



Urban SWM approach

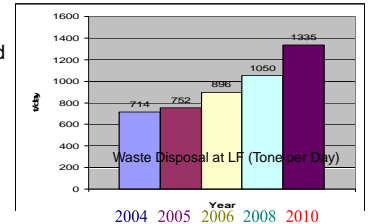
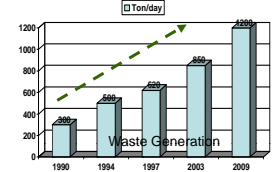
Using Appropriate Method for Waste Reduction

2nd HLS-ESC
Kitakyushu, Japan

Solid Waste Situation

- Waste Generation per Capita in Phnom Penh= 0.70 kg/pers/Day.(1)
- Due to Population Growth, Living standard, Industrialization and Technology, in PNH, the number of Final Disposal waste increased accordingly from 714 t/d in 2004 to 1335t/d in 2010.
- High percentage of Organic waste = 60%.

(1)Source: Jica study 2003



SWM Challenges

- Waste mixed together, lose recycle and reuse opportunity.
- Having heap and waste packages along roads side and public property contribute to less viewer and poor sanitary.
- Waste Generation expected to increase to 2000t/d in 2015.
- Short of LF life cause by increased of waste number, need more and more areas to dump.
- Increase air pollution water pollution and soil degradation.
- Contribute to increase Greenhouse Gas components.



Why littering?
The bin is not too far

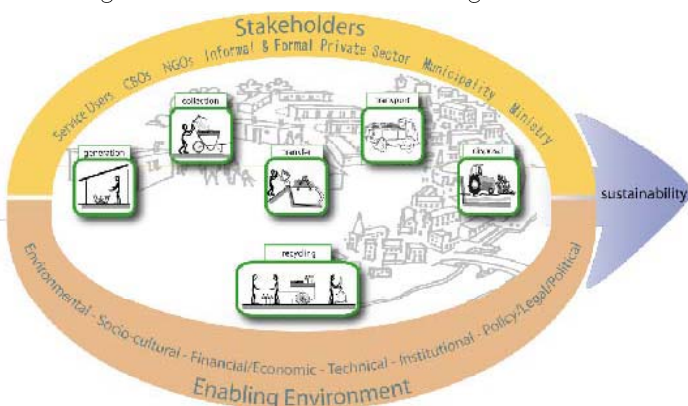


The instruction boards
placed anywhere



So far, they no habit to hold
the garbage to bin...!

Integrated Solid waste Management



Source: ISSOWAMA

SWM by appropriate method



At least 30% will reduce

OBJECTIVE of the Program

- Penalty and aware the people for changing their habit on littering and illegal dump.
- Reduction the number of waste dump, extending LF life:
 - Wet components be used for Biogas and Composting.
 - Dry components will replace to MONEY.
- Be clean and Beautiful city.



During the rainfall period, in the public garden we got more than 3000 attendants



Who Educate People?

- Together with:
 - Volunteer of Male Active Youth 150 persons.
 - Volunteer of Red Cross Youth 100 persons.
 - Volunteer of Female Active Youth 40 persons.
 - Environment Staff 40.
 - Garden Guard 60 .
 - Market leaders and Commune leaders



Awareness raise activities in the markets



Awareness raise activities in the markets



Biogas and Composting Program



កម្មវិធី អង្គការ ខ្ញុំផែត

COMPED, Local non-governmental program

ប្រភពសំណល់ Source of Waste

សំណល់ពីផ្សារដើមឈើ → ជួរកៅស៊ូក្នុងមួយថ្ងៃ
Vegetable market → 5ton/day



ការបែងចែកសំណល់ Separation

សំណល់ត្រូវបានបែងចែកជា ៣ ប្រភេទ: 3 Kinds of waste has

- សំណល់ជីវៈ (80%) Biodegradation → កែច្នៃជីកំប៉ុស Composting
- សំណល់តម្លៃ (12%) Valuable Item → លក់ Selling
- សំណល់ផ្សេងៗ (8%) Non-Valuable → ដាក់ចោលទីពឹង Disposing



Mr.SAM Phalla, Manager of Composting Project, Cambodian Education and Waste Management Organization

ការគំរាស់សំណល់ជីវៈ Making ridged waste

Making ridged waste

ដើម្បីអោយសំណល់ត្រូវបាន
For degradable



ការគ្រប់គ្រងសីតុណ្ហភាព Temperature Control

សីតុណ្ហភាពនៅក្នុងកំប៉ុស ធ្វើដីកំប៉ុស
ត្រូវគ្រប់គ្រងនៅចន្លោះពី 55 °C to 70 °C ។



ការប្រើប្រាស់គ្រឿងបន្លាស់

បើសីតុណ្ហភាពមិននៅចន្លោះពី 55 °C to 70 °C



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កែច្នៃជីកំប៉ុស Compost purifying

(ការផលិតជីកំប៉ុស ១២០ តោនក្នុង ១ឆ្នាំ)
120 Tones per year



ការបិទបង្គំ Packaging

50Kg/bag ជីកំប៉ុសក្នុង១ការ៉ុង



ប្រើប្រាស់សេរីជីវៈកសិកម្ម

Popular Using in the Farming



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កម្មវិធី អង្គការ (ស្បារ៉ូ)

CSARO, Local non-governmental program

FOR SELF-HELP Program

ការកែច្នៃសំណល់ប្លាស្ទិកប្រើប្រាស់វិញ

Plastic waste recycling



ធ្វើការបែងចែកសំណល់រឹង

Waste separations



- ប្រមូលសំណល់រឹងរាល់ថ្ងៃពីទីផ្សារ និងតាមផ្ទះ
- Every day organic waste collection from community and markets.
- បែងចែកសំណល់រឹងរាល់ថ្ងៃ ពី ១២០០ គីឡូ
- Get organic waste separation 1200 Kgs per day
- ផលិតជីពីកំប៉ុស្តរាល់ថ្ងៃ ២ តោន ក្នុងមួយខែ
- Getting compost producing 2 to 3 ton per month.
- ចំណូលអាចទទួលបានពីការលក់ជីពីកំប៉ុស្តរាល់ថ្ងៃ ២០០ ដុល្លារ
- ៣០០ ដុល្លារ ក្នុងមួយខែ
- Get profit from composts in cash \$200 to \$300 dollar per month.



បង្រៀនធ្វើជីពីកំប៉ុស្ត

Composts training

- វាស់សំណល់ដែលនឹងប្រើប្រាស់ Measure incoming waste
- ដាក់កំប៉ុស្តរឹង និងសំណល់ចម្រុះពីកំប៉ុស្តចាស់
- Shred new waste and mix with old compost rejects
- ដាក់ស្រទាប់បាត និងបំពង់អាក្រក់ចេញចូល
- Set-up base layer with drainage and aeration
- បោកសំណល់ចម្រុះចូលក្នុងកំប៉ុស្ត
- Load shredded waste into composting bin
- ត្រួតពិនិត្យសីតុណ្ហភាព
- Monitor temperature
- ប្រើកម្រាលប្រើប្រាស់ Turn the Compost
- បោកជីពីកំប៉ុស្តដោយប្រើប្រាស់
- Dry compost
- បំបែកជីពីកំប៉ុស្តប្រើប្រាស់ ១-២
- Sifting and grading finished compost
- ដាក់ជីពីកំប៉ុស្តចម្រុះ
- Maturing finished compost
- ប្រភេទជីពីកំប៉ុស្ត
- Packaging for selling



Waste Pickers Composting Plant



Community compost ready for selling



PNH Government Program



Segregated waste At Schools



Before



Now



Leaded by CITYNET



CITYNET for Biogas target

- Building 22 m³ biogas 1 unit for Community: Using slaughterhouse waste which disposed at the landfill so far, (combined-tech)
- Building 8 m³ biogas 1 unit for domestic used: Using kitchen and toilet waste (Srilanka-tech)
- Building 6 m³ 4 units for farmers: Using pig/cow dung waste which is use only for fertilizer.

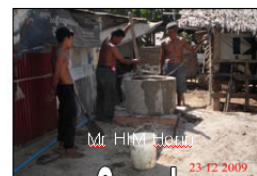
Leaded by CITYNET



3 benefits from using Biogas: 1/ For Family: save money from LPG cost or firewood, Living in sanitary area=Clean homeland. 2/For City: reduce urban waste, city landscape , harmonizing and tourist growth. 3/ For Planet: Reduce firewood used, greenhouse gas, global warming & Climate change.

The construction Result for 8m³ Unit

- The 8m³ unit for toilet and kitchen waste was celebrated by the authority.
- Nowadays the owner said : before, I spent for 16 US\$ /month for LPG gas, now I spent 0.50 US\$/week only for buy additional cow dung.



Landfill Biogas Units

Why?

- Every day the waste heap in crease accordingly, 1335 tones per day,
- The 14 slaughterhouse locations and one Vegetable market has been generate Organic waste more than 20 t/day and discard to LF.
- This Organic matter can be used as compost and Biogas.

How?

- Build 05 of Biogas units for 22 m³ can be absorbed slaughterhouse waste for 1200 tones/year: (Funded by PNH Governor)
 - In the beginning: 10t x 5= 50 tones
 - In daily operation: 3t x 365= 1095 tones
- Produce :
 - Biogas 15m³ per day, direct burning and fuel for generator.
 - Liquid-compost 1500 liters per day
 - Solid-compost 500 kg per day



Lighting



Fertilizing



Liquid-compost





Advantages

- Good collaboration from stakeholders:
- Clear Decision from Governor
- Willingness of local authorities
- Sharing expertise from CITYNET
- Private Company cooperation.
- People Participation
- Ownership on implementation

CHALLENGES

- Weak of public Awareness on proper waste disposal.
- Difficult to changing habit on waste littering.
- Daily migration from rural areas were less aware on proper waste disposal program and also Penalty action.
- Waste-tax not depend on waste number and categories.
- More organic waste, Less reduction means.
- Need technology for Gas storage and using.

Further Steps

- Enhancing and Strengthen the City mechanism on Penalty and Awareness Raising.
- Extending waste segregation program into all markets schools hotels and hospitals.
- Looking for supporting fund for building more 05 Biogas Units for using the rest of slaughterhouse waste.
- Looking for supporting technology on gas storage, Transport and Using in some figures .



Thank You
for your attention and
welcome your
comments and Questions