

The Economics of Solid Waste Management and Drainage: Sustainable Approach to Making South Asian Cities Climate-Resilient

Project Activities & Progress: Sylhet City Corporation
SANDEE-ACD-IWM Climate Change and Cities Research
Review Workshop II
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ICIMOD, Dhapakhel, Lalitpur, Nepal

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Background

- Cities in low income countries face waterlogging and water contamination for indiscriminate dumping of solid waste.
- It is important to develop strategy for reducing the volume of waste and proper disposal.
- The research mainly focuses to identify sustainable instruments for waste disposal by reducing and reusing waste.
- Augmenting human behavior during 'at source segregation' of organic waste is important for any effective sustainable mechanisms.
- Therefore the research initiates an experiment on segregation behavior by using RCT.

Meeting with Mayor and SCC Officials

- Several individual level meeting with SCC officials
- ✓ To brief them about the project
- Honb'le Mayor Mr. Ariful Haque chowdhury and other correspondence of SCC
- ✓ Selecting clubs from various Wards of SCC.



Sampling

- Multistage sampling
 - ✓ Ward selection
 - ✓ Club selection and
 - ✓ Household selection
- Treatment and control Group (Randomly selected)

Treatment –

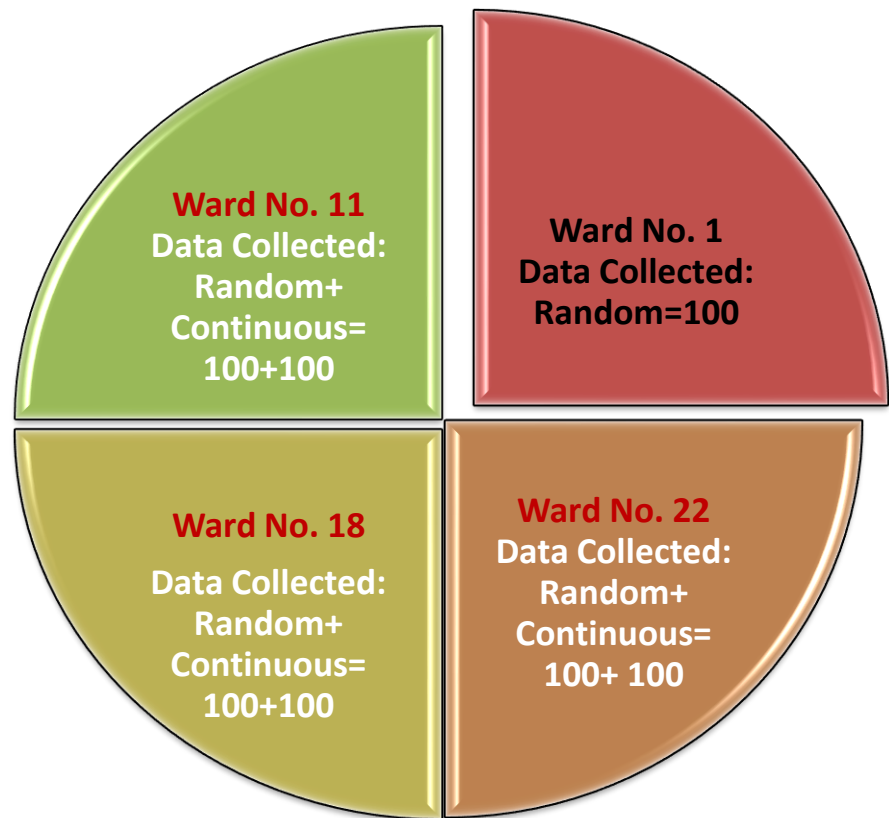
Ward No. 11 (Kolokakoli Shomaj Kollyan Shongstha)

Ward No. 18 (Jhorna Torun Shongho)

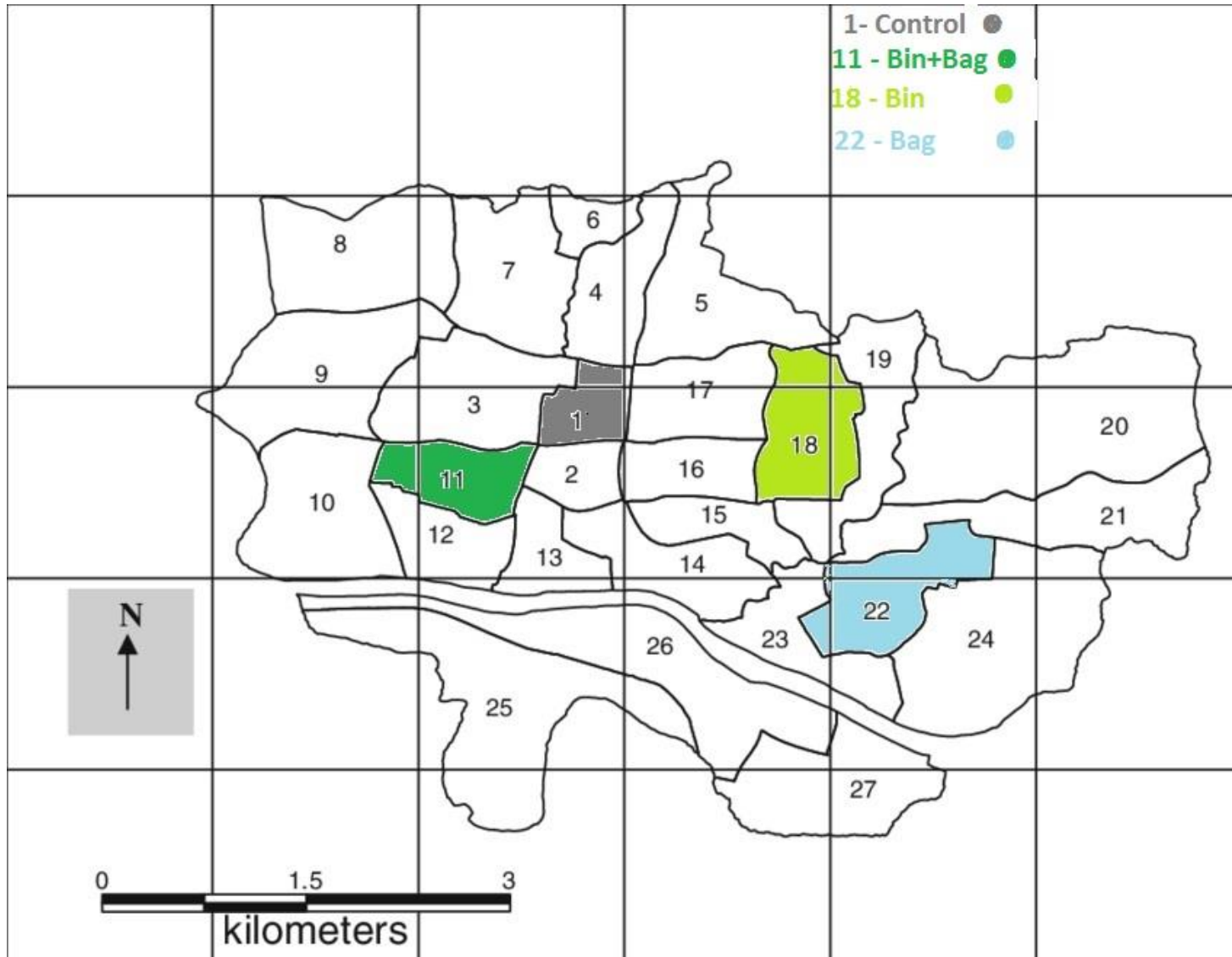
Ward No. 22 (F-Block Unnoyon Shongstha)

(Single club from each of the ward was randomly selected from the club list)

Control - Ward No. 1



Map of SCC by Wards



Activities up to date

- Training and Baseline survey
- Survey on Market chain & value chain of recyclable product
- Intervention estimation /Incentives/Award criteria
- Sensitizing the city councilors
- Sensitizing all the clubs
- Awareness campaign to clubs of treatment area
- Sensitizing and training the waste collectors
- Award declaration (Best households, best clubs and best waste collectors) in the workshop arranged for club and councilors
- Preparing Clean Sylhet App and the Clean Sylhet Facebook page
- Households awareness campaign for segregation at source
- Intervention period (2 months)
- Monitoring composting and maintenance of Logbook
- Resurvey (Round II)
- Collection of documents for award criteria

Training Enumerators for Baseline Survey



Training enumerators by the Research Assistant of ACD about using process of “Kobo Tool Box” software for collecting baseline survey data and also explaining the baseline questionnaire.

Baseline Survey



Enumerator conducting baseline survey using electronic device (mobile phone) at Ward No. 18

Enumerator conducting baseline survey using electronic device (mobile phone) at Ward No. 22



Meeting at ACD Office Sylhet



Baseline data analysis and report preparation

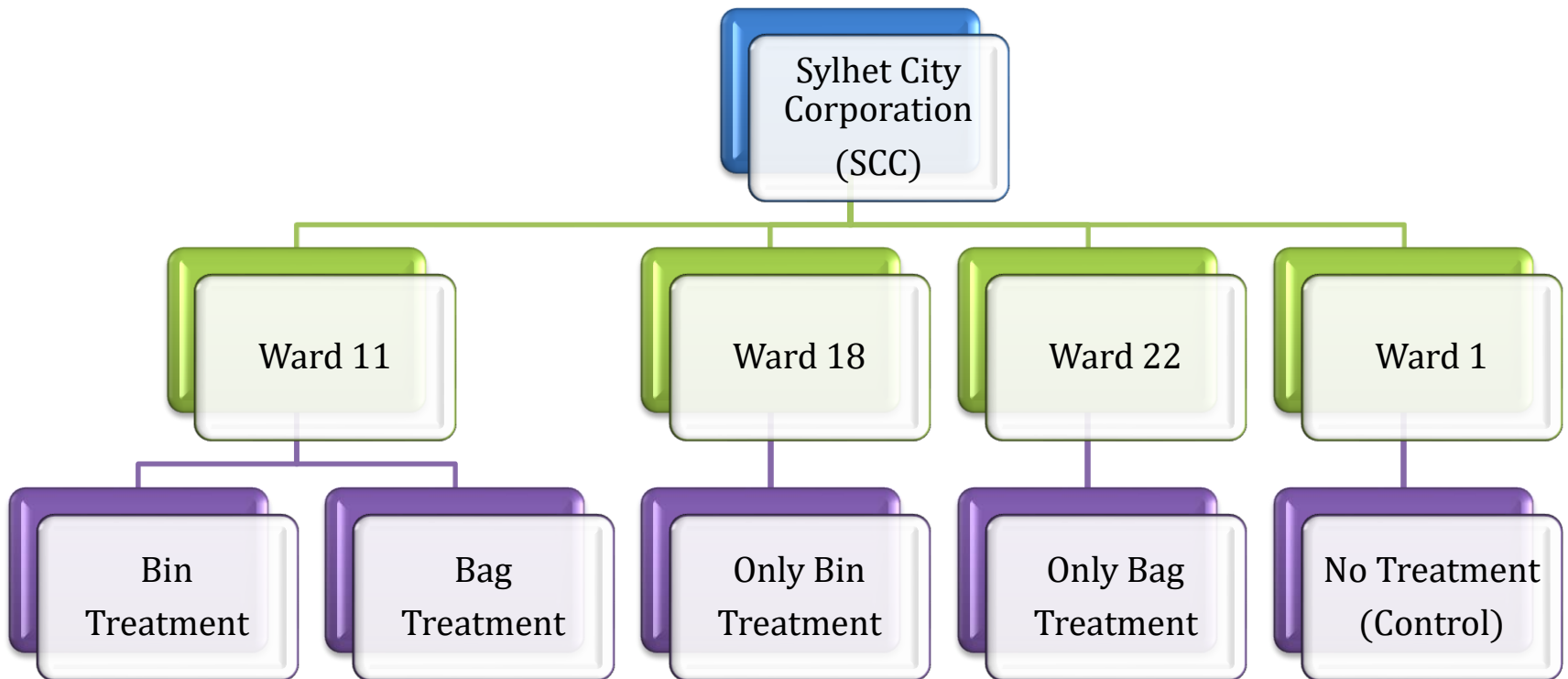
Intervention

Polythene bag and Station Bin (Composter) among the treatment Wards and

No intervention to control Ward.



RCT Experiment at SCC



Estimation of Bag (Treatment 1)

- Two types of bags Blue colour and black colour
- Blue colour bag is for organic waste segregation
- Bag treatment in two wards (11 and 22)
- 100 households in each wards (200 in total)
- Experiment duration - 60 days
- Total 12,000 bags needed
- Distributed in two phases (month wise)
- Black colour bag is for keeping the hazardous waste
- 300 in total for all treated households.

Estimation of Composter

- Cylindrical in shape whose diameter and height is 3 feet by 3 feet
- To know the solid waste production per household, a waste weighing was done.
- 150 households in 3 wards/ 7 days
- From the above estimation, 6 Composters was estimated for each of ward No. 11 and 18.



Estimation of Composter

- Fewer households than estimation took part in the experiment.
- Out of 6 composters, 5 were used in Ward 11.
- 4 Composters were used in Ward No. 18 .
- Experiment duration - 2 months
- 100 households from each ward was treated.



Introducing the composter to SCC Official



Sensitizing Treatment Clubs

Various meeting with the Treatment Club Members for explaining the treatment strategy and activation process



At Mayor Office



Meeting with City Mayor for Two-Days Workshop on
“Clean Sylhet”

At Mayor Office



Discussion with IT Specialist about
CleanSylhet App

Workshop on “Clean Sylhet”

- Two Days Workshop to raise awareness among 24 Clubs
- Explain the importance of segregation and composting
- Inaugurating the “Clean Sylhet App”
- Announcement of the three awards for best HH, Club and Garbage Collector of SCC



Presentations During “Clean Sylhet” Workshop

“Analysis report on perception of the citizens about solid waste management system of SCC”

Market chain & value chain of recyclable product



Workshop on “Clean Sylhet”

DAY-1/Session -2



DAY-2/ Session-1



Workshop on “Clean Sylhet”



Announcement of the criteria for the three awards

Selection Criteria for Green Home Award

- Regularly segregate kitchen waste within the house compound
- Dispose harmful wastes separately and keep in the black polythene bag provided by ACD.
- Regularly sell inorganic (non-decomposing) wastes and keep receipts/vouchers.
- Enhance greenery and keep the compound green
- Uploading photos (before cleaning & after cleaning within respective living area) using CleanSylhet App

Documents e.g. written/photo/video(as necessary) are required as a proof of the activities fulfilled by the Households.

Selection Criteria for **Green Club Award**

- Cleaning roads & way-out within respective Club area
- Cleaning drains within respective Club area
- Enhancing greenery/ urban beautification within respective Club area
- Uploading photos (before cleaning & after cleaning within respective Club area) using CleanSylhet App
- Inaugurating innovative ideas regarding waste management/social development and start practicing within respective Club area
- Promotion of segregation and composting by using the awareness campaign materials provided by ACD within respective Club area

Documents e.g. written/photo/video are required as a proof of the activities fulfilled by the Clubs.

Workshop on Segregation



Providing training to the treated clubs about segregation

Ward No. 18
Jhorna Torun Shongho

Workshop on Segregation



Ward No. 22

F-Block Unnoyon Shongtha

Workshop on Segregation



WARD No. 11

Kolokakoli Shomaj Kollyan Shongstha

Training on Composting



Provided training to the garbage collectors about
composting

Ward No. 18

Training on Composting

Ward No. 22



Ward No. 11



Monitoring

Research Assistants of Asian Center for Development regularly visited the areas

- to check whether waste collectors were disposing the waste systematically
- Whether the 'Logbook' maintainers were keeping the record accordingly.



Training Volunteers for Awareness Campaign



Research Assistant of ACD is explaining volunteers about various campaign materials e.g. leaflet, sticker etc. and providing procedure of poly bags for raising awareness among households.

Awareness Campaign Materials

POSTER



মত্রের আবর্জনা থেকে আমাদের কী কী স্বাস্থ্য হতে পারে

বর্জকে সম্পদে পরিণত করুন

- নগরবাসীরা যাতে অসুখ-বিসৃখে হাত থেকে নিচ্ছৃতি পায় তাই কঠিন বর্জ ব্যবস্থাপনার মাধ্যমে নগরের পরিবেশকে নির্মল রাখা একান্ত জরুরী
- পদনশীল আর অপদনশীল বর্জ আলাদা করে রাখুন
- অপদনশীল বর্জ বা পুনরায় ব্যবহার করা সম্ভব, তা পুনরায় ব্যবহার করুন

কঠিন বর্জ

CleanSylhet App এর মাধ্যমে যত্নর ফেলা ময়লা আবর্জনার ছবি আপলোড করুন। App টি Install করতে নিচের লিংকটি ব্যবহার করুন : www.facebook.com/cleansylhetacd

আবর্জনা গুলে শিয়ে বা পানির সাথে মিশে মাটি ও পানি দূষিত করে

আবর্জনা শুকিয়ে ছোট ছোট মূলিকনার আকার ধারণ করে বাতাসে মিশে যায়। ঐ মূলিকনা শ্বাস-প্রশ্বাসের মাধ্যমে আমাদের শরীরে ঢুকে অসুস্থ করে তোলে

আবর্জনা শরীরের সংস্পর্শে এসে নানান চর্মরোগ হতে পারে এবং আবর্জনা থেকে ধনুটিকার হতে পারে

আবর্জনা শহরের নালা-দর্দমা ড্রাট করে ফেলে; তাতে শহরে বন্যা হয়

Asian Center for Development

STICKER



বর্জ ব্যবস্থাপনায় সকলের অংশগ্রহণ নির্মল পরিবেশের জন্য একান্ত প্রয়োজন

বর্জকে সম্পদে পরিণত করুন পরিচ্ছন্ন সিলেট গড়ে তুলুন

Asian Center for Development

CleanSylhet App এর মাধ্যমে যত্নর ফেলা ময়লা আবর্জনার ছবি আপলোড করুন। App টি Install করতে নিচের লিংকটি ব্যবহার করুন : www.facebook.com/cleansylhetacd

Clean Sylhet

Awareness Campaign Materials

LEAFLET STICKER

বাসাবাড়িতে ময়লা আবর্জনা আলাদা ভাবে ফেলুন

রান্না ঘরের পচনশীল আবর্জনা

নীল পলিথিনে ফেলুন

ক্ষতিকারক আবর্জনা

কালো পলিথিনে ফেলুন

পত্রিকা ও কাগজ

সিলেটের ৫৯% নাগরিক পত্রিকা ও কাগজ আলাদা রেখে বিক্রি করেন।
আপনারাও আলাদা রাখুন।

প্লাস্টিক ও কাঁচ

সিলেটের ৫৭% নাগরিক প্লাস্টিক ও ৬২% নাগরিক কাঁচ আলাদা রেখে বিক্রি করেন।
আপনারাও আলাদা রাখুন।

লোহা ও পলিথিন

সিলেটের ৩৮% নাগরিক লোহা ও ৫৮% নাগরিক পলিথিন আলাদা রেখে বিক্রি করেন।
আপনারাও আলাদা রাখুন।

প্রচারেঃ

Asian Center for Development



LEAFLET

বর্জকে সম্পদে পরিণত করুন

পচনশীল আবর্জনা

- কাঁচা তরিতরকারি/তরিতরকারির খোসা
- চা পাতা (ভুঁড়া, ব্যাগ)
- ডিম/ডিমের খোসা
- ফল/ফলের খোসা
- টিস্যু (ব্যবহৃত)
- বাদামের খোসা
- মাছের কাঁটা
- রুটি
- শস্য
- দুর্গ্জাত পণ্য
- যে কোন খাবার

অপচনশীল আবর্জনা

- পত্রিকা ও কাগজ
- প্লাস্টিক
- কাঁচ
- লোহা
- পলিথিন

সিলেটের ২৮% নাগরিক বর্জ আলাদা করেন এবং ৮% নাগরিক তা সার হিসেবে কাজে লাগান। আপনিও বর্জ আলাদা রেখে সার হিসেবে কাজে লাগান।

পচনশীল আর অপচনশীল আলাদা করে রাখতে হবে সঠিক স্থানে ময়লা ফেলে নির্মল নগর গড়তে হবে

পরিচ্ছন্নতাই পরিচয় যত্রতত্র আবর্জনা নয়
বর্তমানে পুনর্ব্যবহার করে ভবিষ্যৎ রক্ষা করব

যেখানে সেখানে আবর্জনা
রোপ দুষ্ণের সূচনা



Awareness Campaign at HH(s)

Raising awareness by providing various leaflets, small poster, sticker, projecting video clipping on segregation & providing poly bags by door-to-door campaign among the treated HH(s) about segregation of kitchen waste

Ward No. 18



Ward No. 22



Awareness Campaign at HH(s)

Ward No. 11



Ward No. 18



Awareness Campaign at Various Clubs of SCC



Providing large posters, stickers and leaflets among various Clubs of SCC to raise awareness

2nd Round Awareness Campaign



By analyzing the data entered on logbook, ACD team decided to conduct another awareness campaign to receive a better response from the HH(s).

Survey Round II



Conducting resurvey by the Research Assistants of ACD

Collected Documents from HH(s) for Selecting “Green Home”

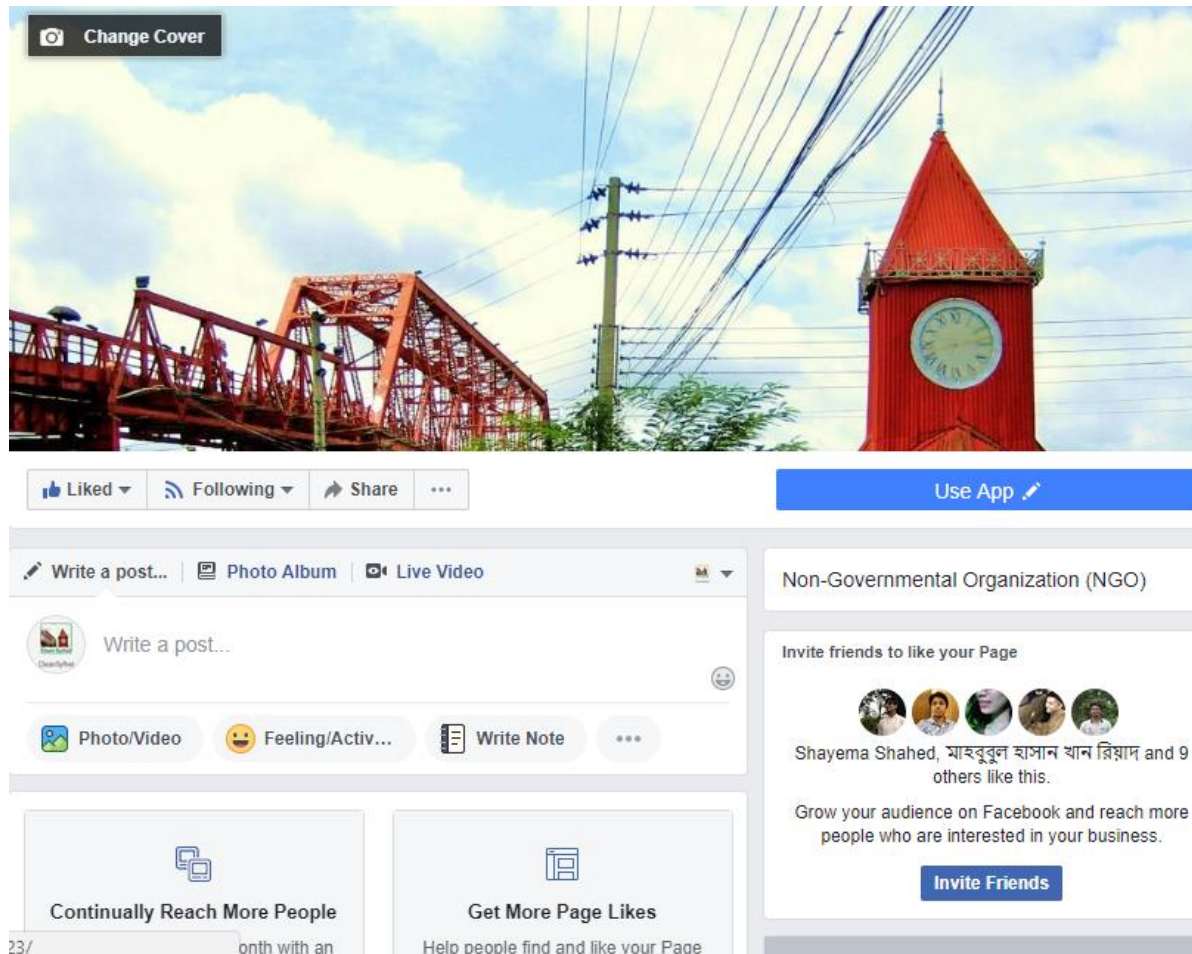
Hazardous Waste Picture
(Sample)



Greenery Picture
(Sample)



Preview of Clean Sylhet Face book Page



Change Cover

Liked Following Share ... Use App

Write a post... Photo Album Live Video

Write a post...

Photo/Video Feeling/Activ... Write Note ...

Continually Reach More People
Get More Page Likes
Help people find and like your Page

Non-Governmental Organization (NGO)

Invite friends to like your Page

Shayema Shahed, মাহবুবুল হাসান খান রিয়াদ and 9 others like this.

Grow your audience on Facebook and reach more people who are interested in your business.

Invite Friends

23/ month with an

Awareness Documents Sent by Clubs for Selecting “Green Club”

Cleaning Roadside by Club
(Sample Picture)



Cleaning Drain
(Sample Picture)



Awareness Documents Sent by Clubs for Selecting “Green Club”




Raising Awareness through sticking Posters
(Sample Picture)



Planting Trees
(Sample Picture)






Awareness Documents Sent by Clubs for Selecting “Green Club”

334 103	2018-06-28 14:43:24	14 Chalibond or Jubo Unnoyon Shonstha			
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Uploaded photos (before cleaning & after cleaning within respective Club area) using Clean Sylhet App

Awareness Documents Sent by Clubs for Selecting “Green Club”

467	2018-07-01	25			
136	13:17:40	Kayesthorai I Shomaj Kollyan Somiti			

Uploaded photos (before cleaning & after cleaning within respective Club area) using Clean Sylhet App

Processing of Compost

- Garbage collectors disposed segregated waste daily and spread dry wood-crums weekly to remove odor.
- After 15 days, 1st composter was full and kept until the end of the 2nd months for composting.
- After completion of two months, waste collectors took out the raw composts and dried in the sun.
- Then they filtrate the dried compost and packed it for manufacturing.

Processing of Compost



From Waste to Compost

Raw Compost



Dried Compost



Thank you



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