by the MMDA personnel at the affected areas. The result was immediate, the terrible stench vanished and the flies went away.

MMDA will forever be grateful to the efforts of scientist.

BAYANI F. FERNANDO
Chairman, MMDA
November 12, 2009

No. 12
EMERGENCY SITUATION

UNDERPASS CLEANING/ CLEAN-UP OF CARBON EMMISSION FROM TRANSPORT VEHICLES

Effects of Bioremediation Fish Feeds in Aquarium Waters

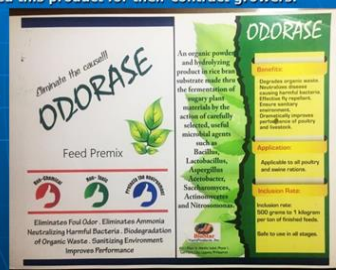
- No more aquarium clean-up
- Very Clear water
- No foul odor
- No more changing of water
- Economizing water usage
- Economizing in fish feed cost
- No more changing of filters
- Fishes become healthy and very shiny

Some Clients of Kalinisan Laundry

- UST Hospital
- Makati Medical Center
- St. Luke's Hospital
- Cardinal Santos Hospital
- U.E.R.M. Memorial Medical Center
- Mary Johnston Hospital
- Quirino Memorial Medical Center
- Delos Santos Medical Center

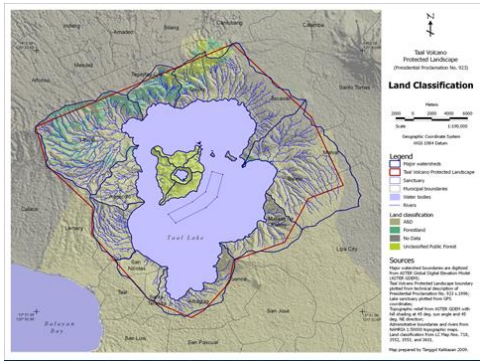
This is one of the two organic, non-chemical product formulated by Biotechnologist E. Maranan to neutralize fly-infestation and unfavorable stench (odor) affecting poultry and piggery farms including surrounding communities nationwide. San Miguel Corporation and other big entities have adopted this product for their contract growers.

The proceeds of this venture serve as financial assistance to needy members as well as the activities of the LC High School Batch '67 of which Biotechnologist E. Maranan is the lifetime President



This is the second organic, non-chemical product formulated by Biotechnologist E. Maranan

FISH KILL TAAL LAKE BATANGAS



PILOT PROJECT: COCONUT SCALE INSECT INFESTATION
Brgy. Bitin, Bay, Laguna
By: Edgar "Egay" Maranan,
BIOTECHNOLOGIST

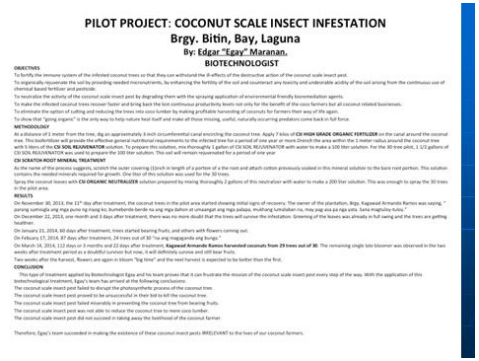
INTRODUCTION:

PILOT PROJECT OVERVIEW

PILOT SITE

COMPOSITION OF BIOTECH EGAY'S TEAM

BASELINE STATUS OF THE 30 COCONUTS BEFORE TREATMENT



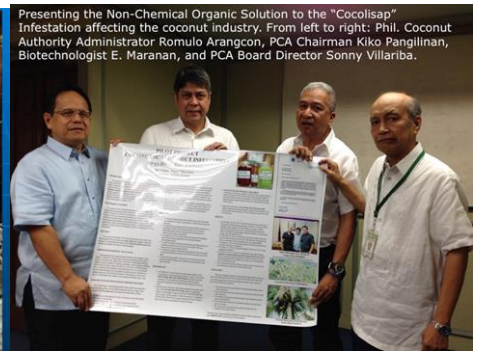
PILOT PROJECT: COCONUT SCALE INSECT INFESTATION
Brgy. Bitin, Bay, Laguna
By: Edgar "Egay" Maranan,
BIOTECHNOLOGIST

OBJECTIVES

METHODOLOGY

RESULTS

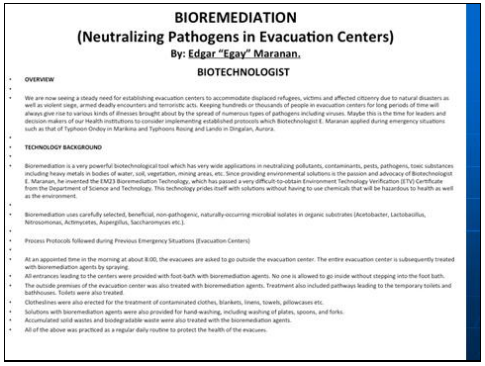
CONCLUSION



Biotechnologist E. Maranan (rt.) assisting the farmers and the Phil. Coconut Authority in the coconut district of North Cotabato to remedy the coconut trees from bearing abnormal and unproductive fruits. Secomd from right is Congressman Jesus Sacdalan and PCA Regional Officers

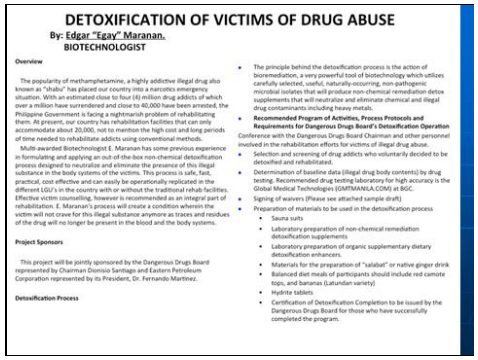
Biotechnologist E. Maranan with DA Sec. Proceso Alcala and Cong.Jesus Sacdalan after the culmination of the successful pilot for Cocolisap solution

Biotechnologist E. Maranan (left) with PCA Coconut Consultant, Dr. S. Magat and PCA Research Director Ramon Rivera at the successful pilot site in Bay, Laguna.



BIOREMEDIATION
(Neutralizing Pathogens in Evacuation Centers)
By: Edgar "Egay" Maranan.
BIOTECHNOLOGIST

- OVERVIEW
- We are now seeing a steady need for establishing evacuation centers to accommodate displaced refugees, victims and affected citizenry due to natural disasters as well as violent siege, armed deadly encounters and terroristic acts. Keeping hundreds or thousands of people in evacuation centers for long periods of time will always give rise to various kinds of illnesses brought about by the spread of numerous types of pathogens including viruses. Maybe this is the time for leaders and decision-makers of our Health institutions to consider implementing established protocols which Biotechnologist E. Maranan applied during emergency situations such as that of Typhoon Ondoy in Marikina and Typhoons Rosing and Landis in Dingalan, Aurora.
- TECHNOLOGY BACKGROUND
- Bioremediation is a very powerful biotechnological tool which has very wide applications in neutralizing pollutants, contaminants, pests, pathogens, toxic substances including heavy metals in bodies of water, soil, vegetation, mining areas, etc. Since providing environmental solutions is the passion and advocacy of Biotechnologist E. Maranan, he invented the EM23 Bioremediation Technology, which has passed a very difficult-to-obtain Environment Technology Verification (ETV) Certificate from the Department of Science and Technology. This technology prides itself with solutions without having to use chemicals that will be hazardous to health as well as the environment.
- Bioremediation uses carefully selected, beneficial, non-pathogenic, naturally-occurring microbial isolates in organic substrates (Acetobacter, Lactobacillus, Nitrosomonas, Actimycetes, Aspergillus, Saccharomyces etc.).
- Process Protocols followed during Previous Emergency Situations (Evacuation Centers)
- At an appointed time in the morning at about 8:00, the evacuees are asked to go outside the evacuation center. The entire evacuation center is subsequently treated with bioremediation agents by spraying.
- All entrances leading to the centers were provided with foot-bath with bioremediation agents. No one is allowed to go inside without stepping into the foot bath.
- The outside premises of the evacuation center was also treated with bioremediation agents. Treatment also included pathways leading to the temporary toilets and bathhouses. Toilets were also treated.
- Clotheslines were also erected for the treatment of contaminated clothes, blankets, linens, towels, pillowcases etc.
- Solutions with bioremediation agents were also provided for hand-washing, including washing of plates, spoons, and forks.
- Accumulated solid wastes and biodegradable waste were also treated with the bioremediation agents.
- All of the above was practiced as a regular daily routine to protect the health of the evacuees.



DETOXIFICATION OF VICTIMS OF DRUG ABUSE
By: Edgar "Egay" Maranan.
BIOTECHNOLOGIST

Overview

The popularity of methamphetamine, a highly addictive illegal drug also known as "shabu" has placed our country into a narcotics emergency situation. With an estimated close to four (4) million drug addicts of which over a million have surrendered and close to 40,000 have been arrested, the Philippine Government is facing a nightmarish problem of rehabilitating them. At present, our country has rehabilitation facilities that can only accommodate about 20,000, not to mention the high cost and long periods of time needed to rehabilitate addicts using conventional methods.

Multi-awarded Biotechnologist E. Maranan has some previous experience in formulating and applying an out-of-the-box non-chemical detoxification process designed to neutralize and eliminate the presence of this illegal substance in the body systems of the victims. This process is safe, fast, practical, cost effective and can easily be operationally replicated in the different LGU's in the country with or without the traditional rehab facilities. Effective victim counselling, however is recommended as an integral part of rehabilitation. E. Maranan's process will create a condition wherein the victim will not crave for this illegal substance anymore as traces and residues of the drug will no longer be present in the blood and the body systems.

Project Sponsors

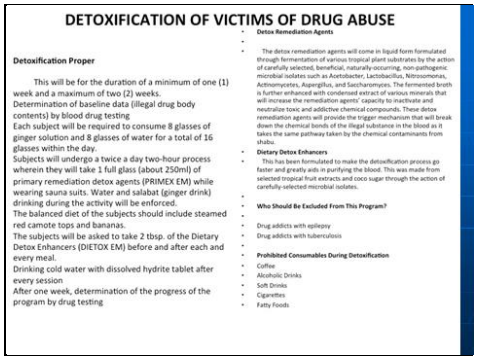
This project will be jointly sponsored by the Dangerous Drugs Board represented by Chairman Dionisio Santiago and Eastern Petroleum Corporation represented by its President, Dr. Fernando Martinez.

Detoxification Process

- The principle behind the detoxification process is the action of bioremediation, a very powerful tool of biotechnology which utilizes carefully selected, useful, naturally-occurring, non-pathogenic microbial isolates that will produce non-chemical remediation detox supplements that will neutralize and eliminate chemical and illegal drug contaminants including heavy metals.
- **Recommended Program of Activities, Process Protocols and Requirements for Dangerous Drugs Board's Detoxification Operation**

Conference with the Dangerous Drugs Board Chairman and other personnel involved in the rehabilitation efforts for victims of illegal drug abuse.

- Selection and screening of drug addicts who voluntarily decided to be detoxified and rehabilitated.
- Determination of baseline data (illegal drug body contents) by drug testing. Recommended drug testing laboratory for high accuracy is the Global Medical Technologies (GMTMANILA.COM) at BGC.
- Signing of waivers (Please see attached sample draft)
- Preparation of materials to be used in the detoxification process
  - Sauna suits
  - Laboratory preparation of non-chemical remediation detoxification supplements
  - Laboratory preparation of organic supplementary dietary detoxification enhancers.
  - Materials for the preparation of "salabat" or native ginger drink
  - Balanced diet meals of participants should include red camote tops, and bananas (Latundan variety)
  - Hydrite tablets
  - Certification of Detoxification Completion to be issued by the Dangerous Drugs Board for those who have successfully completed the program.



DETOXIFICATION OF VICTIMS OF DRUG ABUSE

Detoxification Proper

This will be for the duration of a minimum of one (1) week and a maximum of two (2) weeks.
Determination of baseline data (illegal drug body contents) by blood drug testing
Each subject will be required to consume 8 glasses of ginger solution and 8 glasses of water for a total of 16 glasses within the day.
Subjects will undergo a twice a day two-hour process wherein they will take 1 full glass (about 250ml) of primary remediation detox agents (PRIMEX EM) while wearing sauna suits. Water and salabat (ginger drink) drinking during the activity will be enforced.
The balanced diet of the subjects should include steamed red camote tops and bananas.
The subjects will be asked to take 2 tbsp. of the Dietary Detox Enhancers (DIETOX EM) before and after each and every meal.
Drinking cold water with dissolved hydrite tablet after every session
After one week, determination of the progress of the program by drug testing

- **Detox Remediation Agents**
- The detox remediation agents will come in liquid form formulated through fermentation of various tropical plant substrates by the action of carefully selected, beneficial, naturally-occurring, non-pathogenic microbial isolates such as Acetobacter, Lactobacillus, Nitrosomonas, Actinomycetes, Aspergillus, and Saccharomyces. The fermented broth is further enhanced with condensed extract of various minerals that will increase the remediation agents' capacity to inactivate and neutralize toxic and addictive chemical compounds. These detox remediation agents will provide the trigger mechanism that will break down the chemical bonds of the illegal substance in the blood as it takes the same pathway taken by the chemical contaminants from shabu.
- **Dietary Detox Enhancers**
- This has been formulated to make the detoxification process go faster and greatly aids in purifying the blood. This was made from selected tropical fruit extracts and coco sugar through the action of carefully-selected microbial isolates.
- **Who Should Be Excluded From This Program?**
- Drug addicts with epilepsy
- Drug addicts with tuberculosis
- **Prohibited Consumables During Detoxification**
- Coffee
- Alcoholic Drinks
- Soft Drinks
- Cigarettes
- Fatty Foods

2. Topic: **Umbrella Plant for Heavy Metal Pollution**
   by Dr. Josephine Castaneres
   Professor, Chemistry Dept., University of San Carlos

Dr. Josephine Castañares, described how they used the umbrella plant to clear up the heavy metals present in the waters of Butuanon River. She described the methodology used by her research team and the results gathered from the different specimen areas identified for the study.

Main objectives of their study were (1) to investigate the uptake of copper and zinc by umbrella plant at Butuanon River, (2) to measure the concentration of copper and zinc in surface sediments and above-underground parts of *C. alternifolius* L., and (3) to validate uptake of copper and zinc

After conducting their study and collecting specimen from the areas, these are the significant findings noted by the team:

- The amount of Cu and Zn in the sediments where the umbrella plant was present decreased from weeks 1-4
- The concentration of Cu and Zn in the umbrella plant *C. alternifolius* L. has significantly increased within one month
- The underground biomass has accumulated higher concentrations of Cu and Zn than the aboveground biomass

The conclusion was that the umbrella plant proved to be a good heavy metal accumulator and can efficiently uptake copper and zinc from sediments.

POWERPOINT PRESENTATION

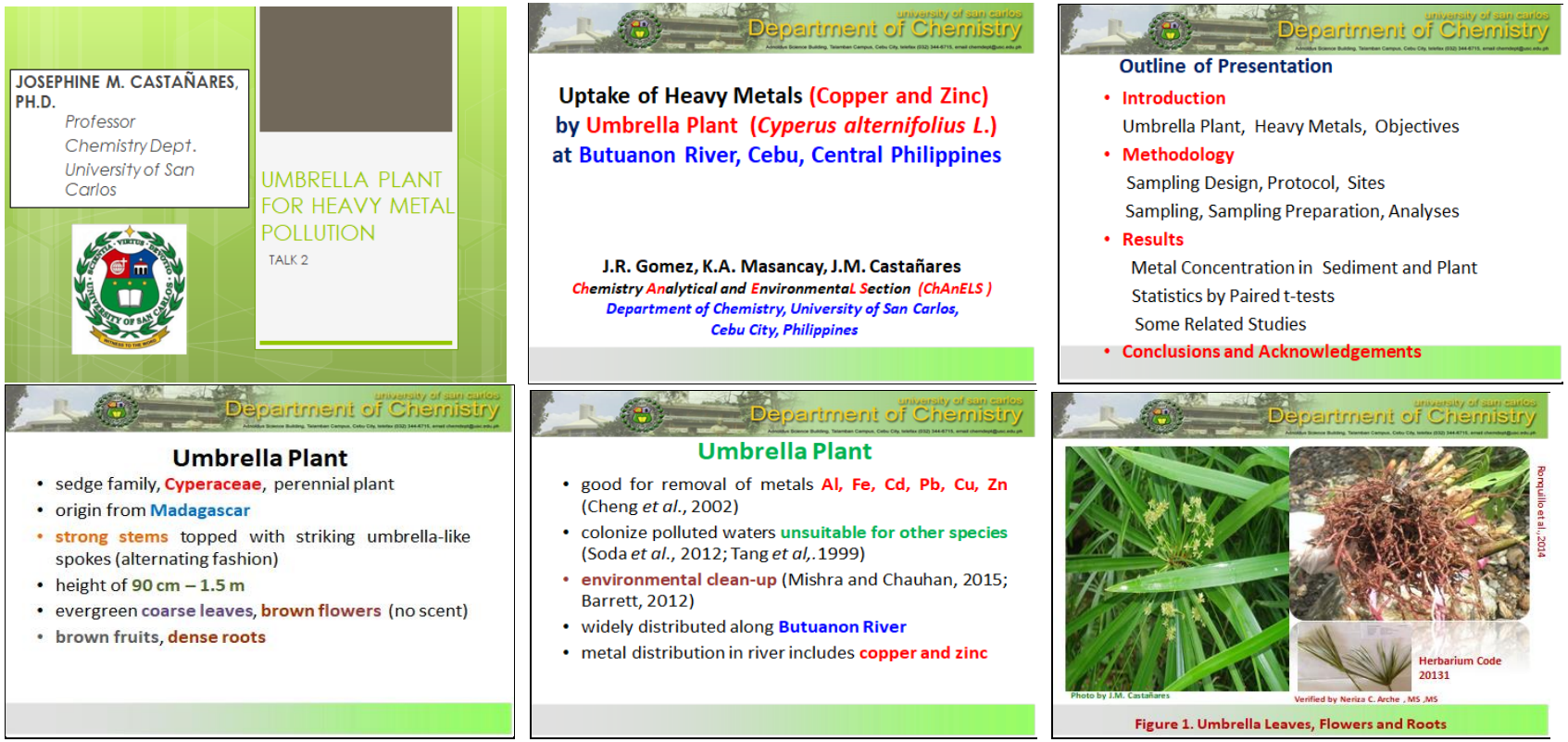


Figure 2. Dense Population of Umbrella Plant

Heavy Metals

- heavy metals are naturally occurring elements
- **high atomic weight ,** density 5x greater than water
- Trace metals (**ppb – ppm levels**)
- **non-biodegradable**, persistent chemicals
- contaminate environment and bioaccumulate
- possible **health effects** (Dixit et al., 2015)
- **Wilson disease** (Tchounwou *et al.*, 2008; ASTDR, (2002)

Past and Current Studies

- copper (Ronquillo *et al.*, 2014)
- zinc and copper (Adarna *et al.*, 2015; Villegas *et al.*, 2016; Gomez *et al.*, 2017)
- copper, lead and zinc (Castañares *et al.*, 2017)
- cadmium, chromium, arsenic (in progress)

Copper and Zinc

http://images-of-elements.com/copper.php

Objectives

Investigate the uptake of copper and zinc by umbrella plant (*Cyperus alternifolius* L.) at Butuanon River

1. measure the concentration of copper and zinc in
   a. surface sediments
   b. above-underground parts of *C. alternifolius* L.
2. validate uptake of copper and zinc

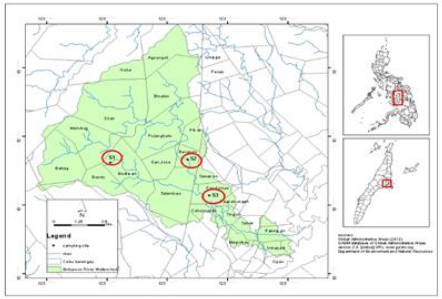


Figure 3. Map of Butuanon River showing sampling sites

Table 1. Technical and Qualitative Descriptions of the Sampling Sites at Butuanon River, Cebu, Central Philippines

Stations	GPS Coordinates	Elevation (ft)	Description of Site
1 (Budla-an) Cebu City	10°22'44"N 123°53'05"E	632	Upstream tributary. No industries in this area. Deepwells at riverbed and banks
2 (Bacayan) Cebu City	10°22'50"N 123°55'09"E	143	Midstream site, with several domestic effluents
3 (Pilit 2-Canduman) Mandaue City	10°21'43"N 123°55'43"E	93	Lower midstream. Site with industrial effluents from paint, food processing and a variety of manufacturing plants

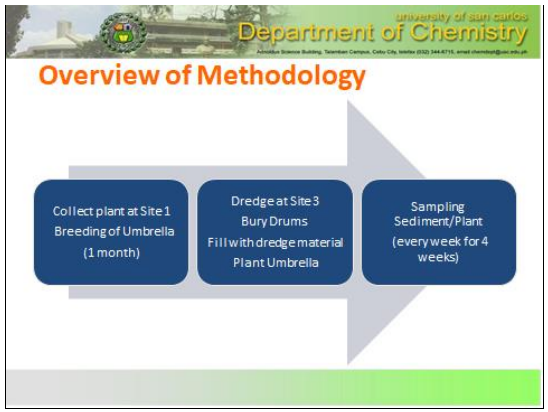
Figure 4. Station 1 at Barangay Budla-an, Talamban, Cebu City

Figure 5. Station 1 at Barangay Budla-an, Talamban, Cebu City

Figure 6. Station 2 at Barangay Bacayan, Talamban, Cebu City

Figure 7. Station 2 at Barangay Bacayan, Talamban, Cebu City

Figure 8. Station 3 at Pilit 2-Canduman, Mandaue City



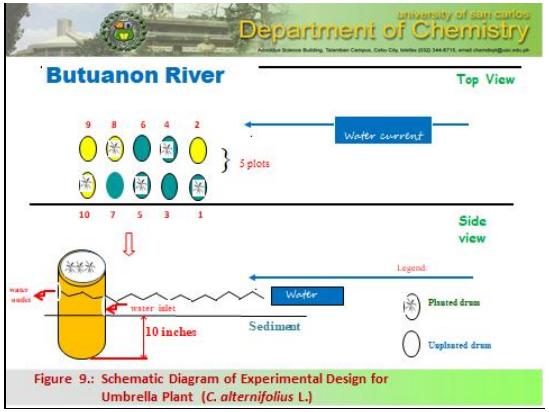


Figure 9.: Schematic Diagram of Experimental Design for Umbrella Plant (*C. alternifolius* L.)

Figure 10: Experimental Design of Mini-Constructed Wetland using Umbrella Plant (*C. alternifolius* L.)

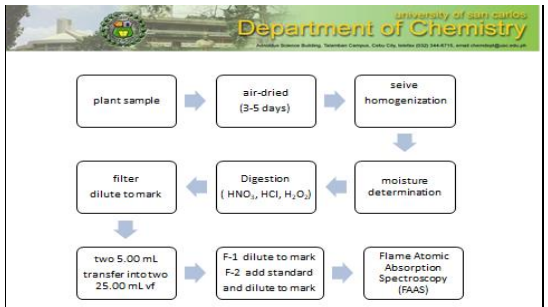


Figure 11. Sediments: Sample Preparation and Analyses

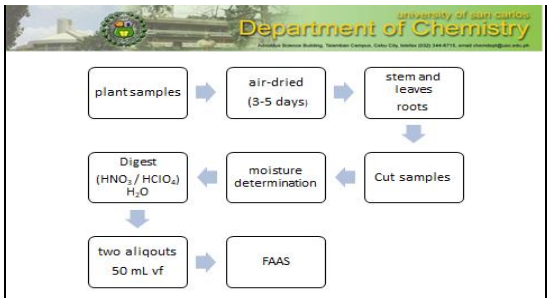


Figure 12. Umbrella plant: Sample Preparation and Analyses

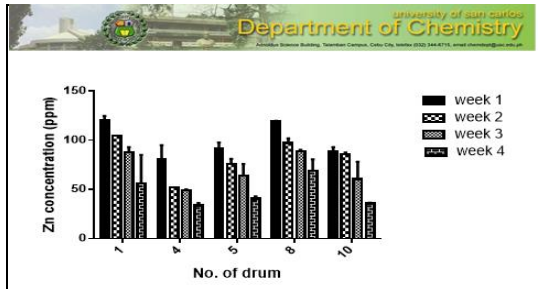


Figure 13. Mean Concentration of Zinc in Sediments (planted drums from weeks 1 to 4)

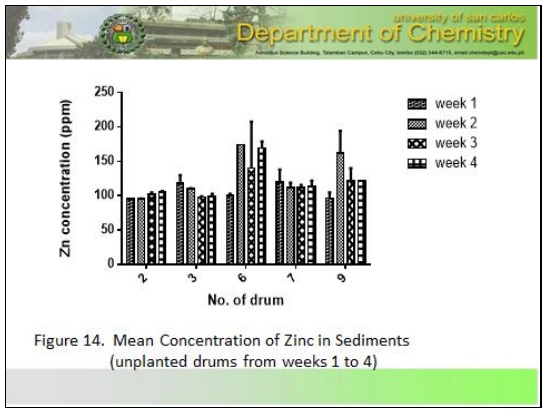


Figure 14. Mean Concentration of Zinc in Sediments (unplanted drums from weeks 1 to 4)

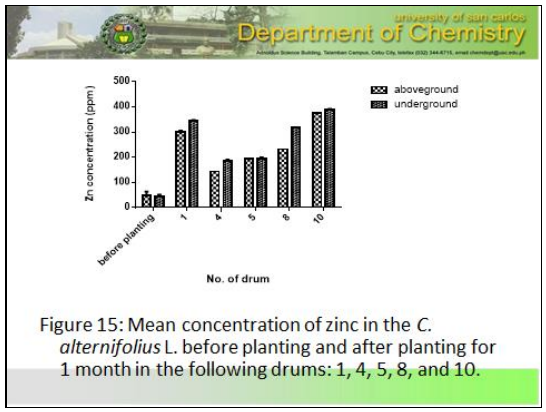


Figure 15: Mean concentration of zinc in the *C. alternifolius* L. before planting and after planting for 1 month in the following drums: 1, 4, 5, 8, and 10.

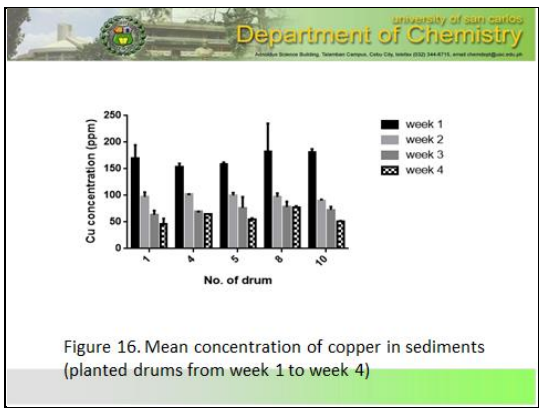


Figure 16. Mean concentration of copper in sediments (planted drums from week 1 to week 4)

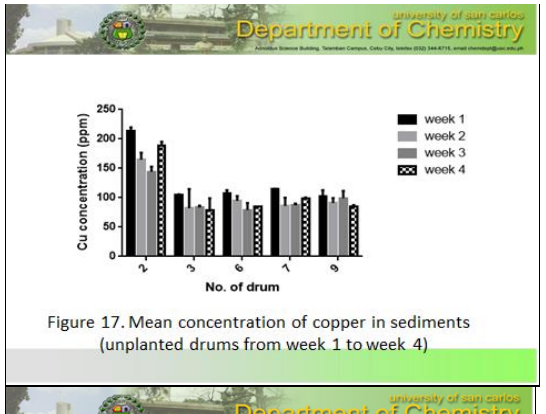
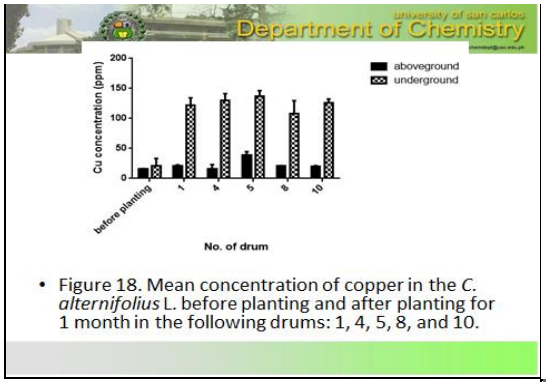
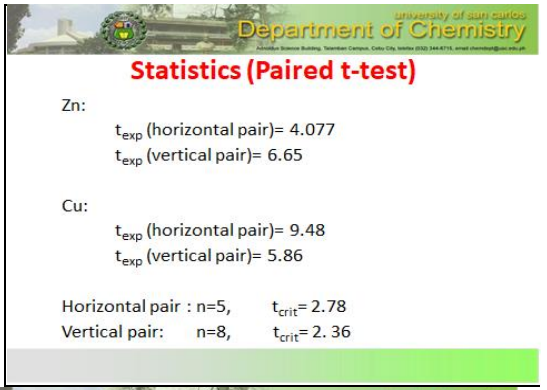
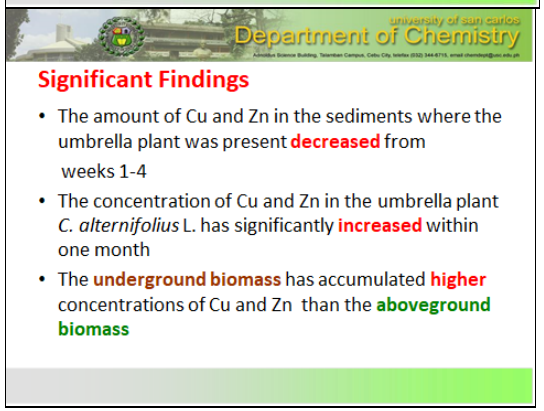


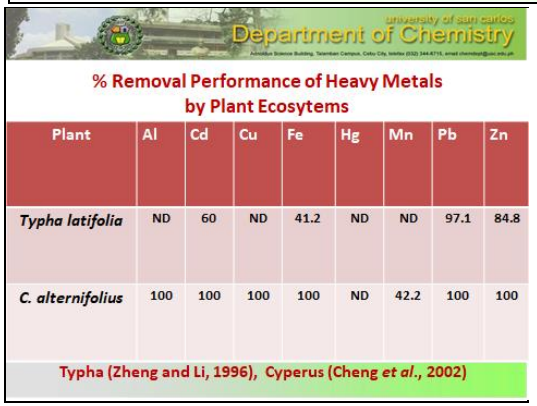
Figure 17. Mean concentration of copper in sediments (unplanted drums from week 1 to week 4)

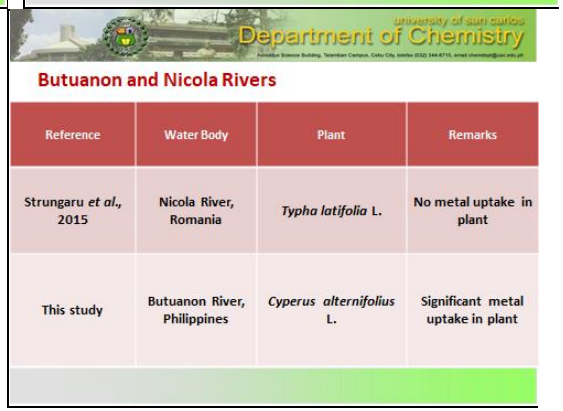


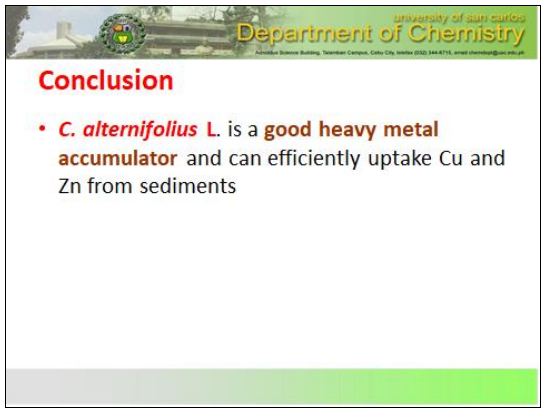
- Figure 18. Mean concentration of copper in the *C. alternifolius* L. before planting and after planting for 1 month in the following drums: 1, 4, 5, 8, and 10.

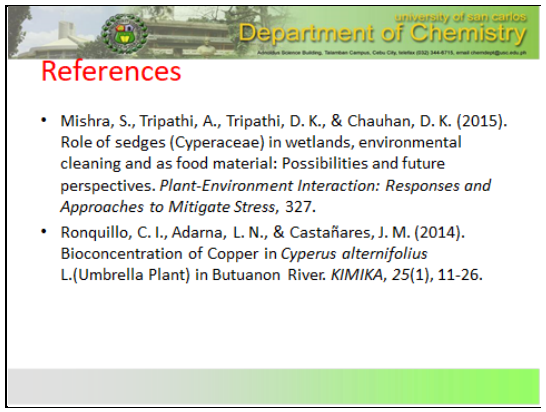


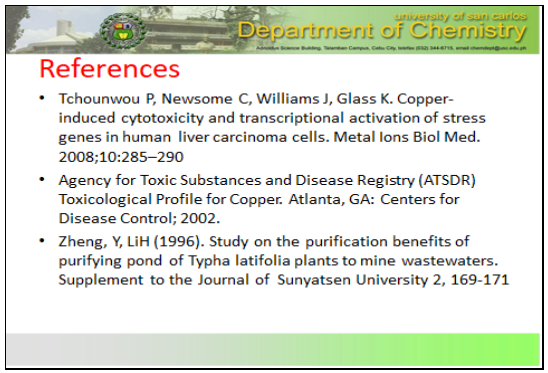


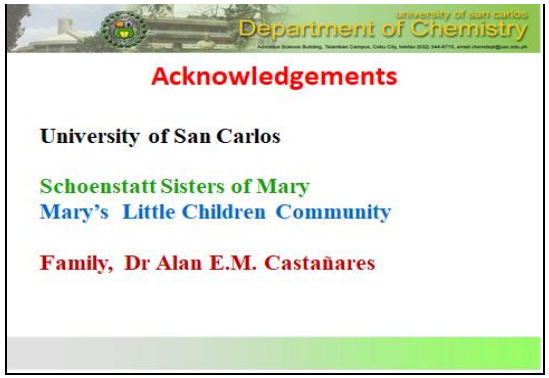












3. Topic: **Landscape and Wildlife Indicators (LAWIN)**
   by Ricardo Calderon
   Asst. Secretary for Staff Bureaus, DENR

Asec. Ricardo Calderon discussed the LAWIN program of DENR. It is a forest protection system to monitor the forest, biodiversity, its threats, the implementation of interventions and their effect on the forest ecosystem. LAWIN uses an open source software called SMART (Spatial Monitoring and Reporting Tool) for data processing with GIS interface. It also uses Cybertracker technology for monitoring threats, forest condition and biodiversity. The LAWIN program helps various DENR personnel – Resource Managers, Data Managers, Patrol Organizers, Patrollers and Environmental Law Enforcers - in performing their duties and in mitigating environmental issues happening in real-time.

LAWIN Forest Protection System

RICARDO L. CALDERON, CESO III
OIC Assistant Secretary for Staff Bureaus
Department of Environment and Natural Resources

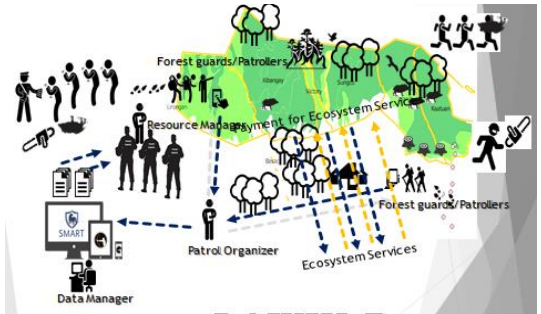
2nd Philippine Environment Summit, Cebu City, 02.20.2018

LAWIN

LAWIN is a forest protection system that integrates forest, biodiversity and threats monitoring, implementation of interventions to address threats and monitoring of the response of the forest ecosystem to these management

LAWIN

- It uses SMART (Spatial Monitoring And Reporting Tool, an open source software for data processing with GIS interface
- It uses Cybertracker technology for monitoring threats, forest condition, and biodiversity



LAWIN Process

Roles and Responsibilities

Resource Managers

- DENR, LGU, indigenous people's groups and/or private groups agreed upon to be responsible for managing the area.
- During the establishment of the LAWIN forest and biodiversity protection system, they formulate measurable conservation objectives and strategies and identify key species and threats applicable to the area.
- During LAWIN operation, they are the key decision maker for facilitating the implementation of responses to observed threats, which include environmental law enforcement, environment-friendly livelihood interventions and policies.
- The resource manager also assess the effectiveness of the LAWIN forest protection system and identifies and implement the modification/enhancement of the system as LAWIN is a continuous process.

Roles and Responsibilities

Data Managers

- Could come from the GIS unit or knowledge management unit of the local DENR office, or the MENRO of the LGU or interested academic and research institutions or an NGO operating in the conservation area.
- The data managers design and re-design the data model and monitoring application using the SMART and CyberTracker softwares and application
- further develop the data model and application, regularly update the software, troubleshoot and resolve technical issues, set up a remote transfer protocol, transfer and analyze the patrol data gathered by patrols/monitors
- generate regular and on demand reports using automated/pre-designed templates, and present and/or share the LAWIN results report to the resource managers.

Roles and Responsibilities

Patrol Organizers

- Responsible for organizing the team of patrollers, schedule of patrolling, design of patrol routes, and the preparation of the android device installed with the CyberTracker application.
- Collect the tablets from the data manager, brings them to the patrollers before they go to the field and collect them from the patrollers afterwards.
- Facilitate data transfer through either physically delivering the devices to the data managers or remotely in areas where data connection is strong.

Roles and Responsibilities

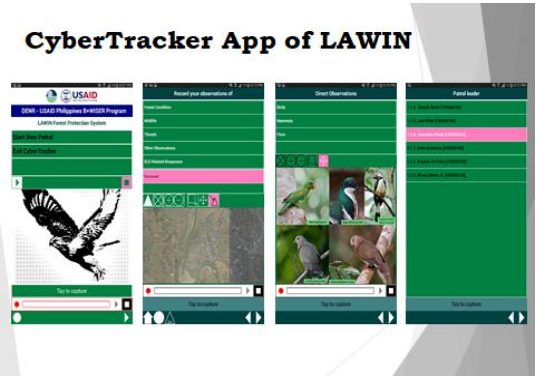
Patrollers

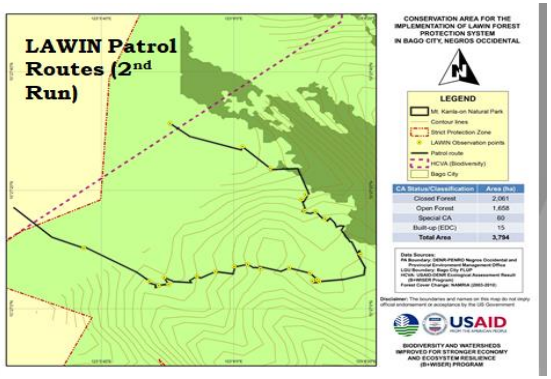
- Collect data from patrolling, monitoring, research, surveillance, intelligence, and similar means using the CyberTracker app designed for their respective conservation area.
- Equipped with skills for assessing forest condition, directly and indirectly observing indicator species, threats, and environmental law violations and are familiar with evidence gathering procedures.
- Primarily involved in designing of patrol plans and patrol routes.
- Enact some appropriate responses depending on their mandate/deputization, e.g., IEC, ELE-related, etc., to threats observed especially during patrolling/monitoring.

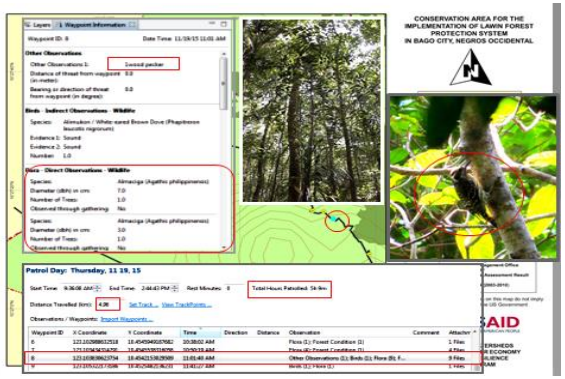
Roles and Responsibilities

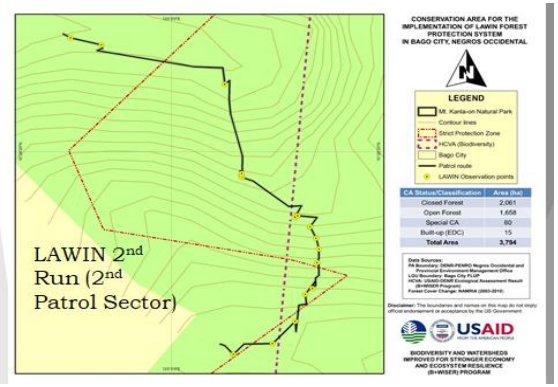
Environmental Law Enforcers

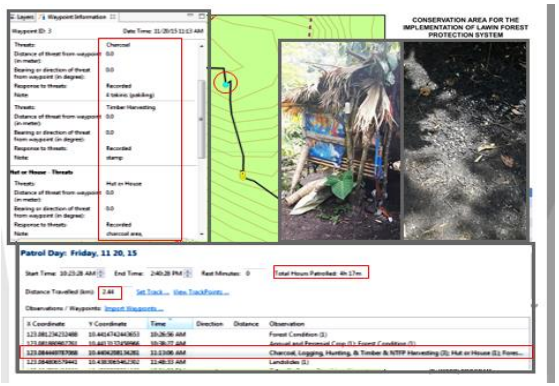
- Can be the deputized patrollers or a dedicated group at the DENR or within the LGU who are involved in ELE.
- Include the mainstream law enforcement groups such as the Philippine National Police and multi-sectoral groups such as the Multi-sectoral Forest Protection Committee, Municipal/City or Provincial Anti-Illegal Logging Task Forces.
- Specialized groups such as the Philippine Operations Group on Ivory and Illegal Wildlife Trade (POGI) may also be called upon to provide assistance.
- Local sites may also create their own ELE task forces.
- The ELE team or task force enacts environmental law enforcement and record the observations, evidences, etc. in the ELE-related Responses section of the data model using the CyberTracker app.











ADVANTAGES OF LAWIN

- Enhance the existing manual system of reporting & can build on existing resources (Forest Rangers, Bantay Gubat)

Spatial Monitoring And Reporting Tool
Wildlife Conservation Society

CyberTracker Wildlife Monitoring and Line Transect Survey Application
Cyber Tracker Conservation

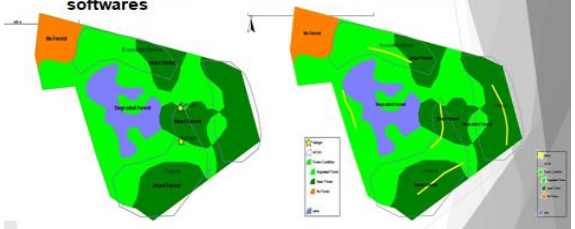
ADVANTAGES OF LAWIN

- Enables the monitoring of patrol efforts (e.g., manpower/patrollers, distance (in km) covered, number of hours spent in patrolling
- Evidence-based compensation for patrolling

Patrol sectors	Distance covered (in km)	Number of hours spent	Number of patrollers
1. Diana-Malasin	8.60	12.80	28
2. Fely-Aplaya	6.74	12.23	15
3. Flores-Reina Mercedes	8.98	9.78	9

ADVANTAGES OF LAWIN

- **Spatial distribution of observation records and patrol efforts and trends using GIS & other open source softwares**



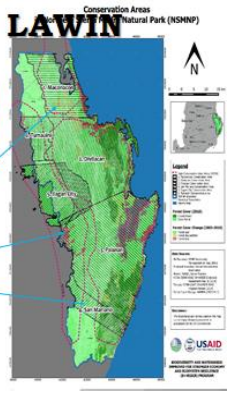
ADVANTAGES OF LAWIN

- Enabling enhanced coordination between biodiversity and threats monitoring with environmental law enforcement through timely and spatially explicit reports of threats

ADVANTAGES OF LAWIN

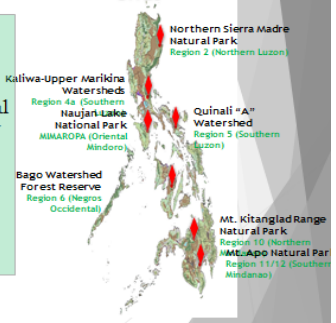
- Science-based process for identifying hotspots for patrol routes, based on conservation targets and desired future forest condition

Areas in need of improved protection



- Pilot tested in 7 project sites
- Issuance of Joint FMB-BMB Technical Bulletin affirmed by OUFO
- **Formally launched in March 2016 in the province of Isabela**

B+WISER's 7 PROJECT SITES



ACHIEVEMENTS

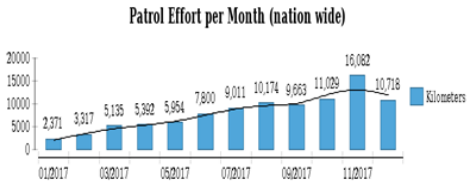
- Lawin incorporated into DENR's forest protection strategy through a Joint Technical Bulletin signed in March 2016
- More than 3,000 DENR field managers, forest rangers. LGU and NGO community forest patrollers have been trained and coached in:
  - forest conservation area planning;
  - patrol planning;
  - patrolling and responding to threats
  - recording observations;
  - using analyzed patrol data to inform future patrols and actions to address threats

ACHIEVEMENTS

- More than 200 field data managers trained in using SMART to store and analyze patrol data and sync these to a cloud server through SMART Connect
- A Lawin Unit at the Forest Management Bureau has been formed responsible for ensuring data integrity and providing technical support to the DENR field offices

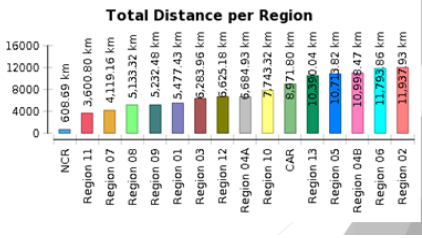
PATROL EFFORTS

- Patrol Distance logged since the inception of Lawin: 116,309.42 km
- Significant increase of Patrol Effort in 2017



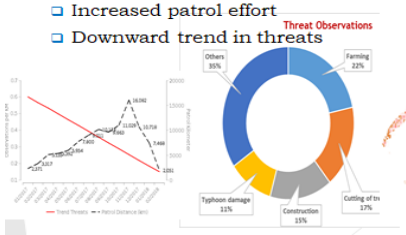
PATROL EFFORTS

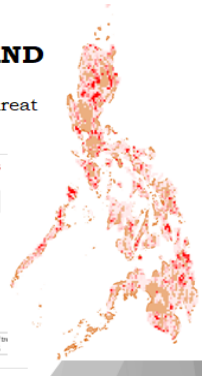
- Central office enabled to monitor Patrol Efforts in the regions



THREAT HOTSPOTS AND TRENDS

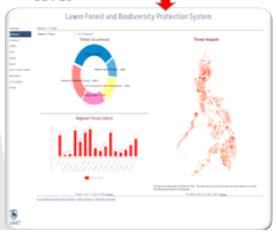
- Up to date information on top threat and threat hotspots
- Increased patrol effort
- Downward trend in threats

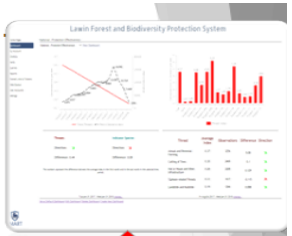




Lawin Dashboard National

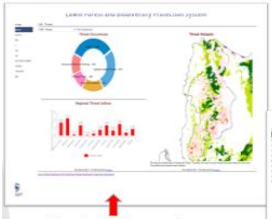
- Timely information on threat observations and hotspots at the national level





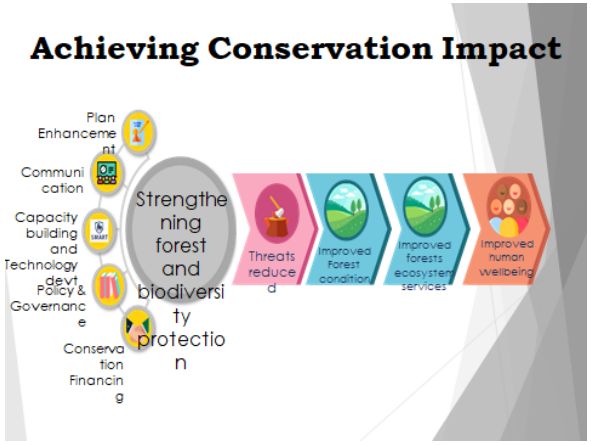
- Real time feedback for national decision makers on forest protection effectiveness in the country

Lawin Dashboard - Regional



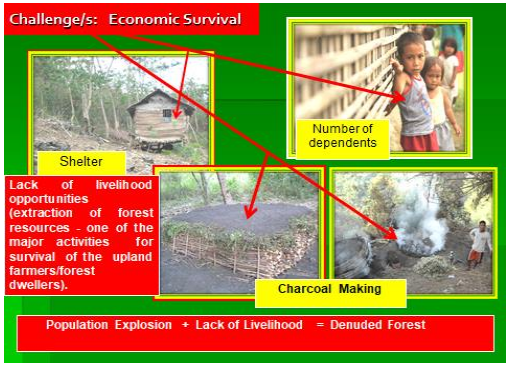
- Timely information on threat occurrences and hotspots at the regional level

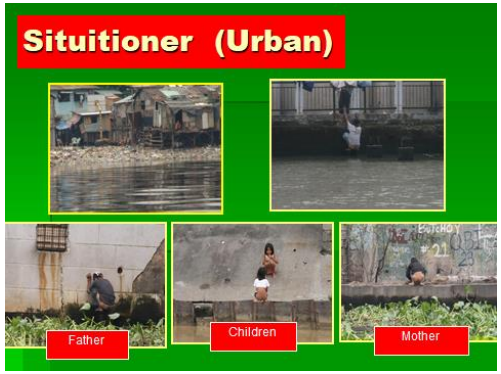
- Real time feedback for regional decision makers on forest protection effectiveness in the region



4. Topic: **Solar Home System**
   by Dr. Aladino Moraca
   Member, Visayas Regional Advisory Committee
   Foundation for the Philippine Environment

Dr. Aladino Moraca discussed creative programs and livelihood projects – solar home system, rainwater collection system and sustainable livelihood- introduced to upland communities that raised their standard of living in exchange for their expressed commitment to protect and conserve the environment.




Situitioner (Urban)
Father
Children
Mother


Situationer
Women and children doing the daily chores in fetching water every everyday walking at a distance of 0.5 to 1.5 kilometers passing a difficult terrain or ravine.


Global Warming (climate change adaptation)
Positive proof of global warming.
18th Century 1900 1950 1970 1980 1990 2006
Source: Nanding (DOST) – Region IV-A


Proposed Interventions


Solar Home System, Rain Water Collector and Sustainable Livelihood Trade-off to Community-based Biodiversity Conservation
Partner/s : Foundation for the Philippine Environment (FPE), Ecological and Agricultural Development Foundation, Inc., (EcoAgri), RU Foundry and Machine Shop Corporation and Central Philippines State University (CPSU)


Solar Home System Installation
Solar Home System (150 watts solar panel, inverter, load controller, battery, and other accessories)


Effect and impact of Solar Home System (education and skills enhancement of women and children)


Rain Water Collector

Strategies (Trade-Off Scheme)

Household-based Solar System and Rain Water Collector Installation in Exchange of the following:

1. Family/household should participate in the project implementation (Household-based Agro-Forestry Project)
2. Protect and conserve the biodiversity/environment to (2 to 5 hectare per family)

- The Philippines consumes about 700,000 tons per year both for Food and Industrial Grades
- 70% of these salts are imported from Australia, India, China among others

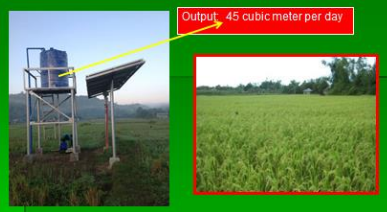
- The Philippines consumes about 700,000 tons per year both for Food and Industrial Grades
- 70% of these salts are imported from Australia, India, China among others

Economic Benefit

1. Solar Home System:

Savings per family:

PhP 428.00 – Kerosene, Battery, Cellphone Charging
Add: 150.00 - sugar
120.00 - cooking oil
130.00 - process cacao
Total 828.00 - Total Savings



Installed Solar Pumping System for Drinking Water and Household Uses in Barangay Oringao, Kabankalan City – 400 to 500drums of water per day delivered closer to the backyard benefitting at least 350 families.

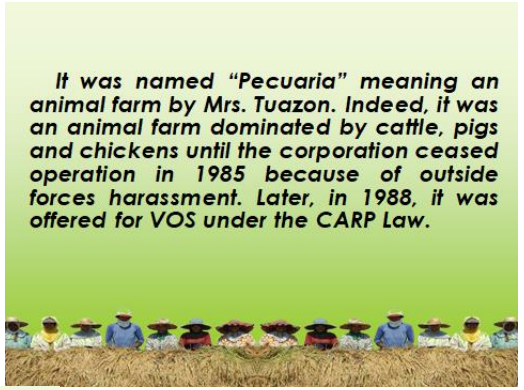
Thank You

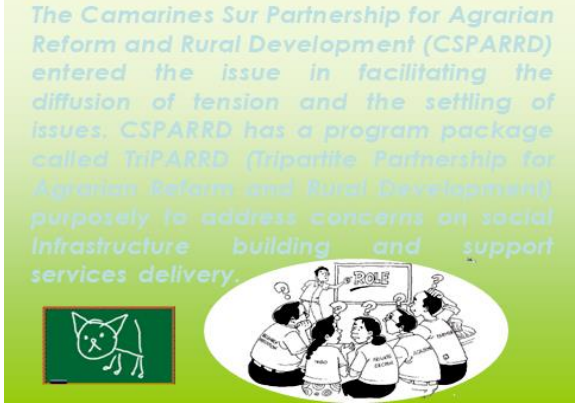
Session C focused on Organic Agriculture and had three (3) speakers.

1. Topic: **Healthy Rice Varieties**
   by Jason Balibe ICS Staff, Pecuaria Development Cooperative (PDCi)

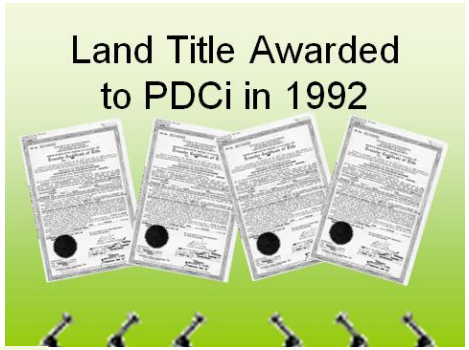
Mr. Jason Baliber discussed how the operations of Pecuaria Development Cooperative started as privately-owned in Camarines Sur, Bicol, in 1952 and how it developed into an organic farm currently managed by a cooperative of organic farmers growing certified organic products. He also presented the challenges encountered by their cooperative.

POWERPOINT PRESENTATION



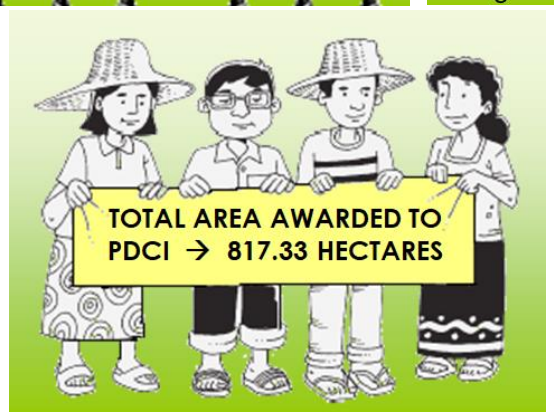


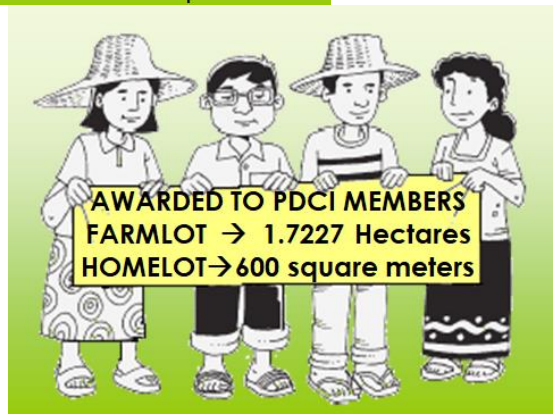

Such events prelude the birth of the Pecuaria Development Cooperative, Inc. (PDCI) in September 30, 1991 and was registered in the Cooperative Development Authority.
under the
CDA CERTIFICATE OF REGISTRATION NO. NG-960
Republic of the Philippines
COOPERATIVE DEVELOPMENT AUTHORITY

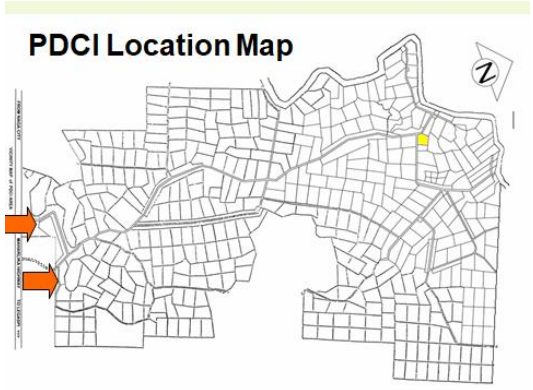

Land Title Awarded
to PDCi in 1992

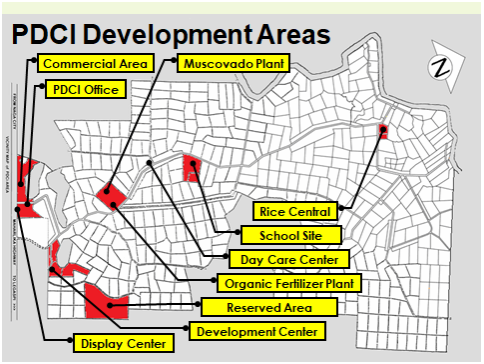

Collective Ownership
Individual Farming
Bond of Cooperation is Land
Agrarian Reform Cooperative

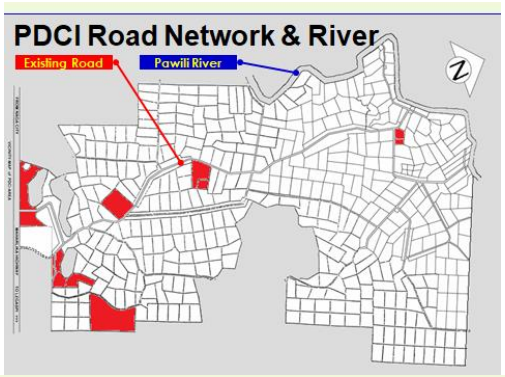

426 MEMBERS are AGRARIAN
REFORM BENEFICIARIES (ARB'S)

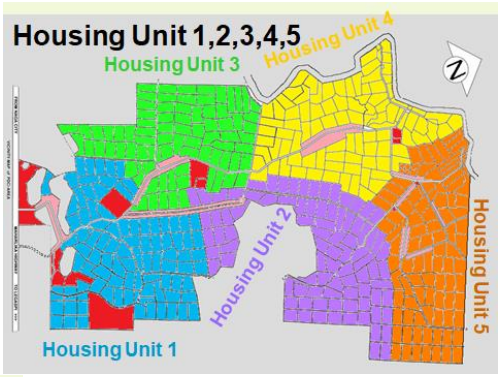

TOTAL AREA AWARDED TO
PDCI → 817.33 HECTARES

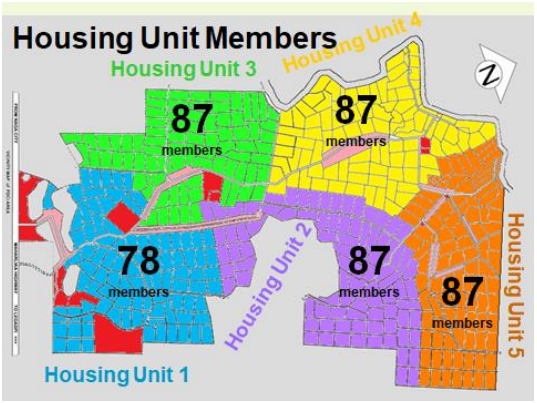

AWARDED TO PDCI MEMBERS
FARMLOT → 1.7227 Hectares
HOMELOT→600 square meters

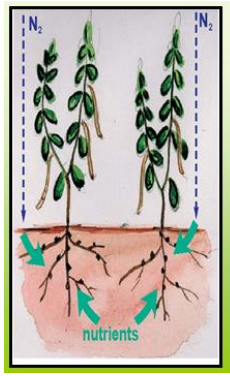

PDCI Location Map
N







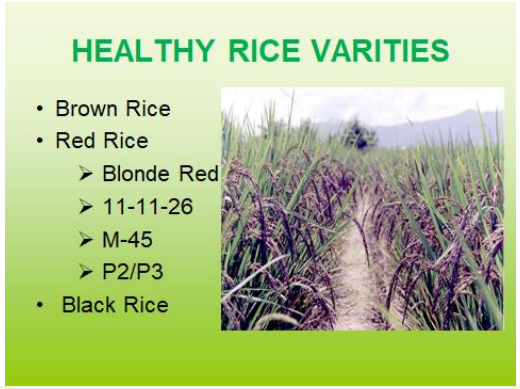




1994
PDCI STARTED ORGANIC AGRICULTURE

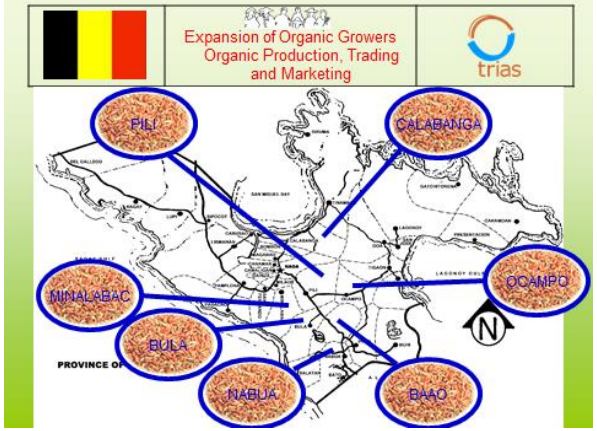
In 2005 we started to undertake activities in preparation for Organic Certification

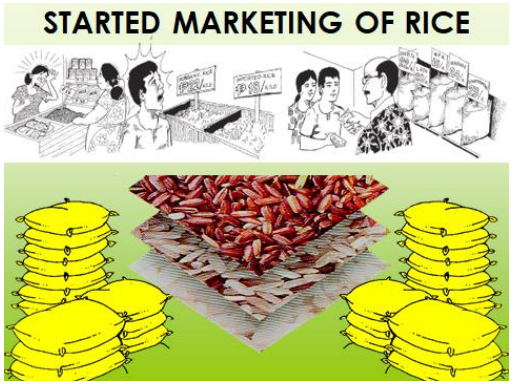

OCCP
OCCP
OCCP
SEAL OF EXCELLENCE AND INTEGRITY
OCCP
CERTIFIED ORGANIC
2007
OCCP
APPROVED OUR
APPLICATION
FOR ORGANIC
CERTIFICATION

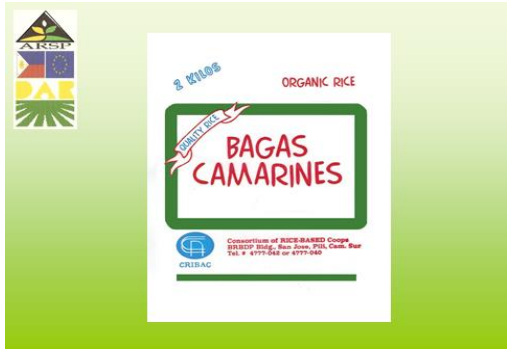

HEALTHY RICE VARITIES
• Brown Rice
• Red Rice
➢ Blonde Red
➢ 11-11-26
➢ M-45
➢ P2/P3
• Black Rice


TRADITIONAL SEEDS


CULTURAL PRACTICES


Expansion of Organic Growers
Organic Production, Trading
and Marketing
trias
PILI
CALABANGA
MINALABAC
OCAMPO
BULA
NABUA
BAAO
N


STARTED MARKETING OF RICE


ARSP
DAR
2 KILOS
ORGANIC RICE
BAGAS
CAMARINES
CRISAC


Pecuaria's
Healthy Rice
Organic Rice
a healthy habit


Packaging
Healthy Rice
Organic Rice
Healthy Rice
Organic Rice
Healthy Rice
Organic Rice


Healthy Rice
Organic Rice
Pesticide-Free


Pecuaria
Pro Organics
HEALTHY RICE
Organic Red Rice
Organic Brown Rice
Organic Black Rice
Organic Pink Rice
Premium Quality


Existing Markets
LCC SUPERMARKET
HYPERMARKET
SUPERMARKET
Rustan's
savemore
PUREGOLD
Robinsons Supermarket
SM SUPERMARKET
South
ROYAL
BUDGET MART
cravings
SHOPWISE
METRO
PIONEER CENTRE SUPERMART


PDCi Enterprises,
Projects, Programs & Services
Pecuaria
Bio-
Organic
Fertilizer


Program and services: Post harvest facilities
Rice Processing Complex (RPC)


CHALLENGES


Challenges: Technology Standard and second liner
Welcome !!!
INTERNAL CONTROL SYSTEM (ICS) TRAINING
PDC/ICS manual


Challenges : Research and Development
❖ Collection of Traditional seeds
❖ High yielding variety
❖ Good eating quality
❖ Market acceptance


ICS: Organic Production

2. Topic: **The Gentle Wild**
   by Bert Peeters
   Coordinator, Philippine Permaculture Association

Bert Peeters focused his discussion on the ego and ecosystem dilemma in taming food for convenience. He said that the ego often hinders development efforts. Nonetheless he also discussed that crafting and healing with nature is one of the things that food producers miss out and that one thing that should be looked into is how we can generate ecosystem - based abundance – which is better and suitable in the country.

Peeters articulated questions such as “How do we turn our hats to the wild?” and “How do we understand that abundance in the tropical country is generated by biodiversity and not just by monoculture or organic agriculture?” The country indeed generates wealth and abundance with its connection with the different components such as the people, crops, plants, and animals. He said that it is really all about the place where we can thrive and grow crops and study the energy flow.

Three important things were mentioned by Peeters in order to have balance between the ego and ecosystems;

(1) **Understanding the shapes of nature**. The value that we need is how we reconnect ourselves with nature by not just living in buildings and infrastructures. Learn to understand the place you are in and look at the beautiful abundance that is still there.

(2) **Balancing the use and amount of energy**. The Philippines, having a tropical ecosystem is powerful in terms of energy. To be able to have a productive garden or agriculture is to understand the energy flow. Everything that we need for agricultural

production systems are there in the four elements – wind, soil, air, and water. We need to master all of these to achieve abundance.

(3) Making the right patterns. Everything is shaped in nature – the place, energy, and pattern. There are different design elements that we can use. In permaculture, there are many best possible patterns for the garden. Designing, building, implementing, and maintaining are also the important factors in producing abundant food.

Moreso, Peeters ended his talk by saying that the best thing yet is to let nature take care of you. *"When you plant something that would protect you and you harvest food from that system then I think you are up for real sustainability." "The secrets are not really out there, it's really about starting doing something and the secrets will reveal themselves to each and every one of us."*

3. Topic: **Learning from the Organic Agriculture of Netherlands**
   by Gordon Alan Joseph
   Honorary Consul, Consulate of Netherlands in Cebu

Consul Gordon Alan Joseph discussed the Dutch model of sustainable agri-innovations. Through studies conducted by Wageningen University, the use of greenhouse technology has made the Dutch produce twice as much food using half the resources. The technology reduces water use by 90%, antibiotic use by 60%, and chemical use by 97%. It conserves land area; one indoor acre in the greenhouse can have the same produce as that of a 10 acre land, while using renewable energy in its operations.

"Twice as much food using half the resources."

90% reduction in water use
60% reduction in antibiotic use
Almost ***100%*** reduction in pesticides

Wageningen University

#1 Agriculture Research Institute in the World

Global average yield of potatoes:
9 tons/acre

Farmers in the Netherlands:
20 tons/acre

Global Leader

- Tomatoes #1
- Potatoes #1
- Onions #1
- Vegetables #2
- Vegetable Seeds 1/3 of all trade

It looks **expensive**.

Quality education is **expensive**.

Weather adaptation is **expensive**.

Technology is **expensive**.

US$ 93,000,000,000

Is this expensive?

12,430,000 hectares (41.7%)

1,900,000 hectares (54.6%)

Each indoor acre = 10 outdoor acres
Chemicals reduced 97%

A sea of greenhouses around a farmers home. The Dutch have become world leaders in agricultural innovation.

Organics?

52,000 hectares (2.7% of agriculture area)

It's about
SUSTAINABILITY
and INNOVATION.

10,000,000,000

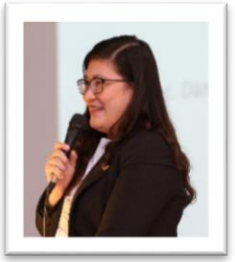
2050

US$ 13,600,000,000
US$ 92,800,000,000

2nd largest food exporter in the world.

Dutch agriculture technology is available.

Session D was on Effective Strategies for Advocacy, chaired by **Prof. Huberto Zanoria** of Mandaue City College and moderated by **Grace Magalzo-Bualat**, Chair of Political Science Department of University of San Carlos. It had three (3) speakers.



1. Topic**: Creative Advocacy (Break Away from Plastic)**
   by Von Hernandez
   Head, Break Away from Plastics

Mr. Von Hernandez introduced the topic by highlighting the seriousness of plastic pollution in our environment. Plastic use has been increasing through the years with only 10% of them recyclable. Plastics give off pollutants that affect the food we eat and the air we breathe. Currently, there is no control group or government agency that handles this alarming problem. He further discussed how his group audited the source of plastics in an area confined in Manila Bay. They communicated with the concerned corporation, which agreed to address the problem; however, Mr. Hernandez questions its sustainability. He recommended involving more sectors in the advocacy, crafting and implementing government policies to mitigate the problem and create effective and less harmful disposal of one-time-use plastics.

2. Topic: **EnvironMentor (Mobile App by DENR)**
   by Daniel Nicer
   Asst. Secretary, DENR

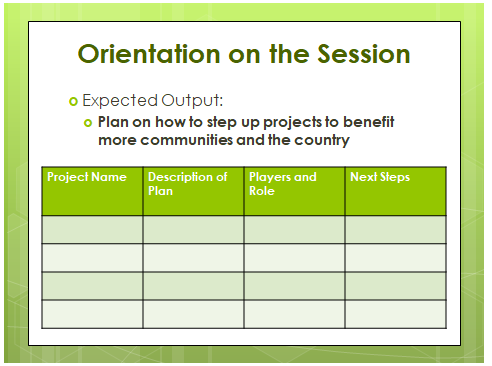
Asec. Nicer discussed the information system developed by DENR for its use and that of its stakeholders. It is a dashboard of all critical environmental information of a particular location, a “waze-like” active web-based application that utilizes GPS technology to summon relevant data regarding an area. It is always a work in progress that relies on the stored data from DENR as well as from other users who continuously enhance the database and its usefulness. It has the capacity to give information on best practices in environmental and natural resources management and uses the latest developments in the information communication technology to serve the needs of the current and future generations of the country.

3. Topic: **Turning Clicks, Likes and Shares into Volunteers and Sponsors**
by Junard Catingub
Consultant, Data Driven Rocks

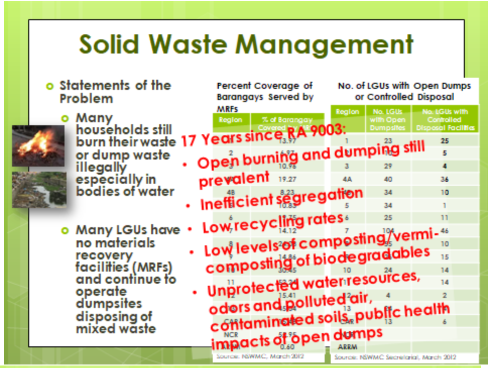
Mr. Catingub discussed digital media as the new technology for advocacy. He presented various platforms for communication, data presentation and analysis. He also discussed the Reach-Engage-Act-Patronage Formula or REAP that can be a communication strategy. He enjoined everyone, regardless of age, to learn the technology by investing in time spent in self-study.

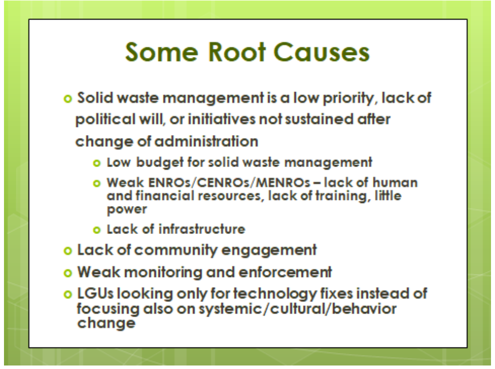
Session E dealt with Solid Waste Management Success Stories chaired and moderated by **Jorge Emmanuel**, a renowned Environmentalist and former Consultant of United Nations Development Program. He talked on the dangers of adopting waste to energy which several government officials are considering to address challenges in Solid Waste Management. He discussed the dangers of dioxin emissions that cause cancer and persists in the environment for many generations. The planned quarterly or annual monitoring of dioxins is inadequate in protecting health and the environment because it releases highly varying levels of dioxin at different times of the day or week. It is also expensive. The Philippines does not have the capability to continuously monitor dioxin from waste-to-energy-plants. He strongly recommends adopting Zero Waste principles and alternative safer technologies like biodigesters, autoclaves, microwaves and hydroclaves that are in operation in various parts of the country. There were three (3) speakers in the session.

POWERPOINT PRESENTATION

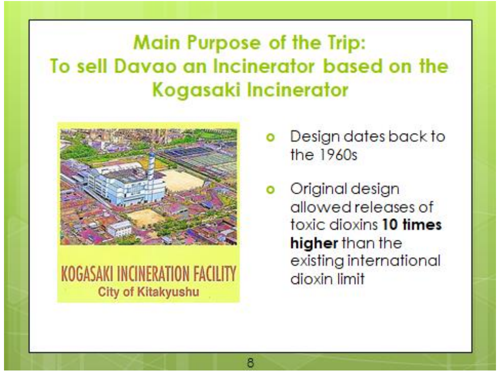


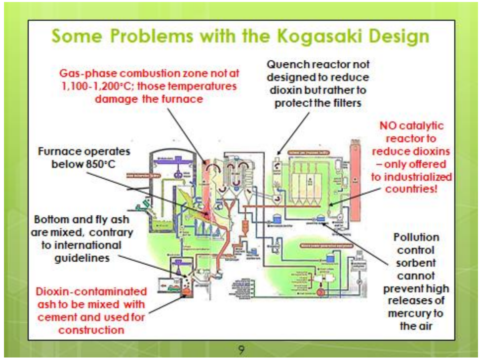

Overview:
Solid Waste Management
Statements of the Problem:
"Looking at the glass half empty"
Some root causes and a Burning Issue
Successful Stories/Projects

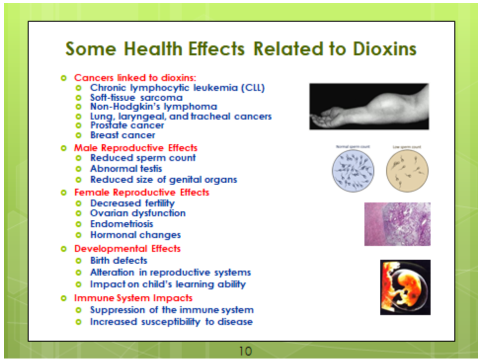

Solid Waste Management
Statements of the Problem
Many households still burn their waste or dump waste illegally especially in bodies of water
Many LGUs have no materials recovery facilities (MRFs) and continue to operate dumpsites disposing of mixed waste
Percent Coverage of Barangays Served by MRFs
No. of LGUs with Open Dumps or Controlled Disposal
17 Years since RA 9003:
Open burning and dumping still prevalent
Inefficient segregation
Low recycling rates
Low levels of composting/vermi-composting of biodegradables
Unprotected water resources, odors and polluted air, contaminated soils, public health impacts of open dumps
Source: NSWMC, March 2012
Source: NSWMC Secretariat, March 2012

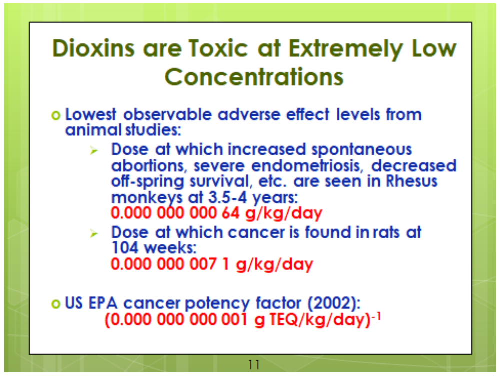

Some Root Causes
Solid waste management is a low priority, lack of political will, or initiatives not sustained after change of administration
Low budget for solid waste management
Weak ENROs/CENROs/MENROs – lack of human and financial resources, lack of training, little power
Lack of infrastructure
Lack of community engagement
Weak monitoring and enforcement
LGUs looking only for technology fixes instead of focusing also on systemic/cultural/behavior change

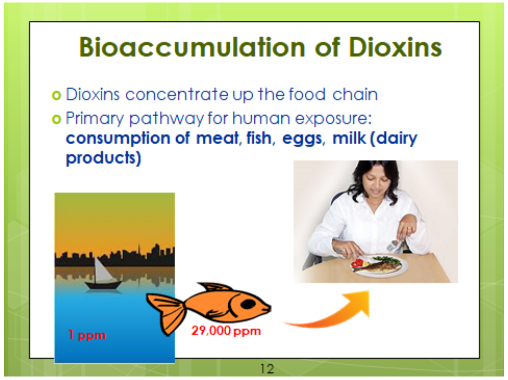

Searching for a magic solution to make waste disappear:
Thermal Waste-to-Energy Technology "quick fix"
Trip to Japan for "Training on Solid Waste Management" (November-December 2017)
Davao City Delegation
Mayor
Asst. City Administrator
Head, Engineering Office
Head and staff, CENRO
Head, Auxiliary Services Unit
Mayor's Executive Assistant
Other Davao City officers
Two NGO representatives
7


Main Purpose of the Trip:
To sell Davao an Incinerator based on the Kogasaki Incinerator
KOGASAKI INCINERATION FACILITY
City of Kitakyushu
Design dates back to the 1960s
Original design allowed releases of toxic dioxins 10 times higher than the existing international dioxin limit
8


Some Problems with the Kogasaki Design
Gas-phase combustion zone not at 1,100-1,200°C; those temperatures damage the furnace
Quench reactor not designed to reduce dioxin but rather to protect the filters
NO catalytic reactor to reduce dioxins – only offered to industrialized countries!
Furnace operates below 850°C
Bottom and fly ash are mixed, contrary to international guidelines
Pollution control sorbent cannot prevent high releases of mercury to the air
Dioxin-contaminated ash to be mixed with cement and used for construction
9

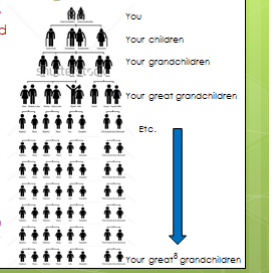

Some Health Effects Related to Dioxins
Cancers linked to dioxins:
Chronic lymphocytic leukemia (CLL)
Soft-tissue sarcoma
Non-Hodgkin's lymphoma
Lung, laryngeal, and tracheal cancers
Prostate cancer
Breast cancer
Male Reproductive Effects
Reduced sperm count
Abnormal testis
Reduced size of genital organs
Female Reproductive Effects
Decreased fertility
Ovarian dysfunction
Endometriosis
Hormonal changes
Developmental Effects
Birth defects
Alteration in reproductive systems
Impact on child's learning ability
Immune System Impacts
Suppression of the immune system
Increased susceptibility to disease
10


Dioxins are Toxic at Extremely Low Concentrations
Lowest observable adverse effect levels from animal studies:
Dose at which increased spontaneous abortions, severe endometriosis, decreased off-spring survival, etc. are seen in Rhesus monkeys at 3.5-4 years:
0.000 000 000 64 g/kg/day
Dose at which cancer is found in rats at 104 weeks:
0.000 000 007 1 g/kg/day
US EPA cancer potency factor (2002):
(0.000 000 000 001 g TEQ/kg/day)-1
11


Bioaccumulation of Dioxins
Dioxins concentrate up the food chain
Primary pathway for human exposure: consumption of meat, fish, eggs, milk (dairy products)
1 ppm
29,000 ppm
12

Dioxins Stay in the Environment for a Very Long Time

If you produce dioxin today and it falls on the ground and is covered by 2 cm of soil

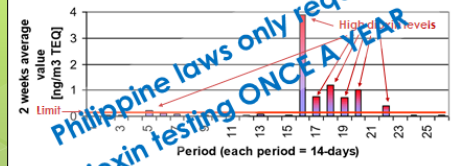


It will take between **10 to 40 generations** for most of that dioxin to disappear

13

Regulations & Capacity have not kept up with Science

Results of Continuous Dioxin Monitoring of Incinerators in Belgium



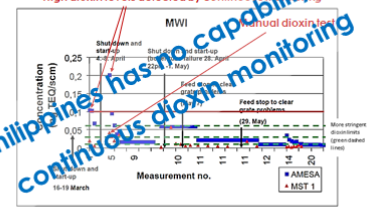
- Continuous monitoring revealed that dioxin levels exceeded the limit about 98 days out of the year
- Some dioxin releases were about 40 times above the limit
- High releases would not have been discovered with only a few tests a year

Philippine laws only require dioxin testing ONCE A YEAR

14

Regulations & Capacity have not kept up with Science

Results of Continuous Dioxin Monitoring of a UK incinerator by the Environment Agency of England and Wales



High dioxin emissions would not be detected even with 30 manual dioxin tests in 3 months.

Philippines has no capability for continuous dioxin monitoring

15

Thermal WTE requires WASTE to operate and make a profit

- Thermal Waste-to-Energy technologies encourage …
  - More generation of waste
  - More consumption of materials
  - More extraction of natural resources

Kogasaki Incinerator requires 810 tons of waste every day

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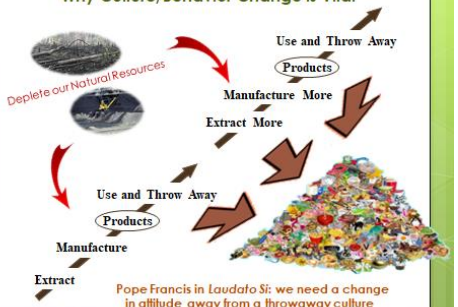
Why Culture/Behavior Change is Vital



Pope Francis in *Laudato Si:* we need a change in attitude away from a throwaway culture

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SUCCESS STORIES: Zero Waste (ZW) "Walang Aksaya", "Walay Usik"

- Goals, principles, and practices that avoid waste generation
- Priority given to waste avoidance (front end) over recovery and recycling (back end of resource management)
- Focusing on systems, processes, and people
- Results in residual waste per capita that is significantly lower than national averages

Zero Waste (ZW) "Walang Aksaya", "Walay Usik"

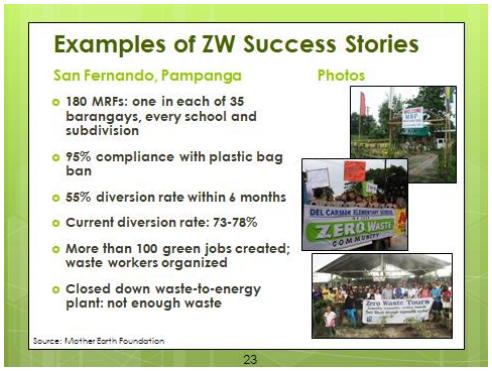
- Examples of ZW SYSTEMS
  - Network of MRFs linked to junkshops, grassroots recycling and upcycling projects
  - Ban on plastic bag and plastic straws
  - Build small industries making biodegradable or reusable containers and straws
  - System of segregation monitoring coupled with penalties and incentives
- Examples of PEOPLE
  - Broad multisectoral engagement – schools, churches, youth, civic groups, businesses, etc.
  - Empowered ENRO/CENRO/MENRO staff
  - Community volunteers/volunteer monitors

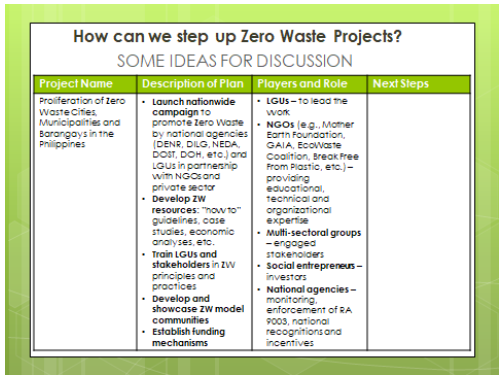
Zero Waste (ZW) "Walang Aksaya", "Walay Usik"

- Examples of ZW PROCESSES/PRACTICES
  - Door-to-door and business-to-business repeat visits to change behavior
  - Community monitors to change behavior *[Singapore study: putting up slogans and signs was useless, community monitor worked]*
  - Information and education campaigns to consumers on sustainable shopping, e.g.
    - Bring your own reusable bag
    - Choose environmentally friendly products with minimal packaging

ZW PROCESS: Mother Earth Foundation

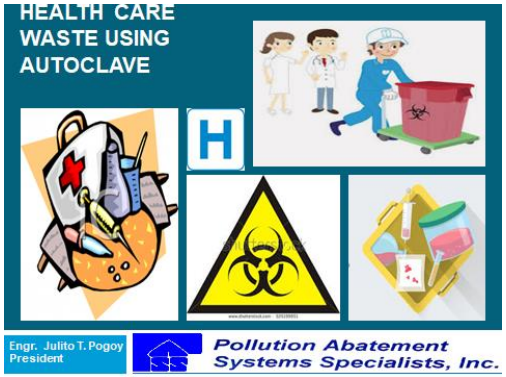
21





1. Topic: **Health Care Waste Using Autoclave**
   by Julito T. Pogoy
   Pollution Abatement Systems Specialists Inc.

Mr. Pogoy discussed the use of Autoclave for Health Care Waste. Through the use of autoclave technology, medical waste can be managed and be compliant to RA 9003, RA 6969 and the DENR/DOH Joint Administrative Order No. 2 series of 2005. Autoclaves use pressurized steam to treat infectious waste. The treated waste comes out cleaner than regular waste. Shredding reduces its volume and can be disposed in dedicated cells in landfills.



Health Care Waste

- Health Care waste (HCW)- include all wastes generated as a result of the following:
  - 1. Diagnosis, treatment, management and immunization of humans or animals;
  - 2. Research pertaining to the above activities;
  - 3. Producing or testing of biological products; and
  - 4. Waste originating from minor or scattered sources (i.e. dental clinics. alternative medicine clinics, etc.)

Source: JAO DENR-DOH No. 02, Series of 2005

Health Care Waste: Governing Laws

- RA 9003: Ecological Solid Waste Management Act of 2000
- RA 9275: Philippine Clean Water Act of 2004
- RA 8749: Clean Air Act of the Philippines
- RA 6969: Toxic Substances & Hazardous & Nuclear Wastes Control Act of 1990

Source: JAO DENR-DOH No. 02, Series of 2005

Health Care Waste: Governing Laws

RA 6969

- AN ACT TO CONTROL TOXIC SUBSTANCES AND HAZARDOUS AND NUCLEAR WASTES, PROVIDING PENALTIES FOR VIOLATIONS THEREOF AND FOR OTHER PURPOSES

Health Care Waste: Governing Laws

- Hazardous Wastes

- substances that are without any safe commercial, industrial, agricultural or economic usage and are transported from the country of origin for dumping or disposal into or in transit through any part of the territory of the Philippines.

Source: RA 6969

Prescribed Hazardous Wastes

- Plating Wastes
- Acid Waste
- Alkali Wastes
- Inorganic Chemical Wastes
- Reactive Chemical Wastes
- Paints
- Resins
- Organic Solvents
- Textiles
- Oil
- Containers
- Miscellaneous Wastes

Source: RA 6969

Prescribed Hazardous Wastes

Miscellaneous Wastes

- Pathological or infectious wastes
- Asbestos Wastes
- Pharmaceuticals wastes and drugs
- Pesticides

Source: RA 6969

HAZARDS OF UNTREATED HCWs

- Risk of diseases transmission;
- dizziness;
- nausea;
- dermatitis;

- Intoxication from chemicals or pharmaceuticals;
- Eye & skin irritation
- Environmental pollution: Water; Land; Air & People

Source: DOH Health Care Waste Management Manual

Health Care Waste: Governing Laws

- DOH-DENR Joint Administrative Order No. 02, Series of 2005
- Objectives:
  a) provide guidelines to generators, transporters and operators/owners of TSD Facilities on proper handling, collection, transport, storage, treatment and disposal of HCW;
  b) clarify the jurisdiction, authority and responsibility of the DENR and DOH with regard to HCWM; and
  c) harmonize the efforts of the DENR and the DOH on HCWM.

Processes Used in the Treatment of Healthcare Waste

Processes :

– Thermal

– Chemical

– Irradiation

– Biological

– Encapsulation

– Inertization

Source: JAO DENR-DOH No. 02, Series of 2005

Processes Used in the Treatment of Healthcare Waste

Thermal Treatment Processes

- Rely on heat to destroy pathogens
- Two types:

– High-heat thermal systems which involve combustion and/or pyrolysis of healthcare waste

– Low-heat thermal systems also called non-burn or non-incineration treatment technologies

Thermal Treatment Processes

Low-Heat Thermal Process

- Uses thermal energy at elevated temperatures high enough to destroy pathogens, but not sufficient to cause combustion or pyrolysis of waste
- Generally operates between 100ºC and 180ºC
- Takes place in moist or dry heat environments

Examples of Treatment Technologies That Do Not Generate Dioxins/Furans

- Non-Burn Thermal Technologies

– Autoclaves

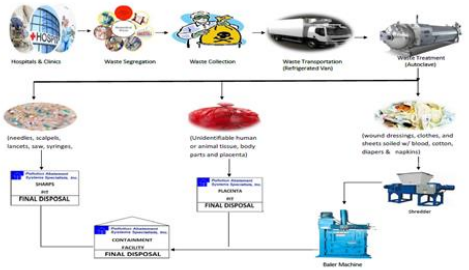
– Microwaves

– Hydroclaves

Pollution Abatement Systems Specialists, Inc.

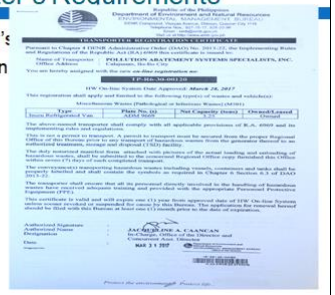
- a corporation duly registered with the Securities and Exchange Commission (SEC) in 2003.
- ISO Certified ISO 9001: 2008
- Accredited Healthcare Waste Transporter
- Accredited Treatment/Storage/Disposal (TS Facility
- PASS Inc. Healthcare Waste Treatment Pla
  a) Cebu City
  b) Palawan
  c) Iloilo City

HEALTHCARE WASTE TREATMENT PROCESS FLOW



Transport of Health Care Waste: Transporter's Requirements

- Transporter's Registration Certificate



Treatment of Health Care Waste

- Treatment, Storage, and Disposal Certificate

Transport of Health Care Waste: Transporter's Requirements

- Permit To Transport

Transport of Health Care Waste: Generator's Requirements

- Quarterly Self-Monitoring Report


Department of Environment and Natural Resources
Environmental Management Bureau

GENERAL INFORMATION SHEET

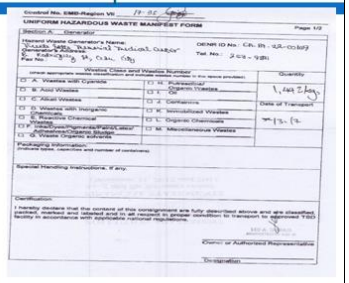
Transport of Health Care Waste: Generator's Requirements

- Hazardous Waste Generator's ID


POLLUTION ABATEMENT SYSTEMS SPECIALISTS, INC.

Transport of Health Care Waste: Transporter's Requirements

- Manifest Form


UNIFORM HAZARDOUS WASTE MANIFEST FORM

Autoclaves

- Capable of treating a wide range of healthcare wastes
- Consists of a metal vessel designed to withstand high pressures, with a sealed door and an arrangement of pipes and valves through which steam is brought in and removed

Autoclaves

AUTOCLAVES

ADVANTAGES

- Waste suitable for landfill
- Well proven technology
- Low Cost
- No hazardous Emissions

Source: DOH Health Care Waste Management Manual

AUTOCLAVES COST

Autoclave Operating Capacity	Approximate Range of Cost
100 lbs/cycles (45.45 kg)	1,000,000 to 5,000,000
250 lbs/cycles (113.64 kg)	1,500,000 to 5,600,000
450 lbs/cycles (204.55 kg)	1,800,000 to 6,200,000
750 lbs/cycles (340.91 kg)	2,000,000 to 6,700,000
1500 lbs/cycles (681.82)	2,500,000 to 9,600,000

Source: DOH Health Care Waste Management Manual

AUTOCLAVES

DISADVANTAGES

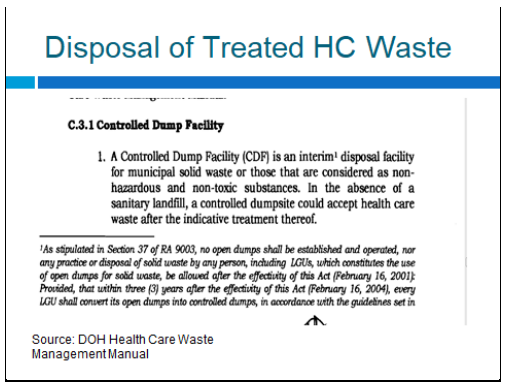
- Possible odors
- Reduce volume

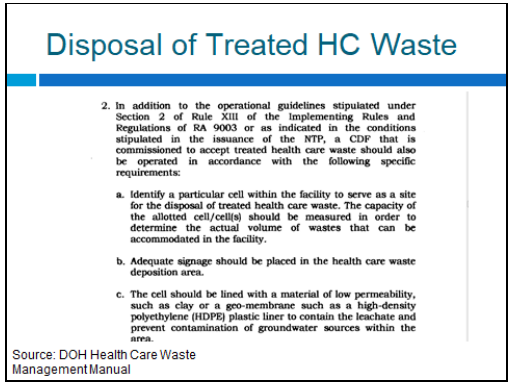
Source: DOH Health Care Waste Management Manual

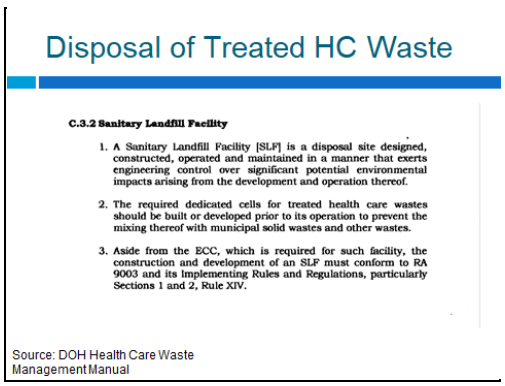
Disposal of Treated HC Waste

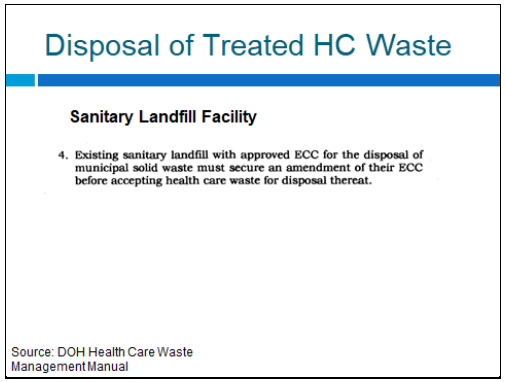
The use of the proceeding disposal facilities should only be limited to health care wastes which have undergone the necessary treatment provided under the prescribed standards stipulated in the DOH Health Care Waste Management Manual:

Source: DOH Health Care Waste Management Manual









2. Topic: **Biodigesters for Municipal Biodegradable Waste**
By Michael Templonuevo
Municipal Environment & Natural Resources Officer, GMA City, Cavite

Michael Templonuevo discussed the use of biodigesters to process biodegradable wastes. It is a biological (non-thermal) waste-to-energy technology that is used widely in Europe, Africa, China, Latin America and other parts of the world. It is intended to address biodegradable waste which is the largest component of solid waste. GMA City uses 1 or 2 IBC tank floating drum biodigesters to process waste from public market, piggeries, chicken farms, etc. The gas produced is used immediately as cooking gas.

INTRODUKSYON SA TEKNOLOHIYANG ANAEROBIC DIGESTION: BIOGAS PAMAMARAAN PARA SA PAG SASAAYOS NG MGA BASURANG NABUBULOK AT PAGLILINIS NG TUBIG

G. MICHAEL S. TEMPLONUEVO
MENRO GMA Cavite/ACENRO

Ano ang anaerobic digestion?

Anaerobic digestion ay isang siyentipikong pamamaraan ng pagsasa-ayos ng mga lahat ng uri ng nabubulok na basura mula sa tahanan, paaralan, establisimiento, mga gusaling pangpamahalaan, restaurant, piggery, at sa lahat ng mga sector na nagpoprodyus ng basurang nabubulok sa pamamagitan ng pag gamit ng mga "bacteria" na inilalagay sa isang saradong lalagyan na walang hangin.

Ito ba ay bagong teknolohiya?

Ito ay hindi bagong teknolohiya! Mas matanda pa ito sa kabihasnan! Hanggang mayroong nagaganap na pagbubulok ng mga bagay na nabubulok, nandun ang Anaerobic Digestion! Ito ay matagal ng ginagamit ng mga karatig bansa natin particular na ang Tsina at India.

Ano-anong mga basura ang kailangan ng isang Anaerobic Digestion?

1. Pagkaing patapon
2. Mga tubig na madudumi na walang halong kemikal o sabon, chlorox etc.
3. Gamit at patapon ng mantika
4. Lahat ng uri ng dumi o tae

Anong mga produkto at pakinabang ang maaaring makuha natin sa pag gamit ng ANAEROBIC DIGESTION?

- Sustinableng apoy para sa pagluluto (biogas)
- Organikong pataba ng halaman
- Paglilinis ng mga maruruming tubig mula sa kusina
- Mababawasan ang ating basura
- Hahaba ang panahon ng pag gamit ng inyong LPG
- Mababawasan natin ang emission ng "greenhouse gases"
- Maiiwasan ang pagpuputol ng mg puno bilang pangunahing pang -gatong
- HIGIT SA LAHAT, HINDI TAYO MAKAKASIRA NG KALIKASAN!

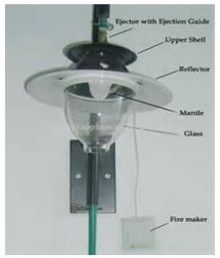
Ano ang biogas?

Ang biogas ay isang produkto ng ANEROBIC DIGESTION na kung saan ang mga nabubulok na mga basura ay hinahayaang mabulok hanggang sa ito ay magprodyus ng gas na ang tawag ay " methane gas" .

Sangkap na kemikal ng isang biogas

- [CH.sub.4] (Methane) 54-70%
- [CO.sub.2] (Carbon Dioxide) 27-45%
- [N.sub.2] (Nitrogen) .5-3%
- [H.sub.2] (Hydrogen) 1-10%
- CO (Carbon Monoxide) 0-.1%
- [O.sub.2] (Oxygen) 0-.1%
- [H.sub.2]S (Hydrogen Sulfide)
- Small amounts of trace elements, amines, and sulphur compounds.

Saan puede gamitin ang biogas ?



Alternatibo sa kerosene lamp o kuryente

Maaaring gamitin sa simpleng pagluluto

Alternatibong gasoline sa sasakyan

Basurang nabubulok mula sa tahanan

Maruming tubig

Papano ang sistema para maging Biogas?

KAILANGAN NATIN NG BIOGAS DIGESTER !

- ITO AY ISANG URI NG LALAGYANAN NA NAKADISENYO PARA MABUHAY ANG KINAKAILANGANG URI NG BACTERIA NA SIYANG TUTUNAW O KAKAIN SA MGA BASURANG NABUBULOK AT LILINIS NG MGA MARURUMING TUBIG DEPENDE SA PANGANGAILANGAN AT LAYUNIN NG NASABING MAY ARI NITO

SINGLE IBC WATER TANK BIOGAS DIGESTER FOR HOUSEHOLD USE

2 IBC WATER TANK BIOGAS DIGESTER FOR BARANGAYS, PRIVATE SUBDIVISIONS AND COMMUNITY USE

1.5 Meter Diameter Floating Type Biogas Digester. Ideal for small to medium public markets, slaughterhouses , schools , commercial and business establishments, 100 kilos to 150 kilos of biodegradable wastes per day, burning capacity, 1hour to 2 hours per day

Two Floating Type Biogas Digesters for Highly Urbanized Cities

Biogas Plant at the center of the community in Kerala, India

100 Metric Cube Floating Type Biogas Digester for Electric Generation

3 Meter Diameter Floating Type Biogas Digester for Piggery and Livestocks

Dome Type Biogas Digester for Manufacturing and Industrial Plants

Russia

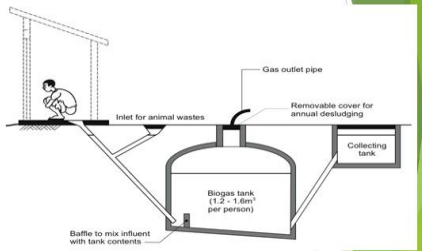
Stockholm, Sweden

Kuala Lumpur, Malaysia

Lagoon Type Biogas Digester for Agricultural and Animal Manure Wastes

Biogas Toilet (Palikuran)

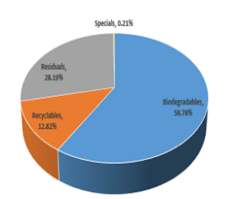
Operational Flow Chart of Biogas Toilet



Mga potensyal na puedeng pag gamitan ng Teknolohiyang biogas

Solid Waste Management Program ng mga LGUs at Barangays

WASTE TYPE	Amount of Ger	Percantage
Biodegradables	30,712.11	59.78%
Recyclables	6,695.82	12.82%
Residuals	14,733.02	28.18%
Specials	109.17	0.21%
	52,249.12	100.00%



Waste Diversion Rate Using Biogas Digester

Single IBC Water Tank Portable Digester 25 KILOS for Households											
1 SINGLE UNIT OF IBC WATER TANK BIOGAS DIGESTER				33 SET OF IBC WATER TANK BIOGAS DIGESTER				66 SET OF IBC WATER TANK BIOGAS DIGESTER			
DAY	WEEK	MONTH	YEAR	DAY	WEEK	MONTH	YEAR	DAY	WEEK	MONTH	YEAR
25 kilos	175 kilos	775 kilos	9,125 kilos	825 kilos	5,775 kilos	25,575 kilos	301,125 kilos	1,650 kilos	11,550 Kilos	51,150 kilos	602,250 kilos
2 IBC Portable Domestic Type Biogas Digester 50 KILOS for Barangays and Community Use											
1 set Portable Digester				33 set Portable Digester				66 set Portable Digester			
DAY	WEEK	MONTH	YEAR	DAY	WEEK	MONTH	YEAR	DAY	WEEK	MONTH	YEAR
50 kilos	350 kilos	1,550 kilos	18,250 Kilos	1,650 Kilos	11,550kilos	51,150 kilos	602,250 kilos	3,300 kilos	23,100 kilos	102,300 kilos	1,204,500 kilos

SA MGA PAARALAN


Sa mga pagawaan o manufacturing plant

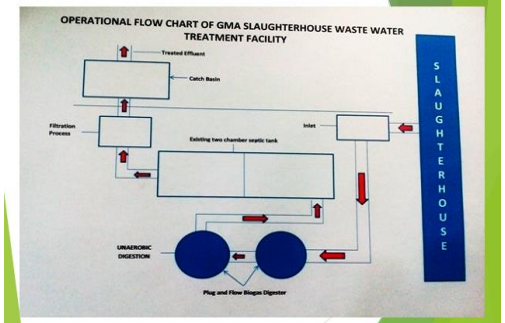

Sa palengke


Sa palengke


Maruming Tubig sa Palengke


Sa mga katayan ng hayop o slaughterhouse

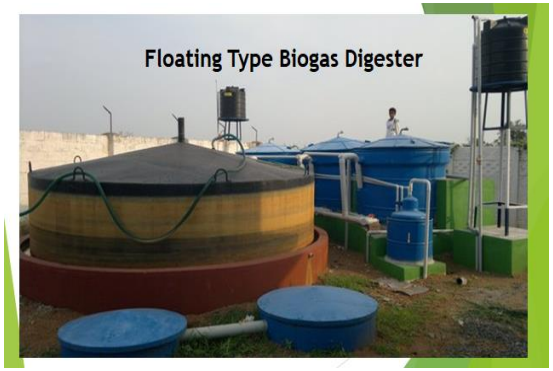

Pagkakabit ng Floating Type Biogas Digester sa isang slaughterhouse sa G.M.A. Cavite



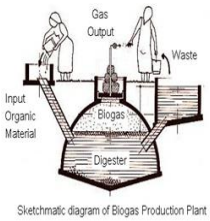
FASTFOOD CHAINS AT RESTAURANTS

BABUYAN,MANUKAN AT IBA PANG HAYUPAN

IBA'T IBANG URI NG BIOGAS DIGESTER



Chinese Dome Type Biogas Digester



Sketchmatic diagram of Biogas Production Plant

BIOGAS COST AND ESTIMATES

1 Metric Cube IBC Water Tank Biogas Digester with Mini-shredder cost P 160,000.00 complete packages (basic training, installation, biogas stove and six months warranty)

Set of Metric Cube IBC Water Tank Biogas Digester with Mini-shredder cost P 250,000.00 complete packages (basic training, installation, biogas stove and six months warranty)

1.5 Meter Floating Type Biogas Digester Plant cost P300,000.00 complete packages (basic training, installation, biogas stove and six months warranty)

3. Topic: **Grassroots Cooperative, Recycling and Livelihood Program**
   by Daniel Alejandre
   Campainger, Ecowaste Coalition

Mr. Daniel Alejandre, was an alternate speaker for Lilia Llanto, Chair of GKK Cooperative, who did not make it to the Summit. He discussed the role of waste pickers in solid waste management. The informal sectors (wastepickers) play an important role by diverting materials from dumpsites and landfills and improving recycling. Waste pickers should be incorporated into the solid waste management system as is done in Zero Waste projects to provide green jobs. The health and safety of waste pickers should be protected as the informal sector is organized and supported to earn livable wages.