THE 1ST TRILATERAL SYMPOSIUM ON SDGs 2021

Proceedings of Satellite Sessions

Sustainability and Society:

September 2, 2021

The Sustainability & Society Session of the 1st Trilateral Symposium on SDGs

Yoshiki Sakurai
Faculty of Education, Kagawa University

In my role as the Head of the International Exchange Committee at the Faculty of Education, Kagawa University, and on behalf of the organizers of the above session, I would like to express my gratitude to all who participated in the online symposium. As a result of this collaboration, Chiang Mai University, National Chiayi University, and Kagawa University were able to hold the above symposium online for the first time. The Sustainability and Society Session was one of the satellite sessions and was held on September 2, 2021 from 14:00 to 17:30 Japan time using Zoom. This session consisted of two parts, the first moderated by Professor Dr. Yumiko Takagi, and the second part by Professor Dr. Atsushi Taira. In the latter, Indian and Bangladeshi university researchers were invited in addition to the three universities in light of the theme, SDGs. A total of 24 researchers made presentations. Insightful and interesting presentations were made from various fields and perspectives in Asia. I appreciate the preparation and efforts for your presentations. Through this session, I was convinced of the possibility of further development of the connections between the three, or more, universities in the future.

The Sustainability & Society Session of the 1st Trilateral Symposium on SDGs

Yumiko Takagi
Faculty of Education, Kagawa University

Kagawa University has held a joint symposium with Chiang Mai University once every two years since 2007. We have also held a workshop with National Chiayi University in Taiwan.

In 2020, the presidents of the three universities consulted with each other and agreed to hold the first joint symposium in 2020. However, unfortunately, this had to be postponed for one year due to Covid-19. This year, in 2021, we planned to hold the first joint symposium by these three universities in Kagawa. Initially, the online symposium in September 2021 was positioned as a pre-symposium, but due to the increasing number of participants, it became the 1st Trilateral Symposium on SDGs on August 26, 2021. We are now planning to hold the 2nd Trilateral Symposium on SDGs in Kagawa, this time with your participation, in September 2022.

Generally speaking, student exchange is one of the most important international programmes of a university. With this in mind, we successfully planned and held a pre-symposium to promote student exchange in March 2021. We are very grateful to the professors who participated in that event.

In order to organise the online symposium in September 2021, the Humanity Session that we have been holding, so far was organized by Prof. Ponchai of Chiang Mai University and Prof. Huang of National Chiayi University. They were in charge of this joint symposium at their universities, also with professors from the Faculty of Economics, Faculty of Law, and International Office at Kagawa University. The Faculty of Economics, the Faculty of Law, and the International Office at National Chiayi University worked together and organised the session as the Sustainability & Society Session.

In addition, we hope to develop joint research among the three universities. We would also like to invite a wide range of professors specialising in climate change and adaptation strategies in Asian countries, which the Faculty of Education at Kagawa University plans to focus on in the future, to participate in these sessions as a kick-off meeting and as a way for all participants to deepen their insights in this field.

The Sustainability & Society Session of the 1st Trilateral Symposium on SDGs

Toru Terao
Faculty of Education, Kagawa University

Three universities, Chiang Mai University, National Chiayi University, and Kagawa University have developed strong collaboration through workshops held almost every year, and other activities including exchange of students in these years. I also have many excellent memories in Chiang Mai, Chiayi, and Kagawa. So, I am very happy to have this workshop focusing on the SDGs this time, even in the virtual space.

Three universities are in somehow local regions from their national capitals. This point may make our collaboration significant. The SDGs are suitable target of our trilateral activities because we are facing quick change in relationship between the nature and humanity. However, this means, on the other hand, we are surrounded by rich natural environment, which make our collaboration much more wonderful.

This time, we invited other researchers from collaborating universities in South Asia. We exchanged diverse but common aspects of SDGs among many participants from different countries. Such virtual exchange can continue since it is beneficious for our future activity.

I am looking forward to the next trilateral symposium which hopefully will be held face-to-face in Kagawa. Let us enjoy program in real natural environment of Kagawa and Seto Inland Sea.

Time Schedule

Congratulatory message

Professor, Yoshiki Sakurai, Head International exchange comittiee, Faculty of Education, Kagawa University

Oral Presentation Program

※ KU: Kagawa University, CMU: Chiang Mai University, NCYU: National Chiayi University,
GU: Gauhachi University, NEHU: North Eastern Hill University, JU: Jahangirnagar University

Thursday, 2nd September, 2021					
Sustainability & Society Session 1 14:05-15:45 Japan time	Chair Person: Yumiko Takagi (KU)				
	SS-1	JP; 14:05 TW; 13:05 TH; 12:05 IN; 10:35	KU	Naoyuki Hara	Introduction of Faculty of Economics and Tourism in Kagawa Prefecture
	SS-2	JP; 14:15 TW; 13:15 TH; 12:15 IN; 10:45	NCYU	Kuo-Hung Huang	A study of developing the educational robots course for pre-service teachers
	SS-3	JP; 14:25 TW; 13:25 TH; 12:25 IN; 10:55	CMU	Ratchaneekorn Tongsookdee	Using Social Stories to Modify Hitting Behaviors of an Early Childhood Student with at Risk of ADHD
	SS-4	JP; 14:35 TW; 13:35 TH; 12:35 IN; 11:05	KU	Eiichi Miyazaki	Development of elementary school programming materials to experience AI using Scratch and Raspberry Pi
	SS-5	JP; 14:45 TW; 13:45 TH; 12:45 IN; 11:15	NCYU	Ching-Ching Cheng Kuo-Hung Huang Yikai Lin	Facilitating Sustainable Development of Preschools: A National Project for Teacher Training
	SS-6	JP; 14:55 TW; 13:55 TH; 12:55 IN; 11:25	CMU	Chanintorn Pensute	So Close yet So Far(Inspired by Jimmy Liao),stories around our faculty
	SS-7	JP; 15:05 TW; 14:05 TH; 13:05 IN; 11:35	KU	Toru Takamizu Mika Shioi Lrong Lim	An Opportunity for Multicultural Students to Learn and Practice SDG 14
	SS-8	JP; 15:15 TW; 14:15 TH; 13:15 IN; 11:45	CMU	Aranya Siriphon	Social sciences Knowledge and SDGs contribution
	SS-9	JP; 15:25 TW; 14:25 TH; 13:25 IN; 11:55	NCYU	Juei-Hsin Wang	A Case study on the practice of remote education policy : Local government and rural school
	SS-10	JP; 15:35 TW; 14:35 TH; 13:35 IN; 12:05	CMU	Ora-orn Poocharoen	Smart Sustainable Governance: A new paradigm for achieving SDGs through sound public policies
Sustainability & Society Session 2 15:50-17:30 Japan time	Chair Person: Atsushi Taira (KU)				
	SS-11	JP; 15:50 TW; 14:50 TH; 13:50 IN; 12:20	KU	Takayoshi Sugita	English Literature and Meiji Japan
	SS-12	JP; 16:00 TW; 15:00 TH; 14:00 IN; 12:30	NCYU	Hsin Yi Tseng	Factors of Elementary School Teachers' Participation in Interdisciplinary Teaching in Taichung City
	SS-13	JP; 16:10 TW; 15:10 TH; 14:10 IN; 12:40	NCYU	Chao Ju Chen	Characteristic Libraries Evaluative Construction in Elementary Schools
	SS-14	JP; 16:20 TW; 15:20 TH; 14:20 IN; 12:50	KU	Toru Terao	Impact of the climate change and adaptation strategy in Asian countries
	SS-15	JP; 16:30 TW; 15:30 TH; 14:30 IN; 13:00	GU	Madhushree Das	Equitable Quality Education and Digital learning: How would Assam fare?
	SS-16	JP; 16:40 TW; 15:40 TH; 14:40 IN; 13:10	GU	Bimal Kumar Kar	Ensuring Water Security for Sustainable Development: Assessment of Availability and Utilization Dynamics of Water in Assam from SDG-6 Perspective
	SS-17	JP; 16:50 TW; 15:50 TH; 14:50 IN; 13:20	GU	Dhanjit Deka	Urban Planning in Context of Tourism Development: A Case Study of Gauhachi City, India
	SS-18	JP; 17:00 TW; 16:00 TH; 15:00 IN; 13:30	JU	A. T. M. Shakhawat Hossain	Risk Associated With Rohingya Refugee Settlements at Ukhia Camp, Cox’ sbazar, Bangladesh-A Threat for Sustainable Development
	SS-19	JP; 17:10 TW; 16:10 TH; 15:10 IN; 13:40	NEHU	Hiambok Jones Syiemlieh	Scales of Hydrologic alternations : How to relieve water stress in areas of abundant water resources
	SS-20	JP; 17:20 TW; 16:20 TH; 15:20 IN; 13:50	NCYU	Kuo-Hung Huang	Student collaborative research on climate change with open data

Gratitude Message

Dr. Toru Terao, Professor, Faculty of Education, Kagawa University
Dr. Pornchai Wisuttisak, Associate Professor, Faculty of Law, Chiang Mai University
Dr. Kuo-Hung Huang, Professor, Dept. of E-learning Design and Management, National Chiayi University, Taiwan

Closing Remarks

Dr. Yumiko Takagi, Professor, Faculty of Education, Kagawa University

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Introduction of Faculty of Economics and Tourism in Kagawa Prefecture

Naoyuki HARA
Prof. of Tourism and Regional Vitalization
Faculty of Economics

香川大学
KAGAWA UNIVERSITY

Faculty of Economics

- Established as Takamatsu Higher Commercial School in 1923.
- Integrated to Kagawa University in 1949 as the Faculty of Economics.
- The Graduate School of Economics (master's course) was established in 1979.
- A second master's course on Enterprise and Business, later became the Business School of Regional Management, was introduced to the Graduate School of Economics in 2000.

Faculty of Economics

- In 2018, the Faculty was reorganized to have a single Department of Economics with five areas of specialization.
- There are Economic Theory and Policy Analysis, Accounting and Finance, Business Administration and Innovation, Tourism and Regional Development, and Global Social Economy.

Self-Introduction

- Naoyuki HARA
- Prof. of Tourism and Regional Vitalization
- Research Theme
  Rural Development and Tourism, Eco-Tourism and Workcation
- Research Method：Action Research

"Action research is a disciplined process of inquiry conducted by and for those taking the action. "-Richard Sagor, *Guiding School Improvement with Action Research*

Rural Development and Tourism

- Rural tourism is a traveling style in which travelers stay in rural villages.
- They can experience a traditional Japanese rural lifestyle and interact with local people. Travelers can also experience a variety of attractive local settings and communities.
- They can buy agricultural products at farmers markets, eat local foods at farmers restaurants, experience many activities in the countryside, and stay at various types of accommodations, including farm stays.
- These contribute to vitalizing rural communities which suffer from depopulation and aging.

Workcation

- "Workcation" is a word that combines "work" with "vacation". Business persons do remote work at tourism destinations while enjoying staying there.
- After the Covid-19, inbound tourists disappeared from Japan and many destinations are suffering from the hard condition. Recently many of them pay attention to and try to introduce workcation because of recovery from disappearance of inbound tourists.
- Workcation is not only for the recovery from it, but also may create opportunities that new business will start by business matching and open innovations between city business persons and local residents.

Tourism in Kagawa Prefecture

- https://youtu.be/cVLQT9eENpQ
- https://www.my-kagawa.jp/en/discover-kagawa

Title: A study of developing the educational robots course for pre-service teachers
Authors: Kuo-Hung Huang
Affiliation: Professor, National Chiayi University
Email: kuohung@mail.ncyu.edu.tw

Abstract:

In order to promote pre-service teacher professional abilities in teaching STEM with robots, the researcher design a new course of educational robot and investigate how students react and learning during this class.
The content of this course consists of three components, namely pedagogical knowledge (theoretical foundation related to robots), content knowledge and pedagogical content knowledge. The researcher, as the class lecture, used participating observation to study students' development.

Using Social Stories to Modify Hitting Behaviors of an Early Childhood Student with at Risk of ADHD

Pattaraporn Saelee and Ratchaneekorn Tongsookdee*
Faculty of Education, Chiang Mai University, Thailand Ratchaneekorn.tongs@cmu.ac.th

Statement of the Problem

- 62% of young Thai children aged 1-14 experienced physical, verbal, and/or emotional abuse.

(World Vision Foundation of Thailand, 2020)
https://www.worldvision.or.th/evac/index.html

Statement of the Problem

- Young children in schools also show some aggressive behaviors with at risk of ADHD
- Children under 12 with ADHD worldwide = 5.3%
- Thai students 1st-5th grade in 10 provinces within four regions = 8.1
  - ***Male** = 12*
  - ***Female** = 4.24*

Ketumarn, Hataiyusuk, Pornnoppadol, Apinuntavech (2016)

Statement of the Problem

- Most classrooms may have at least 1-2 young students who are at risk of ADHD and other aggressive behaviors

Statement of the Problem

- It is important to prevent or intervene such problems of these young children.
- Earlier is better.

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Case study

- Peter is 6 years old and next year he will be in 1st grade.
- His gross and fine motors are normal.
- He can explain, describe, and reason well.

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crawl

Case study

- Peter often does not finish his class assignments and avoids class activities by excusing himself to the toilet.

7

crawl

Case study

- Peter frequently showed some impulsive behaviors, and sometimes became aggressive and had difficulty dealing with his feelings in a socially appropriate way.

8

During Class Activities

Disruptive Behaviors

- He interrupted class activities by walking or crawling around or hitting/poking/pushing his classmates.

9

During Napping Time

Impulsive Behaviors

- He poked his classmate while asleep.
- His friend cried and was unhappy.

10

Methods to help

- Just telling him, “Don’t do that” or “Time-out” did not work.
- Research-based methods
- Social Story came to our attention

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Research Supports

- Sy, M. and Rabago-Mingoa, T. (2017). Social Stories for Children with ADHD.
- Greenway, C. W. (2018). The Efficacy of Social Stories in the Classroom to Reduce Disruptive Behaviors in Children with ADHD.
- More, C. M. (2010). Effects of Social Story Interventions on Preschool Age Children with or Without Disabilities.
- And many more

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Social story

- A social story developed by child pediatrician Dr. Carol Gray in the early 1990s.
- It is **a narrative made** to show certain situations and problems and how people deal with them.
- **It helps children understand social norms and learn how to communicate with others appropriately**.

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Research Objective

To use social stories to modify hitting behaviors of an early childhood student who is at risk of ADHD

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Research Tools

- Two social stories (IOC = .66-100)
- Two individualized education plans (IOC = .66-100)
- Q&A exercises
- Classroom behavior observation form

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Social Story = Picture + sentence

- **Descriptive Sentence(s):**
- **Perspective Sentence(s):**
- **Directive/Coaching Sentence(s):**
- **Affirmative Sentence(s):**

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Examples of Social Story

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Descriptive Sentence

- **He hits his friends when he wants to play with them.**

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Perspective Sentence:

No one likes to play with Peter.

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Directive/Coaching Sentence:

- **Ms. Ploy told Peter to nicely ask friends, “Can I play with you?”**

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Affirmative Sentence:

The next day Peter asked Pom, “Can I play with you?” This time without hitting.

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Affirmative Sentence:

Peter’s friends played with him with a smile.

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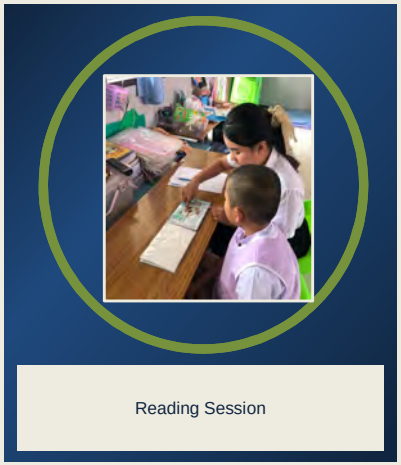
Procedure

- Each social story was read 5 times in 5 different days and at the end of each reading, Peter was asked to answer 5 questions regarding the situation in the story.



Reading Session

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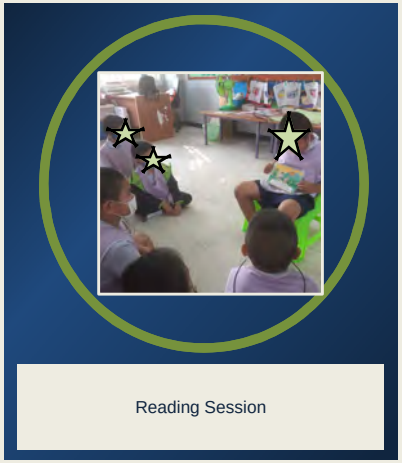
Procedure

Peter shared the story with classmates.



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Results

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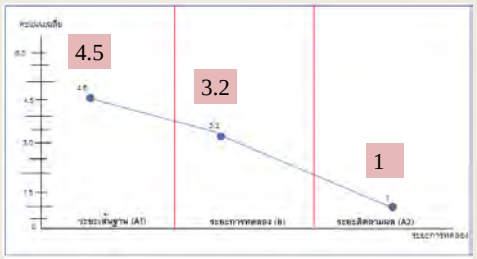
The graph shows the mean rate reduction of the case study hitting his friends in the classroom from baseline, during experiment, and follow-up, i.e., 4.5, 3.2, and 1, respectively.



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Results

Based line (A1)

Date	Feb 1, 2021	Feb 2, 2021	Feb 3, 2021	Feb 5, 2021	Total	Mean
Frequency of hitting	6	4	5	3	18	4.5

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Results

Experiment (A2)

Date	Feb 17, 2021	Feb 18, 2021	Feb 19, 2021	Feb 22, 2021	Feb 23, 2021	Total	Mean
Frequency of hitting	**5**	**4**	**2**	**3**	**2**	**16**	**3.2**

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Results

Follow-up (A3)

Date	Mar 1, 2021	Mar 2, 2021	Mar 3, 2021	Total	Mean
Frequency of hitting	2	1	1	4	1

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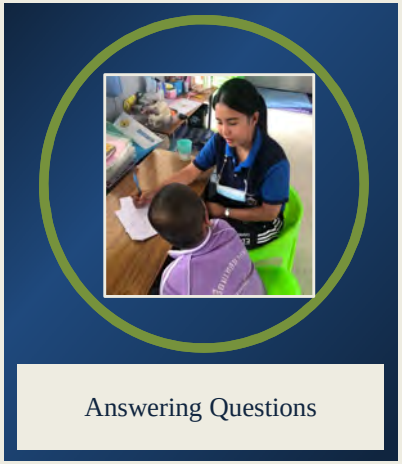
Additional Results

- At the end of each reading, the case study was asked to answer 5 questions regarding the situation in the story.
- The case study was able to answer all of the questions with an increasing in-depth details from the first to the fifth answer.



Answering Questions

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Conclusion

Social stories can be powerful and effective learning strategies to facilitate **young children change undesired behavior on their own** under adult's supervision.

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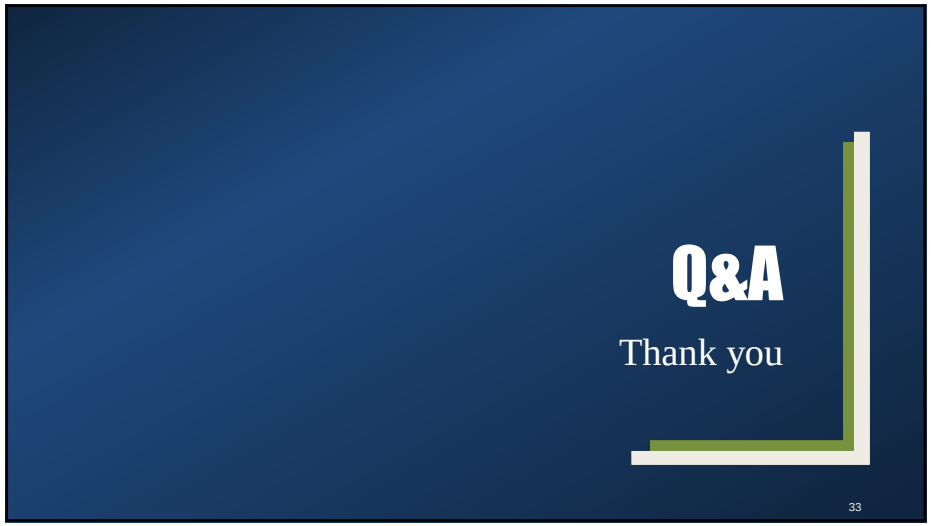
Q&A
Thank you
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Eiichi Miyazaki : Professor
Faculty of Education. Kagawa University. Japan
miyazaki.eiichi@kagawa-u.ac.jp

1st Trilateral Symposium on SDG s

Development of elementary school programming materials to experience AI using Scratch and Raspberry Pi

Eiichi Miyazaki(Kagawa Univ.), Satoshi Sakai(Kagawa Univ.), Taniguchi Kimihiko(Western Nursing School), Sano Shodai(Kagawa Nursing School) and Hazime Kondo(Education Committee)

Introduction.

- Elementary School Programming EducationMade Compulsory
- GIGA School Concept

Making programming education compulsory

- 2012
  New Courses of Study: Junior High School Technology and Home Economics
  Measurement and control by program
- 2013
  Government growth strategy: "Programming education
  Promote IT education including programming education from compulsory education stage
  Promote IT education such as programming education from compulsory education stage
- Year 2020
  Make programming education compulsory in elementary schools

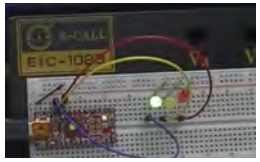
Qualities and abilities to be developed through programming education

stage	Knowledge and skills	Ability to think, judge, and express	Ability to learn, humanityAbility to learn, humanity
elementary school	To be aware that computers are used in our daily lives and that there are necessary steps to solve problems.	To foster "programming thinking" in line with developmental stages.	To cultivate an attitude that seeks to utilize the functions of computers for the betterment of life and society in line with developmental stages.
Secondary Schools	To understand the role and impact of computers in society, and to be able to create simple programs.		

About the state of programming education (summary of discussion)
http://www.mext.go.jp/b_menu/shingi/chousa/shotou/122/attach/1372525.htm

information material

Materials created so far
Scratch → LED Control

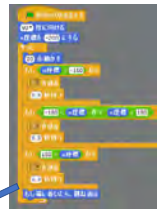


Arduino + LED

computer

relay server

Scratch

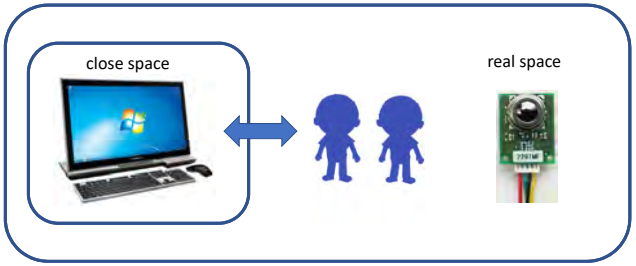


TCP:42001

Send 1: red
Send 2: Blue
Send 3: Yellow

Therefore, in this study, we created a program environment with the goals of

1) Simple operation
2) Attracting students' interest
3) Promising development.



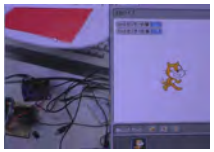
Relay server (self-made)
⇒ External sensor control

Web camera, data on the web
Switches, sensors, etc
↓
relay server
↓ TCP:42001
Scratch

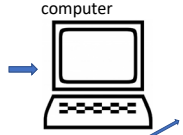
socket communication

```
  ScratchClient.write(dataOut);
}
String recieveFromScratch() {
  String inString = ScratchClient.readString();
  return inString;
}

void setup() {
  size(640, 480);
  //ScratchClient = new Client (this, "127.0.0.1", 42001);
  ScratchClient = new Client (this, "133.92.33.61", 42001);

  sendtoscratch("sensor-update " + "\"On\"" + "Off");

  //□□□□□□320x240□□□
  video = new Capture(this, width/2, height/2);
  opencv = new OpenCV(this, width/2, height/2);

  //□□□□□□□□□□
```

Color recognition Chasing game



computer



Scratch

relay server
TCP:42001

Control

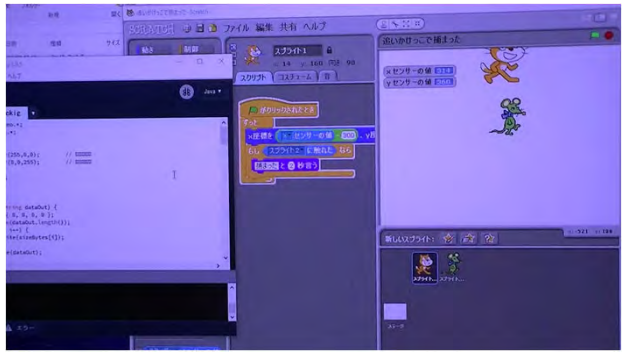
WEB Camera
Recognize two colors
1） Select the color 1 you want to measure.
2） Select the color 2 you want to measure.

Color 1 and Color 2 are present on the screen.
Track each color

Color recognition Chasing game

For each spriteWrite a script for each sprite

Color recognition Chasing game



Facial recognition Switch by face

computer

Scratch

relay server

TCP:42001

Control

WEB Camera
Face Recognition

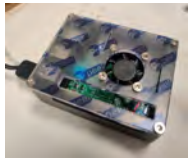
Face 1 is present Face 1: ON
Face 2 is present Face 2: ON

OpenCV: Rectangle[] faces = opencv.detect();

Facial recognition Switch by face

PC→
Deployment to edge devices

Building Edge Devices



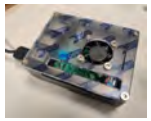
Raspberry Pi 3 Model B
+WEB Camera

1) Learning phase
Large amount of data: Learning model creation
High computational performance is required for computers

2) Inference Phase
Prediction using the created prediction model.
High computational performance is not required.

Example: Automated driving, etc.
Using edge devices for image recognition

System of edge devices



Raspberry Pi 3 Model B
+WEB Camera

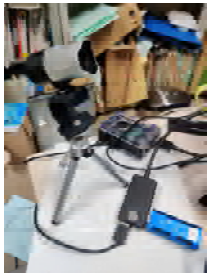
Neural Compute Stick

OpenVINO™

Deep Learning Inference

Use Intel's pre-trained models

→ Face Recognition Model



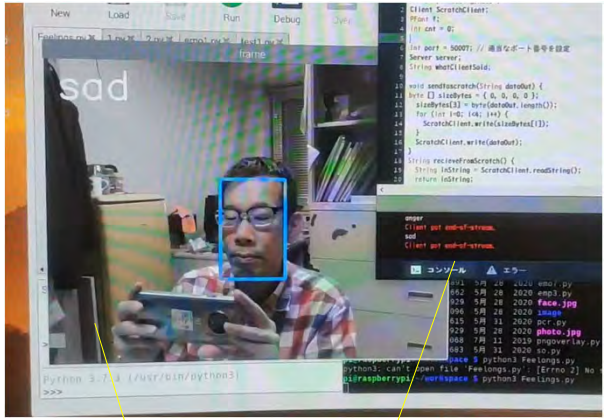
Wi-fi

PC

relay server

Scratch

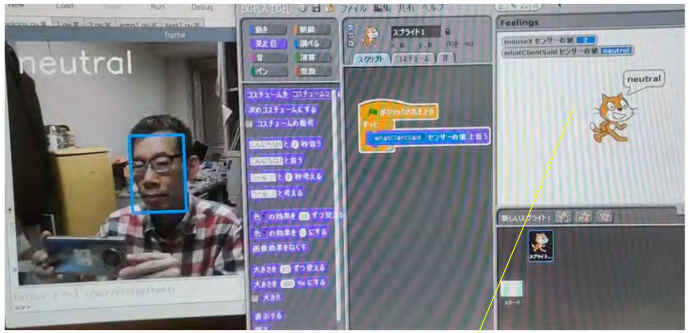
Web camera
Raspberry Pi 3
Neural Compute Stick
Face recognition model



VNC screen

Relay server screen

Emotional judgment



Emotion result

Objectives of this study

Use of this system

→Image recognition, which has been difficult to learn by computer, can be easily handled.

Future Issues

How to use this information education program and computer thinking in the future

thanks

This research is based on

This research is 2021 "Prototype of a Deep Learning System to Support Assistive Technology for Communication Acquisitiveness of Children with Severe Multiple Disabilities (Project Number: 19K11417)

We would like to express our sincere gratitude. We would like to express our sincere gratitude.

Title: Facilitating Sustainable Development of Preschools: A National Project for Teacher Training

Authors: Ching-Ching Cheng, Kuo-Hung Huang, Yikai Lin
Affiliation: Professor, National Chiayi University
Email: chingching_cheng@mail.ncyu.edu.tw

Abstract:
Early Childhood Education and Care institutions are understood as learning organizations in a context of rapid global change. In addition to the external changes, such as government policy and education market, the internal issues including teachers' teaching capacity, values, attitudes and learning goals are crucial to educational practices. The purpose of this study is to assist the preschools to achieve sustainable development by providing PDCA training for teachers. Therefore, the training aim to help preschool staff and teachers to construct their own knowledge and culture for organizational growth and effective operation to achieve the program objectives by promoting the systematic thinking. Three stages of training programs, namely knowledge diffusion, knowledge adaptation, and support network, were designed and implemented in form of training lectures, workshops, and professional community. Quantitative and qualitative methods are used to collect the research participants' perception and intention on these training. The results indicate that three kinds of training developed all are positively perceived by preschool teachers. From the response of the participants, the professional community and workshops are higher than the training lectures on overall satisfaction of the training, perception of usefulness for preschool work, and the willingness to adopt PDCA in work-related projects.

SO CLOSE YET SO FAR

(INSPIRED BY JIMMY LIAO), STORIES AROUND OUR FACULTY

Chanintorn Pensute
Faculty of Political Science and Public Administration
Chiang Mai University
chanintorn.p@cmu.ac.th

Faculty: 16 years
Students: 1,000
Staffs: 71

Faculty of Political Science and Public Administration
Chiang Mai University

The Past

General Education (GE) 1 + 2

Project + 145 hrs.

Ref: Students

Ref: Students

Ref: Students

Ref: Students

Citizenship

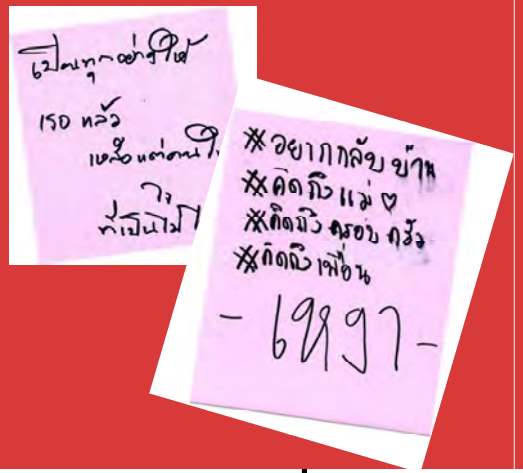
60 - 300 students per academic year

Ref: Students

Problems

Design Thinking

Field Trip(s)



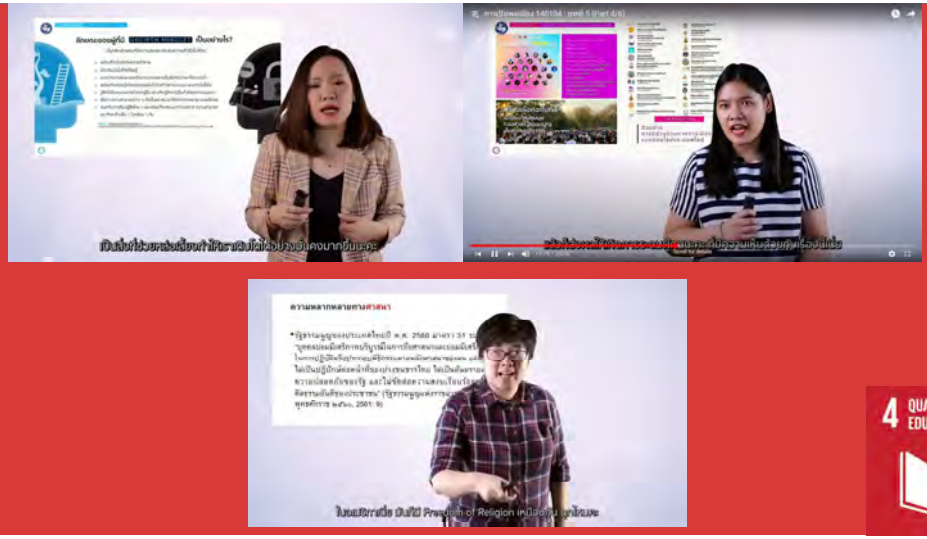
Ref: Students

The Projects

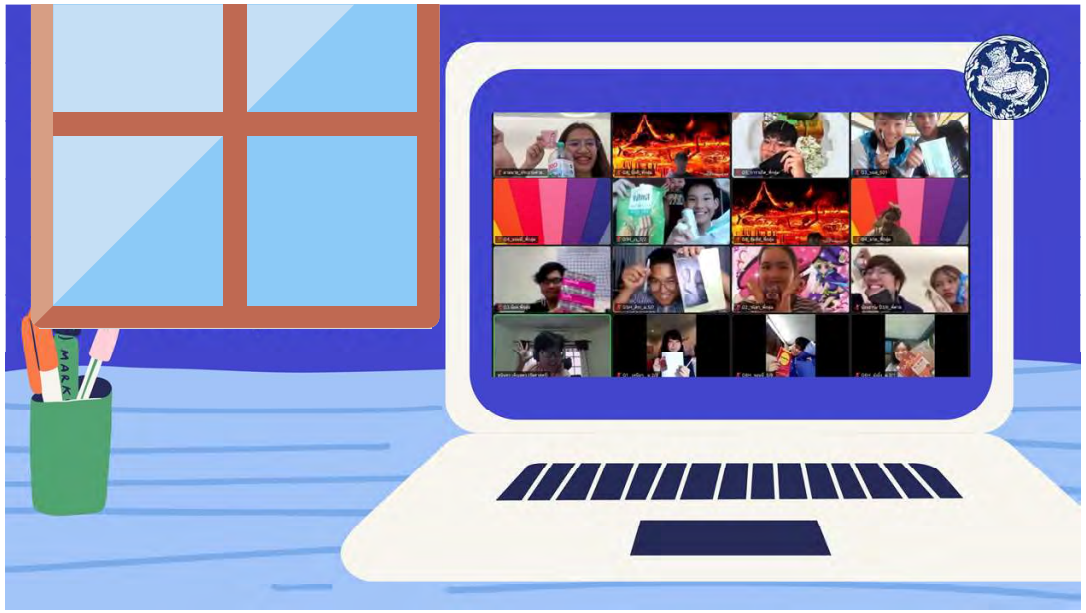
Inclusive Cities

The Present

...and then COVID-19

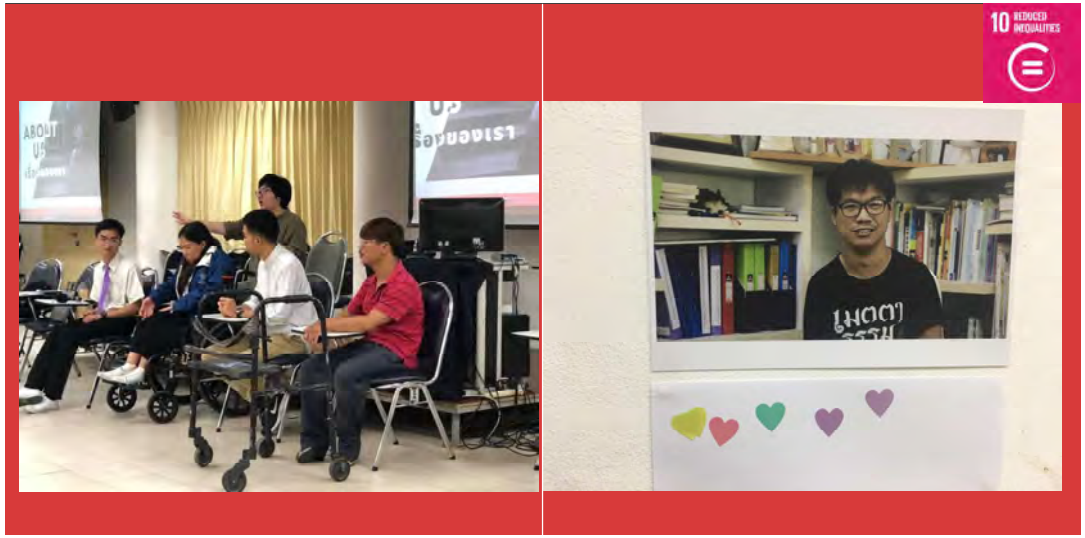


7,000 - 8,000 students per academic year



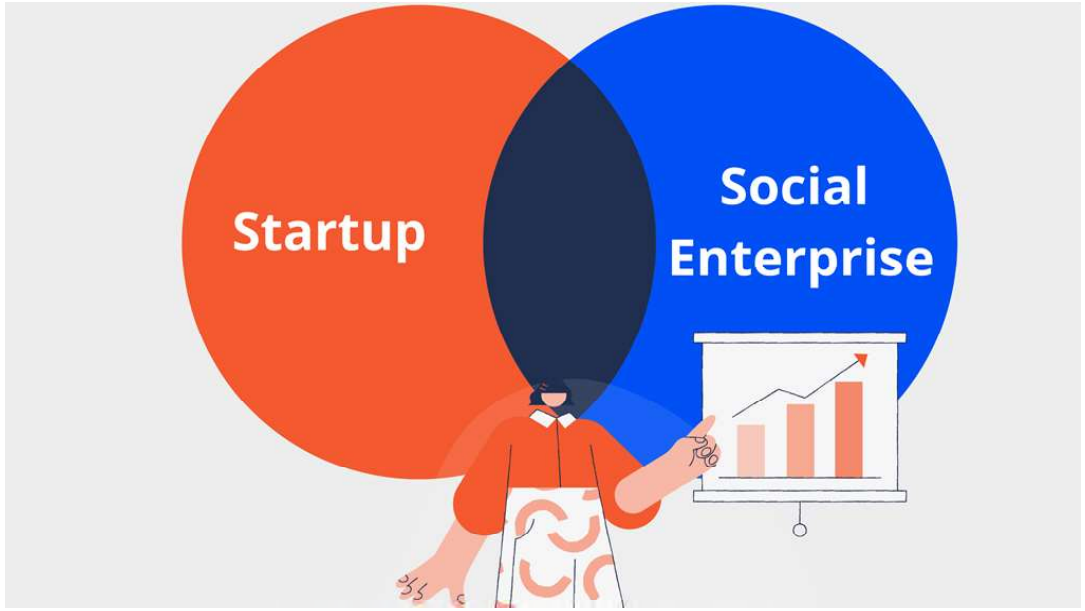
Mae Kha Project

Documentary



Documentary

The Future



Freegan Movement

Minimalism

香川大学

An Opportunity for Multicultural Students to Learn and Practice SDG 14

1st Trilateral Symposium on SDGs

Sustainability & Society

2nd September 2021

International Student Center, International Office,
Kagawa University, Japan
takamizu.toru@kagawa-u.ac.jp
TAKAMIZU Toru, SHIOI Mika, Lrong Lim

Project Sanuki

香川大学

- Common subject in which students find social problems and foster problem solving abilities
- Social problems in Kagawa (formerly known as Sanuki)
- Project/Group work & active learning
- Maximum of 30 students (plus exchange students)
- International & Japanese students study together
- Until 2019: Students could choose any related topics
- Since 2020: focusing on SDG 14 “Life below Water”
- Duration: one quarter (eight weeks)
- Individual report is also required

2

Group and Theme

香川大学

- Each group is designed to have members of international and Japanese students (it was impossible in some cases)
- International students are mainly exchange students that are taking “Sanuki Program” (from partner universities) or government funded students. Regular (degree seeking) international students can also join.
- Japanese students are undergraduates, mainly first year students.

[Theme until 2019] Topics related to Kagawa prefecture, such as water shortage, traffic accidents, bicycle riding manner, euthanasia of dogs and cats, diabetes, environments around train stations, etc.

3

Languages used (in principle)

香川大学

- Each group can choose Japanese or English, depending on the abilities and preference (for lecture, group work, presentation, and peer evaluation)
- “It is not a language class”
- Handouts are in both languages

Pre-survey for language preference

4

Language used (in practice)

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Notes on FY2020 and 2021: they were exceptional

Due to COVID-19 pandemic, new international students could rarely come to Japan and join the program

⇒ Number of intl. students

FY 2020 Q2: 1

FY 2020 Q4: 3

FY2021 Q1: 0

The courses were conducted fully in Japanese because the above students had certain level of Japanese ability.

The course had been conducted multi-lingually in practice till 2019.

5

1 quarter/8 weeks

香川大学

eight weeks include special lectures and fieldwork

Ex.: Q1, 2021

1. Introduction to the course and SDGs
2. Special lecture 1 (by an officer of Kagawa prefecture.)
3. Intro. to SDGs (continued), assign group and choose a topic
4. Special lecture 2 (by members of an NPO)
5. Fieldwork: beach cleanup
6. Preparation for the final presentation
7 & 8. Presentations, Q & A, peer evaluation

The schedule was tight.

6

Collaboration with…

香川大学

Collaboration with local governments and NPO

- Satoumi group, Kagawa prefecture
- Archipelago, non-profit organization
- (Takamatsu City helped the cleanup activities)

Collaboration with other faculties

Faculty members who specialize on revitalization of the area, eco-tourism, geological engineering, disaster prevention (from “Economics” and “Engineering and Design”)

7

Special lectures and fieldwork

香川大学

Special lectures

1. Satoumi Group, Kagawa pref.
   - History of Seto Inland Sea and water environment administration
   - Problems in Seto Inland Sea
   - Satoumi building, attempts by local government and companies
2. Archipelago, NPO
   - Marine debris and impacts on lives in the sea
   - Micro plastics and how to reduce plastic debris
   - Other contributions by the NPO

8

Special lectures and fieldwork

香川大学

Fieldwork

- Observe and collect debris at beaches in Kagawa, and classify them based on ICC data card
- Guided by Archipelago
- “Project Sanuki” students + some others

Planned three times and all of them were cancelled: Q2, 2020 (heavy rain), Q4, 2020 (corona virus), Q1, 2021 (corona virus)

9

SDG 14

香川大学

Life below water

- Kagawa and Seto Inland Sea
- Students are interested in environmental problems, but they do not know in detail

香川大学インターナショナルオフィス留学生センター(2021)より

Achievements

香川大学

Final presentations

- Analyze the topic and suggest a solution: training on problem solving
- Could conduct the course with the new topic, SDG 14
- Many students joined
  - Exceeded the maximum (Q2, 2020)

Statistics

Q2, 2020 (conducted only in Japanese)

Total students: 55, Intl students: 1 (regular)

Q4, 2020 (conducted only in Japanese)

Total students: 6, Intl students 3 (regular: 1, others：2)

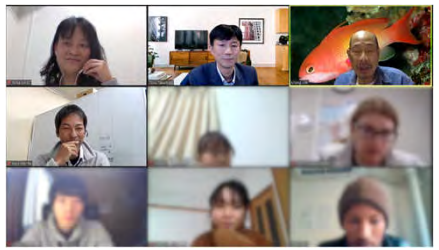
11

Achievements

香川大学

Educational effects

- knowledge on SDGs and the sea
- Examples from outside of Japan
- Practical communication works as an opportunity to know each other



Challenges

香川大学

- The pandemic started after we started the new framework: only limited international students joined
- Conducting in English: the schedule will be tight and mutual understanding will be more difficult
- Stronger linkage between fieldwork and the topics
- Other interesting resources:

13

Thank you for your attention

香川大学

Social sciences Knowledge and SDGs contribution

Faculty of Social Sciences, Chiang Mai University
Aranya Siriphon
aranyass@gmail.com
aranya.s@cmu.ac.th

Context Episode

- the situation and problems in implementing the repatriation of forest policy (2014-2018) by the military government, and recently current government implemented new National Park law.
- Conflict between officers of National Park Department, and local communities, ethnic villagers more than 60 years living in the mountainous areas before the law applied.
- Conflicts came from the authorities prioritized conservation, seeing local people as backward, non-knowledge to protect natural resource. (idea that forest should not have people living in)
- Local people who have traditionally lived in or near recently established parks are limited their access to use natural resources
- communities who farm in the forests or gather firewood and mushrooms, are often charged with trespassing and evicted, the power to give permission rests solely with authorities
- Law / officers impose stricter penalties to further limit the rights of farmers and indigenous people, a series of convictions highlighted their vulnerability, the exclusive conditions which keep people from their farm Lands, and community forests.

Role of educational/academic institution

- Role of the Faculty of social sciences, CMU
- A request from the head of Muang Kham village, Tai Yuan, 200 year old settling in Pong Yaeng district, mountainous area in rural Chiang Mai.
- Help negotiating with National Park Department
- Social sciences Knowledge provided in action
- Apply Geography, sociology and anthropology in design and action
- Two aims:
  - 1) utilizing Social sciences Knowledge to help solve the conflicts
  - 2) combining our 2 missions (students teaching and academic service), allow our students to participate in real situation, and faculty takes the academic role to assist marginal people.

Village

- Doi Dan Spirit, worship location

Process in practices

1. **Meeting** with the National Park Department, students, local people

2. **Setting academic design**: students teaching and academic service

   - **Geography team** (BA senior students and lecturers) works on mapping and GIS system
   - **Sociology and Anthropology team** (BA senior students and lecturers) works on collecting information (history, socio-economic, cultural resources, ethnic dimension, resource management and their knowledge)

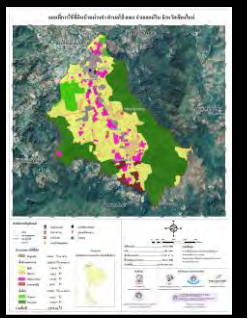
- **Meeting** with the National Park Department, students, local people

Geography team

Sociology and Anthropology team

Output return to local villagers, officers

GIS Map to indicate actual land and forest demarcation
**
booklet
To speak out their cultural resources and identities, support cultural tourism, and sustainable economy



Mission Summary
by 2.43 minutes VDO clip

Which SDG goal this academic activities indicate?

- https://www.youtube.com/watch?v=rUpC8A4_ERI

Form A

Application Form for Presenters

Pre-symposium for the Joint Symposium on Sustainable Development in Asia—Part 2

Please send this form by fax or e-mail by **21st July 2021**

Notice;
The outline must be submitted by 22nd September 2021.

Name	(Given) (Family) Juei-Hsin Wang
Affiliation	Graduate institute of Educational Administration and Policy Development
Position	Professor
Address	No.85, Wunlong Village, Minsyong Township, Chiayi County 621, Taiwan
	National Chiayi University Teachers College, Graduate institute of Educational Administration and Policy Development
Presentation Title	A Case study on the practice of remote education policy：Local government and rural school
Author(s)	Juei-Hsin Wang
Short Abstract	According to the core values of the 12 years of basic national education in Taiwan, the various educational policies and local education policies are in the process. The local government and school leaders need to innovative operations to achieve the implementation of remote education policy. Based on this, this micro-study is focus on the case local government and the rural school practice. By using interviewing and document analysis, the research aimed to analyze the practice of local government and the case school in terms of the five dimensions: Policy characteristics, structure and system, local government and school leadership, the influence of remote education policy interpretation, feedback on the quality of local and school education. The findings of the research are mentioned as the following: 1.Although the implementation of relevant remote education policies, it seems that there is protection by relevant laws and regulations, but the education situation cannot solve the dilemma in accordance with the law. 2. Only a small number of rural schools are formal teachers, and most of them are acting teachers or substitute teachers. 3. In rural schools, since many students come from disadvantaged families, the ability of students to learn independently is an opportunity to improve their learning ability in rural areas. 4. Rural schools need the support of internal and external resources of the local government to survive and develop the characteristics of the school. 5. The local education authorities and rural schools need to support teachers to continue teacher professional development in a harmonious ‘learning and teaching’ environment. Based on the findings mentioned above, the research offered many implied applications for reference.

A Case study on the practice of remote education policy：
Local government and rural school

Professor Wang introduced rural education and its issues in Taiwan. Innovative operations are needed to achieve the implementation of government policies. Artcile 8, the Basic Law of Education, states that parents have the right to “choose the method and content of education ”for their children. Professor Wang introduced the relevant laws influencing decisions. Introduced issues teachers in remote villagers are facing: accomodation, transportation, allowances, etc. The context of the situation of life in the rural situation was also introduced. Articles in the law governing this field were introduced. Education in remote areas in Taiwan can focus on policy characteristics, structure and system, local and government education.

According to the core values of the 12 years of basic national education in Taiwan, the various educational policies and local education policies are in the process. The local government and school leaders need to innovative operations to achieve the implementation of remote education policy. Based on this, this micro-study is focus on the case local government and the rural school practice. By using interviewing and document analysis, the research aimed to analyze the practice of local government and the case school in terms of the five dimensions: Policy characteristics, structure and system, local government and school leadership, the influence of remote education policy interpretation, feedback on the quality of local and school education.

The findings of the research are mentioned as the following:

1.Although the implementation of relevant remote education policies, it seems that there is protection by relevant laws and regulations, but the education situation cannot solve the dilemma in accordance with the law.

2. Only a small number of rural schools are formal teachers, and most of them are acting teachers or substitute teachers.

3. In rural schools, since many students come from disadvantaged families, the ability of students to learn independently is an opportunity to improve their learning ability in rural areas.

4. Rural schools need the support of internal and external resources of the local government to survive and develop the characteristics of the school.

5. The local education authorities and rural schools need to support teachers to continue teacher professional development in a harmonious ‘learning and teaching’ environment.

Based on the findings mentioned above, the research offered many implied applications for reference.

1st Trilateral Symposium on SDGs online 2021.9.2

Smart Sustainable Governance: A new paradigm for achieving SDGs through sound public policies

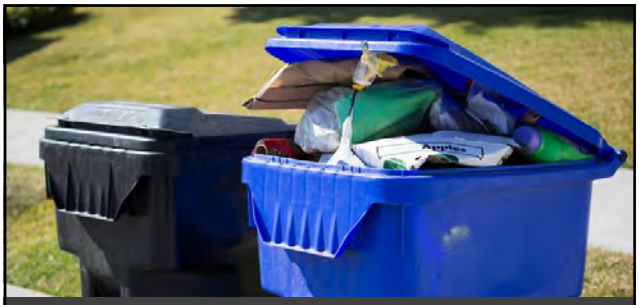
Ora-orn Poocharoen, Assistant Professor
School of Public Policy, Chiang Mai University
ora-orn.p@cmu.ac.th

1

Principles of Effective Governance for SDGs

Effectiveness	Accountability	Inclusiveness
• Competence • Sound policymaking • Collaboration	• Integrity • Transparency • Independent oversight	• Leaving no one behind • Non-discrimination • Participation • Subsidiarity • Intergenerational Equity

2



Example: Trash collection

3

Paradigm shifts in public administration

	Ancient public administration	*Traditional public administration (1960s)*	*New public management (1980s)*	*New public governance (2000s)*	*Smart sustainable governance (2020s)*
Governance principles	Only government	Best government	Efficient governance	Good governance	Effective governance
Target audience	Commoners	Voters	Customers	Citizens	Public
Public services	Basic provision	Direct provision	Contracted provision	Co-produced provision	Customized provision
Role of Government	To rule	To row	To steer	To facilitate	To design
Leadership style	Autocratic style	Bureaucratic style	Competitive style	Collaborative style	Constructive style
Accountability	Leader	Hierarchy	Market	Network	Multilevel
Goal and focus	Obedience, loyalty-based	Law, rule-based	Indicators, results-based	Relationships, trust-based	Sustainability, justice-based

Reference: CEPA, 2019. Enhancing the capacity of the public sector in a fast-changing world for the achievement of the Sustainable Development Goals

4

English Literature and Meiji Japan

Takayoshi SUGITA
Faculty of Education, Kagawa University, Japan
Email: sugita.takayoshi@kagawa-u.ac.jp

Contents

Introduction

Name: Takayoshi Sugita

Major: English Literature

Education: Ph.D in English Literature at Waseda Univ.

Experience: Faculty of Education, Kagawa Univ. (～2020)

Charles Dickens(1812-1870)

Major Novels

- *Oliver Twist* (1837-39)
- *A Christmas Carol* (1843)
- *A Tale of Two Cities* (1859)
- *Great Expectations* (1860-61)

Dickens's Life

○1812
Born at Landport, England.

○1824
His father imprisoned because of debt.
Charles went to the factory.

○1833
Debut as a fiction writer.

○1858
Divorced with his wife.

○1870
Died in London.

Dickens and social Problems

○Workhouse in *Oliver Twist*
Workhouse⇒an official welfare building for poor people
'I want some more.' by Oliver

○Exceed capitalism in *A Christmas Carol*
Scrooge(protagonist)⇒worship money and become insensitive

○Snobbism in *Great Expectations*
What is 'Gentleman'? What is nobleness?

Writers in Meiji Era in Japan

○Wanting to create a 'new' novel

・Different from old-fashioned tales

・Expanding Japanese vocabulary

・Protecting Japanese language

⇒Learn foreign languages

Dickens's works were

The most appropriate material for Meiji writers.

・having wide variety of words

・involving social problems

⇒seems the very 'Englishness'

Major writers in Meiji Japan

○Tsubouchi Shoyo (1859-1935)

Major work: *Shosetsu Shinzui* (1885-86)

・What is the 'novel'? How to write the 'novel'?

○Natsume Soseki (1867-1916)

Major Works: *Bocchan* (1906), *Kokoro* (1914), etc….

・How Japanese can develop their own novels?

Conclusion

In Meiji era

⇒Many adaptations or translations of Dickens's works

But in Taisho era (≒after 1900)

⇒Dickens had lost his reputation among Japanese

This is what I will and must survey……

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Shoyo, Tsubouchi. *Shosetsu-Shinzui*. In Tsubouchi Shoyo shu, ed. Nakamura Kan and Uezawa Nobuo, Kadokawa shoten, 1974.

Natsume Soseki. *Bungakuron*. 2vols. Ed. Kamei Shunsuke. Iwanami shoten, 2007.

Name	(Given) (Family) Hsin Yi Tseng
Affiliation	Institute of Educational Administration and Policy Development of Chiayi University
Position	graduate student
E-mail	
Phone	
Presentation Title	**Factors of Elementary School Teachers' Participation in Interdisciplinary Teaching in Taichung City**
Author(s)	Hsin Yi Tseng
Short Abstract	At present, Taiwan is promoting the twelve-year Basic education curriculum, emphasizing cross-field and interdisciplinary curriculum development, focusing on topics, experience, exploration, practice, performance, and utilization. It is expected that students will have key literacy abilities and have integrated learning experience; therefore, interdisciplinary teaching allows students to integrate the knowledge concepts of the learning content, and use multiple teaching and learning methods to stimulate students' motivation, so that they can classify and connect when facing problems in different life situations. The learning content of the subject area can effectively solve the problems in life, and then deepen and enrich self-learning. The knowledge, attitudes and skills learned in life can produce good learning transfer experience. The twelve years Basic education emphasizes the core spirit of students. This research is mainly to understand the background of teachers in elementary schools in Taichung City in interdisciplinary teaching, the reasons for their participation, and the current status of cross-disciplinary implementation. The method of this research adopts the questionnaire survey method, and the data analysis adopts the SPSS statistical software. According to the statistical results from the t test and ANOVA test, we provide conclusions of this article, and future research suggestions based on the findings of the research results.

1

Factors of Elementary School Teachers' Participation in Interdisciplinary Teaching in Taichung City

INSTITUTE OF EDUCATIONAL ADMINISTRATION AND POLICY DEVELOPMENT OF NCYU

PRESENTER: HSIN YI TSENG
DATE: 2021/09/02
S1090709@MAIL.NCYU.EDU.TW

2

Purposes of research

- To understand the background of teachers in Taichung elementary schools in interdisciplinary teaching
- To understand the reasons why teachers of elementary schools in Taichung city participate in interdisciplinary teaching

3

Questions to be answered

- The background of teachers in Taichung elementary schools in interdisciplinary teaching
- What are the reasons for teachers of elementary schools in Taichung City to participate in interdisciplinary teaching

4

Preface

- 12-Year Basic Education is advocated
- Key literacy capabilities
- Integrated learning experience by interdisciplinary curriculum

introduction

- Preface
- Purposes of research
- Questions to be answered

Literature Discussion(1)

The concept of interdisciplinary teaching

- The definition of interdisciplinary teaching
- Interdisciplinary teaching model
- Types of interdisciplinary teaching

Literature Discussion(2)

The trend of interdisciplinary teaching

- The trend of foreign interdisciplinary teaching
- Advocated domestic policy for interdisciplinary teaching

Method of research

- Questionnaire survey method

Tools of research

- The viewpoints of teachers from Taichung elementary school questionnaire
- The SPSS statistical software

10

Data collection and analysis

- The research data are from the teachers of bilingual teaching in Taichung participated in interdisciplinary workshop.
- Data is analyzed by the SPSS statistical software.

Outcomes and Discussion(1)

FIGURE 1

Reliability statistics		
Cronbach's Alpha	Standardized Cronbach's Alpha	items
.932	.928	25

KMO vaule .559
Bartlett's test 988.456

12

Outcomes and Discussion(2)

- Gender:

factor	1	2	3
P-value	0.937	0.711	7.999
T-test	0.006	0.139	0.066

- School area

factor	1	2	3
P-value	0.435	0.222	0.224
ANOVA	0.853	1.575	1.563

Conclusion

- GENDER: No Significance
- School area : No Significance

Reflection and Suggestion

- Change Variables
- Add samples
- Add Variables
- Add Qualitative research

References

- 周宜璇. (2019). 兩個教師專業學習社群實施國小跨領域統整教學之研究 / A Study of cross-disciplinary curriculum implemented by two professional learning communities of teachers. 淡江大學課程與教學研究所碩士班學位論文, 1.
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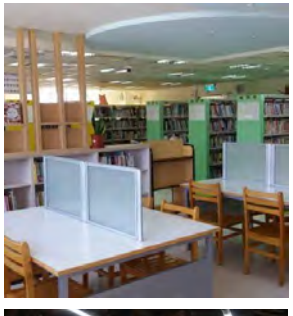
Evaluative Indicators of Characteristic Libraries for Elementary Schools in Taiwan

Advisor: Dr. Lain-Chyi Yeh
Chao Ju Chen, Student
Graduate Institute of Educational Administration and Policy Development, National Cyiayi University, R.O.C
acz851636@gmail.com

Chapters



Chapter 1 Specific Objectives

For developing characteristic libraries, promoting the functions of education, advocating children reading cultivation and learning abilities, this thesis carries on designing evaluative indicators and assists in finding problem and resolving.

Section 1 Background and Motivation

- Inspect Systematically
- Develop Evaluative Indicators
- Management and Service Standardized

Section 2 Purpose and Queries

Probe the implications and theories

Sift the conditions and issues

Case by case study and search evaluative indicators

Chapter 1 Specific Objective

Section 3 Research Ranges and Limits

- Research the characteristic libraries in public elementary school in Taiwan.
- This research is basically on quantitative research and supported by qualitative analysis.

Section 4 Identification

- Libraries in elementary schools
- Characteristic
- Evaluative Indicators
- The Situation of Characteristic Libraries Nowadays
- The Evaluative Indicators of Characteristic Libraries

Chapter 1 Specific Objective

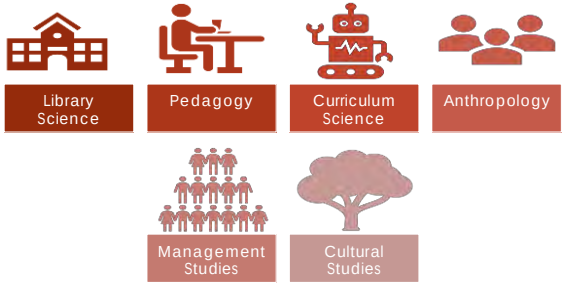
Chapter 2 Literature Review

Advisor: Dr. Lain-Chyi Yeh
Chao Ju Chen, Student
Graduate Institute of Educational Administration and Policy Development, National Cyiayi University, R.O.C
acz851636@gmail.com

Chapter 2 Literature Review

- Realize the implications and theories of characteristic libraries in elementary schools and evaluative indicators.
- Probe relevant research results and raise the factors that influence characteristic libraries in elementary schools.

Section 1 Implications and Theories of Characteristic Libraries



Section 2 Primary Structure of Evaluative Indicators

Chapter 3 Research Design and Implement

- Analyze educators' perspectives by questionnaire survey.
- Sample educators', scholars' and experts' interviews for opinions and perspectives.

Research Methods

- Documentary Research
- Interview with Educators
- Survey Investigation-IPA
- Evaluative Indicators

Research Structure

Background Variable
Educators in elementary schools, gender, position, seniority, educational background,
school location, school extent, school history

Evaluative Indicators
Characteristic building and equipment, characteristic collections, characteristic management and service, characteristic performance

(There are 4 main factors, 12 sub-level and 38 evaluation indexes in total according to relevant results.)

Sample Research

- A total of 20 elementary school principals, teachers, scholars and experts were sampled to investigate their opinions on the management concepts and practices of the characteristic libraries of elementary schools.




Chapter 4 Findings

- Content validity analysis is based on profession index (P-index), Kappa coefficient(Dr. Ye, 2016) and content validity index (CVI)
- P-index=1.0 Means that the review expert has a high degree of professionalism.
- CVI≧0.8 and P-index>0.7(item-level CVI, I-CVI)(Yusoff, 2019), keep the question, otherwise consider the content of the question and decide whether to delete.
- There are six valid samples of principals, office directors, section chiefs and teachers.
- All indicators show good content validity (P=1, CVI=1) that can be used in IPA analysis.

Importance-Performance Analysis Grid

Performance	Low	High
High	2. Possible overkill	1.Keep up the good work
Low	3.Low priority	4.Concentrate here

Importance

Martilla and James (1977)

Factors	Items	Importance M	Importance SD	Importance Rank	Performance M	Performance SD	Performance Rank	IPA Classified
Functions of Characteristic Library	1.Promote Service Quality	6.50	0.84	9	6.50	0.84	8	2
	2.Strengthen the Role of Assisting Learning	6.00	1.27	12	5.83	1.17	12	3
	3.Extend Service Items	6.00	0.89	12	5.50	1.87	13	3
	4.Increase Interactions with Young Learners	6.67	0.52	5	6.67	0.52	3	1
	5.Develop Reading Cultivation	6.83	0.41	1	6.83	0.41	1	1
	6.Enhance Connections with Social Development	6.67	0.52	5	6.67	0.52	3	1
	7. Advance Multi-Abundant Collections	6.33	0.82	11	6.33	0.82	11	3
	8. Promote Reading and Educational Activities	6.83	0.41	1	6.83	0.41	1	1

The average falls from 6 to 6.83.

Factors	Items	Importance M	Importance SD	Importance Rank	Performance M	Performance SD	Performance Rank	IPA Classified
Values of Characteristic Library	9. Promote the Joy of Reading	6.83	0.41	1	6.67	0.82	3	1
	10.Promote the Willing of Getting Close to Libraries	6.83	0.41	1	6.50	0.84	8	1
	11.Promote the Knowledge of how to Use a Library	6.67	0.52	5	6.67	0.52	3	1
	12.Provide Chances for Young Learners to Serve in Libraries	6.50	0.55	9	6.50	0.55	8	2
	13.Assist Young Learners Extending Learning Support	6.67	0.52	5	6.67	0.52	3	1
	Entirety	6.56			6.47			

Chapter 4 Findings-IPA Importance-Performance Analysis

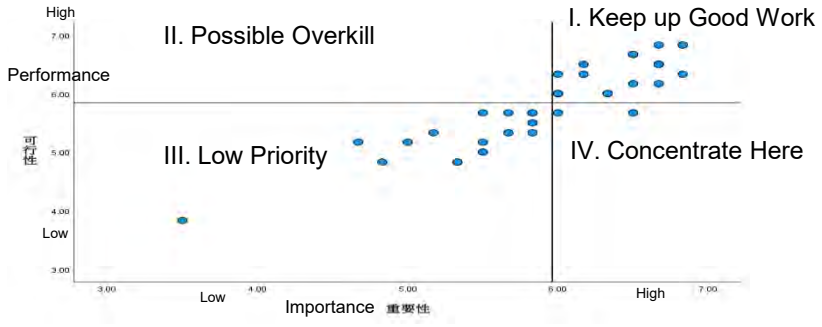
			Importance			Performance			IPA
Factors	Sub-level	Evaluative Indicators	M	SD	Rank	M	SD	Rank	Classified
1. Featured Concept	1. Publicization	1.Cooperate with Other Library／Share Resource	6.33	0.516	14	6	0.632	16	1
		2. Consult Social Service for Improve Opinions	5.5	1.643	29	5	1.265	34	3
	2. Smart and Automatic Equipment	3. Automatic Service in Characteristic Libraries	5.5	2.258	29	5.17	2.137	31	3
		4. Smart Solicitation/Processing/Reply to Improvement Suggestions	5.67	1.506	27	5.33	1.211	28	3
	3. Eco-Friendly	5.Eco-Friendly Design of Lighting, Water Supply and Air-cons	6.5	0.548	10	6.67	0.516	4	1
		6.Eco-Friendly Hardware	6.17	0.983	16	6.33	0.816	11	1
	4. Human Central	7 Consult Young Learners for Planning and Improvement Opinions	6.5	0.548	10	5.67	1.211	21	4
		8 Consider Young Learners' Needs for Equipment	6.67	0.516	4	6.17	0.983	14	1
	5.Professional Training	9 Professional Training for Librarians/Volunteers	6.83	0.408	1	6.83	0.408	1	1
		10 Library Service meet Professional Requirements	6	1.549	18	6	1.549	16	1

2 Characteristic Service Management	6 Smart/ Automated Management	11 Set up an unmanned book picking machinery	4.83	1.169	36	4.83	1.169	35	3
		12 Set up a Smart Collection System	5.33	1.506	32	4.83	1.169	35	3
		13 Set up an Automatic Machinery	5.33	2.251	32	4.83	2.041	35	3
	7 Shared Resource Management	14 Open for the Community	6	1.095	18	5.67	1.033	21	4
		15 Participate in Inter Library Cooperation Agreement	5.83	1.472	23	5.67	1.506	21	3
		16 Release Society Service Volunteers	6	1.095	18	6	1.095	16	1
		17 Cooperate in the Theme Exhibition	6	1.095	18	6	1.095	16	1
	8 Human-Oriented/Child-Oriented Service	18 Books Classified Display Rich Childlike	6.67	0.816	4	6.5	0.548	6	1
		19 Handle Storytelling/Exploration Activities	6.67	0.516	4	6.5	0.548	6	1
		20 Training Guides for Young Learners	5.83	0.983	23	5.67	1.506	21	3
		21 Multi-Language Service/Text Label	5.83	0.983	23	5.33	1.506	28	3
		22 Provide Light Meals and Sugar-Free Beverages	3.5	2.345	38	3.83	2.401	38	3

			Importance			Performance			IPA
Factors	Sub-level	Evaluative Indicators	M	SD	Rank	M	SD	Rank	Classified
3 Characteristic Collection	9 Collect Important Cultural Relics	23 Collect School Historical Relics	5	2.098	35	5.17	2.137	31	3
		24 Collect Places/Historical Relics	5.17	2.229	34	5.33	2.251	28	3
		25 Collect Celebrity Commemorative Relics	4.67	2.251	37	5.17	2.229	31	3
		26 Collect Theme Artifacts	5.5	1.517	29	5.67	1.211	21	3
	10 Collect Featured Learning Resources	27 Collect Children's Picture/Pop-up Book	6.5	0.837	10	6.67	0.516	4	1
		28 Collect Children's Comics	6	1.549	18	6.33	0.816	11	1
		29 Collect Audiovisual Media	5.67	1.506	27	5.67	1.862	21	3
		30 Collect E-books	6.67	0.516	4	6.5	0.548	6	1
		31 Collect Thematic Learning Resources	6.33	0.816	14	6	1.095	16	1

4 Special Atmosphere1	11 Characteristic Environmental Planning	32 Design Theme Layout	6.67	0.516	4	6.5	0.548	6	1
		33 Design Childlike Facilities	6.67	0.516	4	6.83	0.408	1	1
		34 Painted in Colorful Colors	6.17	1.329	16	6.5	0.837	6	1
	12 Human-Oriented Facility Planning	35 Planning for Handicapped Facilities	6.5	0.837	10	6.17	1.169	14	1
		36 Set up Research/Discussion space	5.83	1.472	23	5.5	1.643	27	3
		37 Set up Emergency Rescue Equipment	6.83	0.408	1	6.33	0.816	11	1
		38 Humanized Design of Lighting, Tables and Chairs	6.83	0.408	1	6.83	0.408	1	1
		Entirety	5.96			5.84			

Importance-Performance Analysis



Chapter 5 Conclusion and Future Study

- The IPA analysis study shows that characteristic libraries focus on educational factors and safety a lot.
- The evaluative indicators, No.7 Consult Young Learners for Planning and Improvement Opinions and No. 14 Open for the Community. They are high importance but low performance.
- These are two problems encountered in the development of characteristic libraries in elementary school.
- Build up evaluation index for characteristic libraries and evaluate the characteristic libraries of public elementary schools in Taiwan.

Thank you for your attention.

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AsiaPEX SOHMON Living Spaces ICEDS

2 Sep. 2021: SDGs and Climate Change session
(SDGs and Society Session-2) @ Trilateral Symposium 1st

Impact of the climate change and adaptation strategy in Asian countries

Toru Terao (Kagawa University)

Topics on SDGs and Climate Change

Long Collaboration under Academic Agreements

- Chair: Atsushi Taira, KU
- Madhushree Das (GU)
  - Equitable Quality Education and Digital learning: How would Assam fare?
- Bimal Kumar Kar (GU)
  - Ensuring Water Security for Sustainable Development: Assessment of Availability and Utilization Dynamics of Water in Assam from SDG-6 Perspective
- Dhanjit Deka (GU)
  - Urban Planning in Context of Tourism Development: A Case Study of Gauhachi City, India
- A.T. M. Shakhawat Hossain (JU)
  - Risk Associated With Rohingya Refugee Settlements at Ukhia Camp, Cox' sbazar, Bangladesh-A Threat for Sustainable Development
- Hiambok Jones Syiemlieh (NEHU)
  - Scales of Hydrologic alternations : How to relieve water stress in areas of abundant water resources
- Kuo-Hung Huang (NCYU)
  - Student collaborative research on climate change with open data

Long Collaboration on Climate Change

- Visiting Universities and Institutes
  - Thanks Teacher's Day
- Meteorological Obser
  - Raingauge network ma
- Inviting Researchers for Discussion
  - From GU, JU, NEHU, NCYU, IITG
- Exchange with Young Generation

Historical Environmental Resources in Kagawa (1)

Honen Reservoir

Water Crisis Symposium 2015 in Kagawa Univ.

Teshima Tour 2017

Historical Environmental Resources in Kagawa (2)

Long Collaboration on Climate Change

- Visiting Universities and Institutes
  - Thanks Teacher's Day
- Me
  - F
- , NEHU, NCYU, I
- th Young Genera

Historical Environmental Resources in Kagawa (1)

Honen Reservoir

risis 2015 in Univ.

Historical Environmental Resources in Kagawa (2)

What 'Teshima' means
「豊島」の名前の由来は？

Historical Environmental Resources in Kagawa (2)

- Rich Island /「豊」: Rich (豊か),「島」: Island (島)
  - Teshima was rich in resources, water, productions, community.

Beautiful and rich terrace / 美しく豊かな棚田

Karato spring water / never
決して涸れない唐櫃の清水

Teshima Community Festival

Fight against illegal industrial waste disposal
廃棄物不法投棄とのたたかい

Historical Environmental Resources in Kagawa (2)

- 1975-2000: Fight against the company and prefecture
- 2000-2019: Fight against the industrial waste

権力に挑んだ1600人の住民たち

In 2000, Teshima residents reconciled with Kagawa prefecture regarding the illegal industrial waste dispute. The governor of Kagawa Prefecture apologized and they most of more than 60,000 tons of wastes were transported out from Teshima island by 2019.

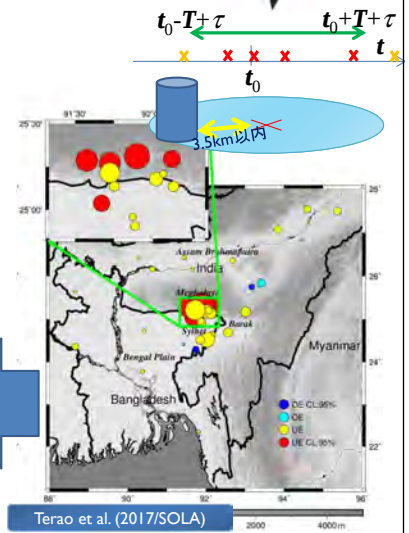
Satellite Validation by Raingauge

- We obtained 28,207 matchups
- Underestimations were found.
  - Meghalaya and Sylhet-Barak region in monsoon season.
- High Quality Satellite Validation in Remote Area

T. Terao, Hiambok Jones Syiemlieh, Laitpharlang Cajee, Abani Kumar Bhagabati, Prasanta Bhattacharya and co-authors

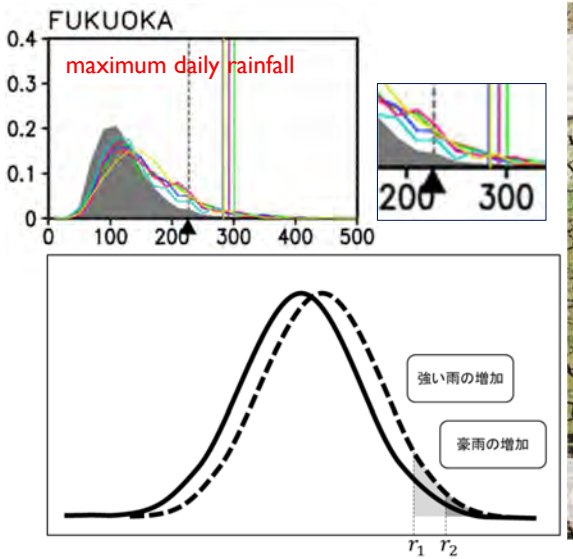
Direct Validation of TRMM/PR Near Surface Rain over the Northeastern Indian Subcontinent Using a Tipping Bucket Raingauge Network

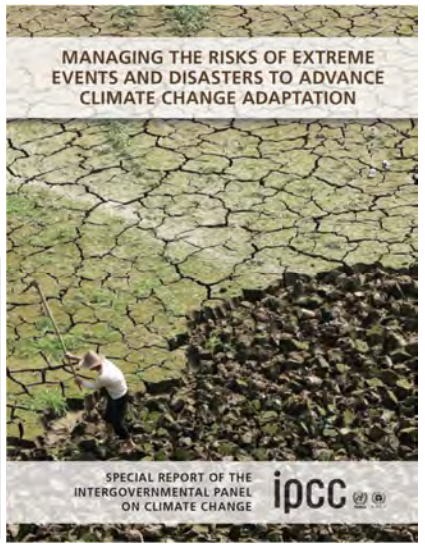
Minister of Education, Culture, Sports, Science and Technology Commendation, 2018



Terao et al. (2017/SOLA)

Climate Change and Extremes





Core-to-Core Project / JSPS

- Based on Historical Resources
  - Historical Reservoirs
  - Experiences in Teshima People
- IWCRC
  - Launching new research center in Kagawa Univ.
- Collaboration Network:
  - AsiaPEX
  - SOHMON
  - Living Spaces

  } ICEDS Archive
- Graduate School of Science for Creative Emergence (New)

Kick-off Conference

AsiaPEX

- Date: 28-30 August 2019
- Venue: Hokkaido University, Sapporo, Japan
- Participants: 72 from 10 countries
  - Philipping, Vietnam, Indonesia, Bangladesh, Mongolia, Nepal, USA, India, China, Japan
- 7 Sessions, 61 Presentations including 16 posters

GEXEX Quarterly, Aug 2020

SOHMON

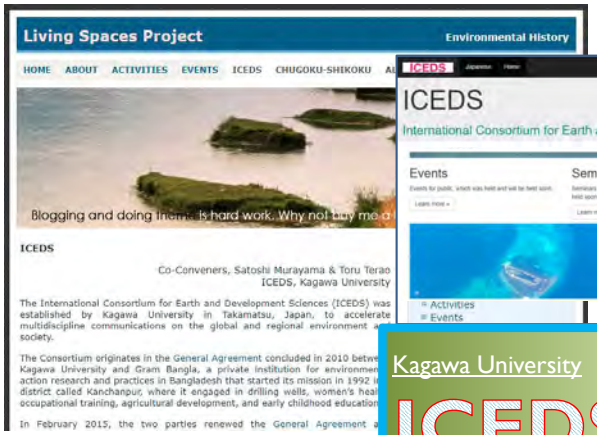
SOHMON

- Southasia Hydor-Meteoro-Climatological Observation Network

Living Spaces

Living Spaces

- Living Spaces Project



ICEDS

Kagawa University
ICEDS
International Consortium for Earth and Development Sciences

Equitable Quality Education and Digital learning: How would Assam fare?

Dr. Madhushree Das[1*], Syeda Fahima Shahnaz Sultana[1], Chandan Bhuyan[1]

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The Sustainable Development Goal 4 is to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all; but hit by the pandemic and the subsequent shift to remote teaching-learning mode, the goal became more difficult to be achieved in the developing and least developed countries. India has shown a decreasing score in Goal 4 in the Sustainable Development Report 2020 with some challenges still remaining. Assam, one of the eight North-eastern states of India, has a shrinking score in the SDG India Index 2020-21 as compared to the previous SDG India Index 2018 and 2019. Of the eleven national level indicators identified to achieve six out of ten SDG 4 targets for 2030, Assam has performed relatively better in only three indicators and with an Index score of 43, the state occupies 24th rank of the 28 states considered. An online survey conducted by the researchers in 2020 to comprehend the problems and prospects of digital education highlighted unequal digital inclusivity. The present paper will draw upon past studies as-well-as the current digital accessibility of education in the state to investigate as to how Assam would fare in SDG 4 in 2021-22.

Keywords: Accessibility, Education, Inclusion, SDG

Gauhati University

Department of Geography

1st Trilateral Symposium on SDGs 2021:
Sustainability and Society
Organised by Kagawa University, Chiang Mai University and National Chiayi University
September 1-2, 2021

Equitable Quality Education and Digital learning: How would Assam fare?

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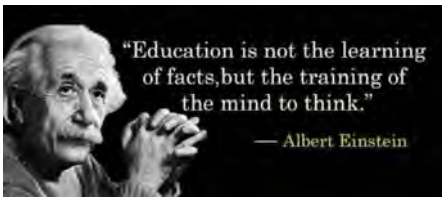
Introduction



Education

- *A continuous process of learning and relearning*
- *A basic human right and a means to a better end*
- *Imperative for human resource development*

"Human Resource Development is a process for developing and unleashing human expertise through organization development and personnel training and development for the purpose of improving performance"- Swanson and Holton (2008)

Khadija Haq and Uner Kirdar (1986) reaffirmed a positive and significant correlation between education and human resource development in their edited book, entitled 'Human Development: the Neglected Dimension'

- The Sustainable Development Goal 4 aims to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.
  - 10 targets
  - 11 indicators
- COVID-19 affected 90% of the world's student population
- The UNESCO estimated a total 320.71 million learners to have been affected in the entire India. India has shown a decreasing score in Goal 4 in the Sustainable Development Report 2020 with some challenges still remaining.
- The transition to a digital teaching-learning mode was unplanned and rapid
- Is it a boon and a bane- increased opportunities and deepened divides

Objectives of the Study

To assess how the state of Assam has fared in achieving of the targets of SDG 4

To comprehend the role played by digital education in the state during pandemic induced lockdown phase through the gauging of opportunities and challenges faced by students and teachers in adoption of emergency remote teaching-learning

To predict as to how would Assam fare in the Goal 4 in 2020-21

Database & Methodology

Data type: primary and secondary

Primary data:

- ❑An online cross-sectional study carried out in June 2020 in the state
- ❑The respondents for the study were chosen through snowball sampling technique
- ❑Link to Google Form survey was made available through social media platforms.
- ❑The number of respondents-

  Primary education level: 100

  Secondary educational level: 150

  Tertiary educational level: 573

  Teacher: 216

Table 1. Questions designed and Questionnaires retrieved for each category of respondents

SL No.	*Respondent Category*	*Number of Questions designed*	*Number of Questionnaires retrieved*
1	Primary Level Students	29	100
2	Secondary Level Students	34	150
3	Tertiary Level Students	36	573
4	Teacher	28	216

- ❑ The inquiries were explicitly designed to seek socio-demographic information challenges, issues, coping strategies, adaptability, and changes imposed upon the students at primary, secondary and tertiary level of education as well as teachers due to the Covid-19 lockdown concerning education accessibility and availability.
- ❑ The data obtained were interpreted using descriptive statistical measures to derive results.

Secondary data sources

- ❑Secondary data sources-
  - SDG India Indices
  - North Eastern Region District SDG Index & Dashboard: Baseline Report 2021-22
  - Census of India 2011
  - Annual Status of Education Report (ASER) 2020
  - Assam Budget
  - All India Survey on Higher Education, etc.
- ❑This study makes use of descriptive statistical analysis of the secondary data to assess the objectives laid.

Sustainable Development Goal 4 and Assam:Reviewing how Assam fared in the previous SDG India Indices

Aspirant: 0-49, Performer: 50-64, Front Runner: 65-99, Achiever: 100

- ❑ Assam fell into the 'Performer' category state with a score of 54, the national average being 58 in 2018
- ❑ Assam was an aspirant state with a score of 44, the national average score was 58 in 2019-20
- ❑ Assam is an aspirant state with a score of 43, the national average score being 57 in 2020-21

Table 2. SDG India Index score for Assam in Goal 4

SDG India Index	*SDG 4 score*
2018	54
2019-20	44
2020-21	43

Source: i) SDG India Index-Baseline Report 2018
ii) SDG India: Index & Dashboard 2019-20
iii) SDG India: Index & Dashboard 2020-21

North Eastern Region District SDG Index & Dashboard: Baseline Report 2021-22

7 indicators assessed for 4 targets of SDG 4

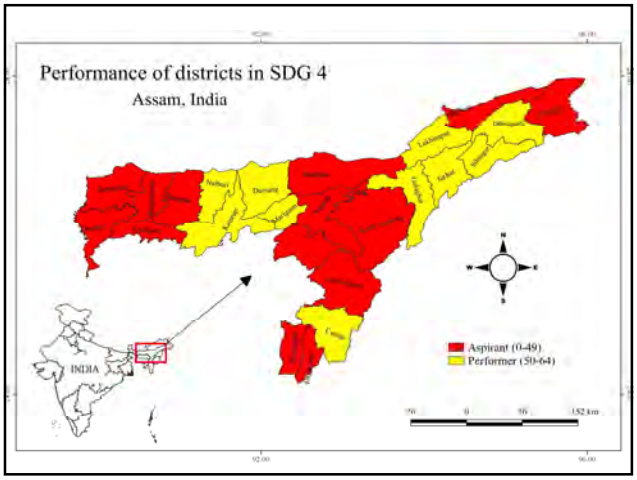
Indicators	Targets
Average annual drop-out rate at secondary level (Class 9-10)	By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes
Percentage of students in grade 8 achieving at least a minimum proficiency level in terms of nationally defined learning outcomes to be attained at the end of the grade	
Ratio of female to male enrolment at secondary level (Class 9-10)	By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations
Percentage of schools with computers available	Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all
Percentage of schools with access to electricity	
Percentage of trained teachers at secondary level (Class 9-10)	By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States
Pupil-Teacher Ratio at secondary level (Class 9-10)	

- In case of Assam, the indicators are assessed for 27 districts out 33
- The score for Goal 4 ranges between 63 and 40 for the 27 districts of the state
- Of the 27 districts, only 11 districts fall in the 'Performer' category while the rest 16 districts fall under 'Aspirant' category
- The highest rank within the state is obtained by the Kamrup Metropolitan district with a score of 63 in SDG 4. The rank for the district is 40 for the overall 103 districts of the eight states.
- The lowest rank is obtained by the district Chirang with a score of 40 and it too occupies the lowest rank of 103 among all the districts of the eight states.

Assam in NER District SDG Index and Dashboard 2020-21

District	SDG 4 Index Score	Rank in NER District SDG Index & dashboard 2020-21	Rank in the State	District	SDG 4 Index Score	Rank in NER District SDG Index & dashboard 2020-21	Rank in the State
Baksa	45	95	20	Kokrajhar	43	100	24
Barpeta	48	84	14	Lakhimpur	50	78	11
Biswanath	*	*	*	Majuli	*	*	*
Bongaigaon	46	91	17	Morigaon	53	64	5
Cachar	51	69	6	Nagaon	48	84	14
Charaideo	*	*	*	Nalbari	56	54	3
Chirang	40	103	27	Sivasagar	51	69	6
Darrang	62	43	2	Sonitpur	45	95	20
Dhemaji	48	84	14	South Salmara Mancachar	*	*	*
Dhubri	46	91	17	Tinsukia	49	81	12
Dibrugarh	51	69	6	Udalguri	43	100	24
Dima Hasao	45	95	20	West Karbi Anglong	*	*	*
Goalpara	49	81	12				
Golaghat	51	69	6				
Hailakandi	44	98	23				
Hojai	*	*	*				
Jorhat	55	59	4				
Kamrup	51	69	6				
Kamrup Metropolitan	63	40	1				
Karbi Anglong	46	91	17				
Karimganj	43	100	24				

Source:NER District SDG Index and Dashboard 2020-21



Digital education and Assam:

A Panacea during COVID-19 Crisis?

Education Infrastructure of Assam

- The Higher (Tertiary) education infrastructure of the state of Assam is comprised of
  - 26 universities
  - 562 colleges
  - 92 stand-alone institutes
- The Secondary education infrastructure consist of 4,032 schools
- The Primary education infrastructure consist of 47,813 schools

Online Education- Instructional strategies, Variants and Platforms

Instructional Strategies/ Online Education Variants		Platforms utilized
Synchronous Teaching-Learning	• Telephonic Communication	Google Meet, Whatsapp
	• Online Classes	Zoom, Cisco Webex
Asynchronous Teaching-Learning	• WhatsApp for sharing e-resources	Google Classroom, Telephonic conversation
	• E-mail used for sharing resources	Youtube, Email
	• Pre-recorded lecture videos and/or audios shared through YouTube and other platforms	
	• Virtual Labs and Simulations (both synchronous and asynchronous depending on the type of tools used	Virtual labs and Simulations

Students and learning devices

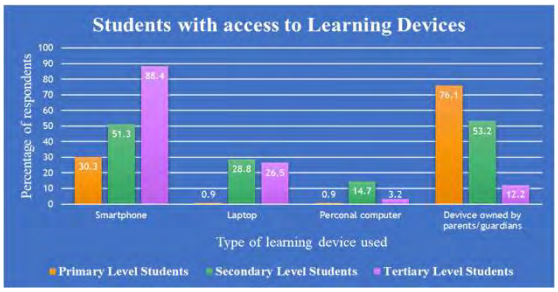


Fig 1. Students in Primary, Secondary and Tertiary level of education with access to learning devices

Source: Primary Study 2020

Students' Experiences with Emergency Online Education

Emergency e-learning: A boon or a bane?

Positive Experiences	Negative Experiences
Helped in continuity of education	Technical errors
Mitigated Academic Loss	Infrastructure failures
Sole and safe mode	Increases communication gap
Globalization of education	Devoid of emotional connect
Increase in choice	Affects understanding process
Flexibility of time and space, family time	Strong self-motivation
Collaborative projects, Additional Skills	Time management
	Suitable for theoretical aspects
	Not suitable for practical hands on experiences

Emergency Remote Teaching and Teachers' Encounters

BENEFITS		PREDICAMENTS
Helped continue teaching and learning	Space-time independent	Initial struggle
Cost effective	Access to unlimited resources	Struggle to make course learner inclusive
Helped in conducting Ph.D. viva, webinars, workshops, assessments and evaluation	Resource person	Creates hierarchies or heterogeneity
New ideas, skills		Not for lab-based/ field-based studies
		Indicates attendance but not the level of understanding
		Not viable for conducting assessments/ evaluations
		Quality constrains due to lack of resources, infrastructure, investment and preparedness

Health ailments surging from more screen time- of students and teachers

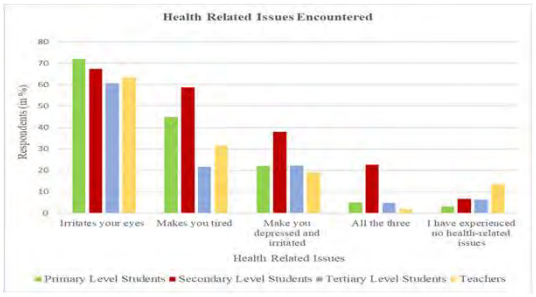


Fig 2. Health issues among students and teachers
Source: Primary Study 2020

Examinations: Opinions, Perspectives and Suggestions

Student	Teacher
Not conducive	Necessary for academic future
Adoption of assignment based/ open book evaluation	Continuance of connected processes
Not feasible for practical subjects	E-exams not favourable
Alternative practical examination strategy	Challenge for both teachers and students
Concerned over uncertain notifications.	Technological drawbacks
	Limited capacity
	Offline exams more conducive
	Prepared with Plan B

How would Assam fare in SDG India Index 2020-21?

Schools of Assam and access to infrastructure

- **Percentage of schools with computers available**
  - Performance range: 4.84 - 69.68
  - Best performing district: Morigaon
  - Worst performing district: Hailakandi
- **Percentage of schools with access to electricity-**
  - Performance range: 14.06 – 81.45
  - Best performing district: Nalbari
  - Worst performing district: Dima Hasao

Budgetary allocations

- The state has allocated 18.64% (INR 20049 crore) of its expenditure on education, sports, art and culture in Assam Budget 2021-22
- The budget allocation for SDG 4 in Assam Budget 2020-21: INR 4153.51 crore
- The budget allocation for SDG 4 in Assam Budget 2021-22: INR 6145 crore from

COVID-19 and enrolment in schools of Assam

Children enrolled in schools in 2020

Table 4. Children enrolled in schools of Assam in 2020 by different age groups and sex

Age group and Sex	Government School	Private School	Other	Not enrolled	Total
Age 6-14: all	65.0	33.4	0.5	1.2	100
Age 7-16: all	65.8	31.4	0.6	2.2	100
Age 7-10: all	61.7	37.2	0.3	0.8	100
Age 7-10: Boys	58.7	40.3	0.6	0.3	100
Age 7-10: Girls	64.9	33.9	0.0	1.3	100
Age 11-14: all	68.4	29.3	0.7	1.6	100
Age 11-14: Boys	62.8	34.3	1.1	1.9	100
Age 11-14: Girls	74.4	24.1	0.2	1.3	100
Age 15-16: all	69.5	22.2	0.9	7.5	100
Age 15-16: Boys	68.5	22.3	0.0	9.2	100
Age 15-16: Girl	70.6	22.0	1.9	5.5	100

*'Other' includes children going to Madarsa and EGS.
**'Not enrolled' includes children who never enrolled or are not currently enrolled.
Source: ASER 2020 Wave 1

Enrolment status of 5-year-olds in Assam

Table 5. Enrolment status of 5-year-olds in Assam, 2018 and 2020

ASER 2018				ASER 2020			
OOS*	Pre-primary**	School	Total	OOS*	Pre-primary**	School	Total
4.3	67.2	28.5	100	3.9	56.5	39.6	100

*Not enrolled in any institution at the time of the survey
** Enrolled in any pre-primary class (eg: Nursery/LKG/UKG) in any institution (Anganwadi/school)
Source: ASER 2020 Wave 1

Children not currently enrolled in school

Table 6. Percentage of children currently not enrolled in school by age: 2018 & 2020

Age group	2018	2020
Age 6-10 years	0.8	0.9
Age 11-14 years	3.0	1.6
Age 15-16 years	11.7	7.4
All	3.5	2.2

Source: ASER 2020 Wave 1

Gross Enrolment Ratio (GER) in Higher Education

- The Gross Enrolment Ratio in Higher education calculated for 18-23 years of age group, is the ratio of total enrolment in Higher education to the total population of the age group 18 to 23 years

Table 7. Gross Enrolment Ratio (GER) in Higher Education during last 5 years

Year	*Male*	*Female*	*Total*
2019-20	17.4	17.2	17.3
2018-19	19.1	18.3	18.7
2017-18	18.6	17.8	18.2
2016-17	17.9	16.6	17.2
2015-16	16.2	14.7	15.4

Source: AISHE 2019-20

Enrolment in Higher Education in Assam between 2018-19 and 2019-20

Table 8. Enrolment in different levels of Higher Education: 2018-19 & 2019-20

Year / Level	2018-19			2019-20			Growth Rate in Enrolment (in %)		
	Female	Male	Both	Female	Male	Both	Female	Male	Both
Ph.D.	1970	2970	4940	2413	3214	5627	22.49	8.22	13.91
M.Phil.	272	192	464	371	245	616	36.40	27.60	32.76
Post Graduate	38720	26709	65429	39800	27523	67323	2.79	3.05	2.90
Under Graduate	296037	300082	596119	278078	269915	547993	-6.07	-10.05	-8.07
Post Graduate Diploma	1564	1694	3258	1530	1683	3213	-2.17	-0.65	-1.38
Diploma	10910	12704	23614	8078	11139	19217	-25.96	-12.32	-18.62
Certificate	1034	756	1790	1176	743	1919	13.73	-1.72	7.21
Integrated	2172	2377	4549	2247	2446	4693	3.45	2.90	3.17
Total	352679	347484	700163	333693	316908	650601	-5.38	-8.80	-7.08

Source: AISHE 2019-20

Gender parity in Higher Education in the state

- Gender parity in Higher Education refers to the proportionate representation of males and females in availing higher education.
- Gender Parity Index in tertiary education is the ratio of the number of female students enrolled at tertiary level of education to the number of male students in the level
- The closer the Gender Parity Index is to 1, the better.

Table 9. Gender Parity Index (GPI) in Higher Education during last 5 years

Year	*Gender Parity Index*
2019-20	**0.99**
2018-19	**0.95**
2017-18	**0.96**
2016-17	**0.93**
2015-16	**0.90**

Source: AISHE 2019-20

For the state, the Gender parity in Higher education which decreased from 0.96 to 0.95 between 2017-18 and 2018-19, increased to 0.99 in 2019-20. This is believed to be reflected in a higher score in SDG India Index 2020-21

With all the above steps and realizations, a slightly better score for Assam with the 11 national level indicators remaining constant is expected in the SDG India Index 2020-21

Conclusion

Increase the scope and reach of education to all segments of society

Rope in new avenues for globalizing of local ideas and knowledge and vice-versa

A blended teaching-learning mode should be the priority in a post-Covid world

The three new E's of education- Enabling, Engaging and Empowering

Through attaining of the three new E's of education- Enabling, Engaging and Empowering (Resilient Educator 2020), to meet the predicaments that await beyond COVID-19, Assam is expected to move forward in SDG 4 and online education.

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1st Trilateral Symposium on SDGs 2021: Sustainability and Society
Organised by Kagawa University, Chiang Mai University and National Chiayi University
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ENSURING WATER SECURITY FOR SUSTAINABLE DEVELOPMENT:

ASSESSMENT OF AVAILABILITY AND UTILIZATION DYNAMICS OF WATER IN ASSAM FROM SDG-6 PERSPECTIVE

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ABSTRACT OF PAPER

Ensuring Water Security for Sustainable Development: Assessment of Availability and Utilization Dynamics of Water in Assam from SDG-6 Perspective

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Water being one of the most essential elements for survival of human beings, ensuring water security has become a prime concern for any sustainable development initiative. Although water is a renewable resource with huge global reserve, the fresh water necessary for human use is highly limited. India's potential water resources from surface (rivers) and underground sources is currently 1869.35 BCM (Billion cubic meter) and 431.86 BCM respectively, while its corresponding utilizable capacities are 690.1 BCM and 392.70 BCM. So far Assam is concerned, despite its considerably high water resource potential, it has not been utilized efficiently for agricultural and domestic purposes. Moreover, its utilization level varies spatially from one district to another depending on variation in terrain condition, cropping pattern and other economic activities. The level of utilization of ground water for agricultural and domestic purpose has also been quite insignificant in the state as compared to many other states of the country excluding the north-east region. The present paper attempts to assess the level of water availability and to examine its utilization dynamics in spatio-temporal contexts in Assam in the light of SDG-6 based on secondary data from various reliable sources.

Keywords: SDG-6, water security, water availability, water utilization.

Water Security for Sustainable Development

- **Fresh water in sufficient quantity and quality is essential for all aspects of life and sustainable development.**
- **Water resources are embedded in all forms of development in sustaining growth in agriculture, industry and energy generation, and in maintaining healthy ecosystems.**
- **Lack of Water Security brings about Diseases, Deaths and Under-development**

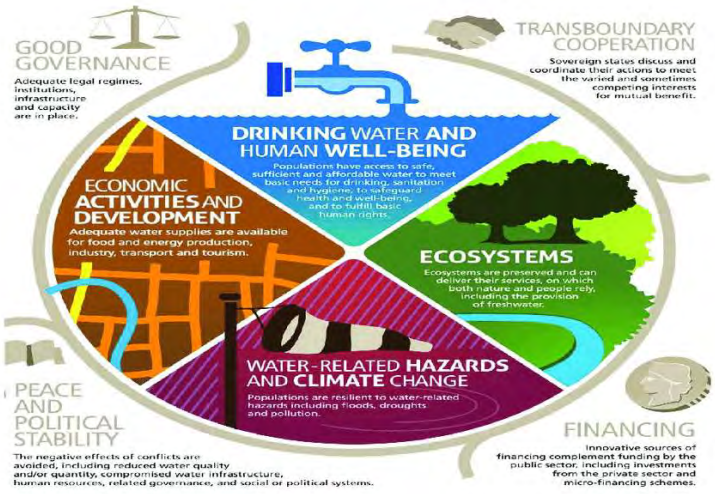
- **Today, 1 in 4 people (2 billion) around the world lack safe drinking water.**
- **Globally, more than 800 children (under age 5) die every day from diarrhoeal diseases due to lack of acceptable quantity and quality of water**
- **1 million deaths each year are associated with unclean births. Infections account for 26% of neonatal deaths and 11% of maternal mortality and all are linked to unsafe water.**
- **Hinders economic (agriculture, industry, energy production) development.**
- **Disrupts social (food security, health promotion, poverty reduction) development.**

Importance of Water in COVID-19

- Lack of acceptable quantity and quality of water hinders maintenance of proper **sanitation and hygiene**, possibly causing more infections and deaths.
- Infectious diseases can be eradicated by maintaining proper hygiene and sanitation which requires water, including the current **COVID-19** pandemic, can also be addressed successfully from its geographical spread as recommended by World Health Organisation (WHO, 2020).
- Hence, **water security** is central for overall development (UN-DESA, 2014).

Common definitions of 'Water Security'

- The capacity of a population to safeguard sustainable access to **adequate quantities of acceptable quality water for sustaining livelihoods, human well-being and socio-economic development**, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability (UN-Water).
- Water Security, at any level-from the household to the global- means that every person has access to enough safe water, at an affordable cost, **to lead a clean, healthy, and productive life**, while ensuring that the natural environment is protected and enhanced (Global Water Partnership).
- Water Security is the availability of an acceptable quantity and quality of water **for health, livelihoods, ecosystems, and production**, coupled with an acceptable level of water-related risks **to people, environments, and economics** (World Bank- Grey and Sadoff).



United Nations framework of water security

Geographical Context Favouring High Potential of Water Resources in Assam (India)

- **Location in the Humid Tropical Region**
- **Average Annual Rainfall is around 2200mm**
- **Presence of mighty river Brahmaputra along with many large tributaries and wetlands**
- **Huge Ground water resources**
- **Assam is surrounded from all sides by hilly and mountainous terrain**
- **Very low level of Urbanization (only14.10 per cent urban population)**
- **Low Rural Population Density in Assam (347/km²)**
- **There is however marked spatial variation in rainfall, surface water and ground water across the state.**

Database ↓

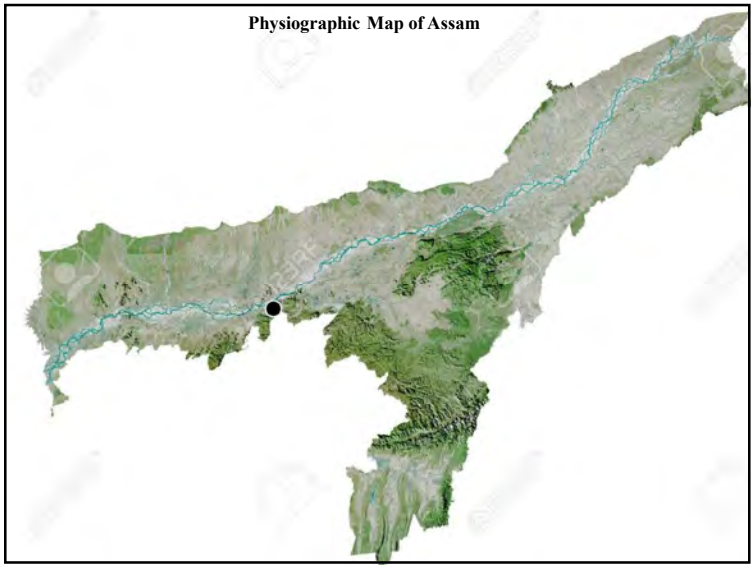
i. National Wetland Atlas of India, 2011
ii. Central Ground Water Board, 2004 &2013
iii. Department of Drinking water & Sanitation, 2021
iv. Census of India, 2001 & 2011
v. Statistical Handbook of Assam, 2019
vi. NITI Aayog Report 3.O, SDG INDIA, 2021

Methodology ↓

i. Zonation is done to classify districts for the state of Assam
ii. Data for each zone was grouped.
iii. Population interpolation is done to assess requirement of water for the non-census year

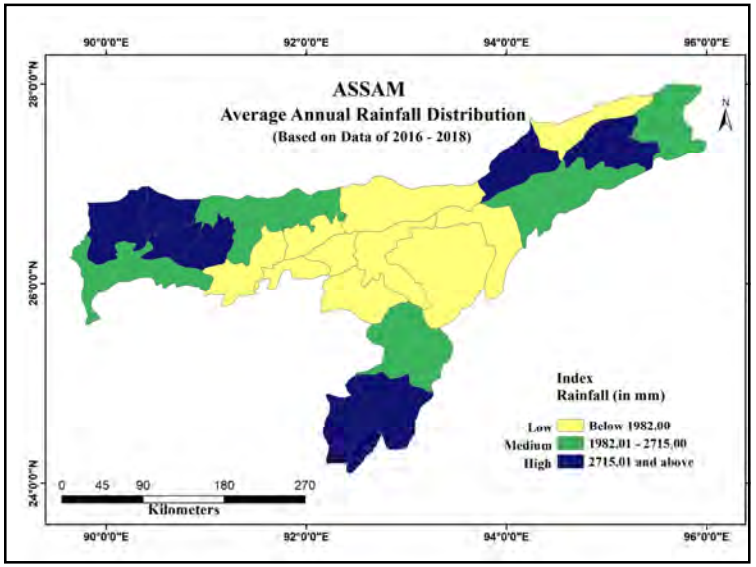
Location Map of the Study Area

Physiographic Map of Assam



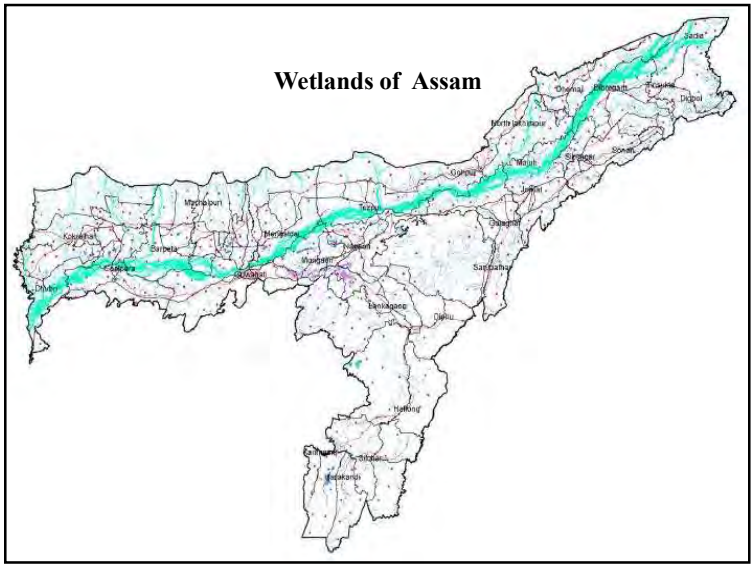
Geographical Location/ Zones		Annual Rainfall (in mm)			Average Annual Rainfall (in mm)
		2016	2017	2018	
Brahmaputra Valley	Upper	1158	1838	1579	1,525
	Middle	509	1470	786	922
	Lower	2010	2412	2951	2,458
Hill Region		279	1677	300	752
Barak Valley		866	3466	993	1,775
Assam		2143	2172	2339	2,218

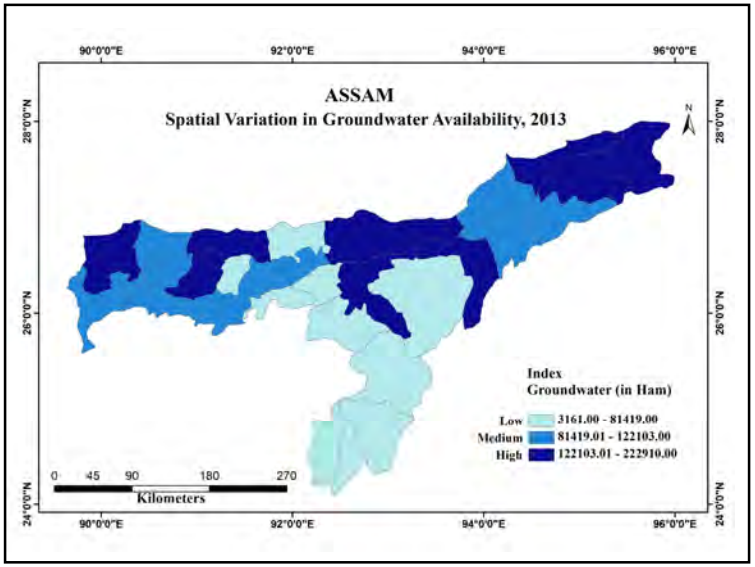
Source: Statistical Handbook, Assam, 2017 &2018.



Availability of Surface Water Resources in Assam, 2011

Geographical Location/ Zones		Geographical Area		Surface Water Area	
Brahmaputra Valley	Upper	21,706 km²	27.67 %	2760.58 km² (12.72%)	36.12 %
	Middle	14,325 km²	18.26 %	1968.42 km² (13.74%)	25.75 %
	Lower	20,163 km²	25.70 %	2595.74 km² (12.87%)	33.96 %
Hill Region		15,322 km²	19.53 %	124.29 km² (0.81%)	1.62 %
Barak Valley		6,922 km²	8.82 %	194.69 km² (2.81%)	2.55 %
Assam		78,438 km²	100.00	7643.72 km² (9.74%)	100.00





Geographical Zone		Total Availability of Ground Water (in per cent and ham)	
		2004	2013
Brahmaputra Valley	Upper	28.87 (718,450)	34.67 (1001,917)
	Middle	20.41 (508,041)	19.71 (569,618)
	Lower	33.72 (839,106)	38.89 (1123,643)
Hill Region		3.53 (87,748)	1.70 (48,812)
Barak Valley		13.47 (335,234)	5.04 (145,576)
Assam		100.00 (2,488,579)	100.00 (2,889,566)

Source: Central Ground Water Board, Assam , 2004 & 2013.

Geographical Zone		Volume of Ground Water Withdrawal (in per cent)	
		2004	2013
Brahmaputra Valley	Upper	16.15	11.84
	Middle	33.64	21.01
	Lower	29.40	19.72
Hill Region		3.42	12.36
Barak Valley		2.24	5.57
Total		21.86	16.41

Source: Central Ground Water Board, Assam , 2004 & 2013.

Geographical Zone		Irrigation (in hectares)				Zonal Level Utilization (in per cent)
		Potential		Utilization		
Brahmaputra Valley	Upper	141,723	13.94%	6,254	2.60%	4.41
	Middle	327,591	32.23%	106,268	44.13%	32.44
	Lower	308,464	30.33%	70,875	29.43%	22.98
Hill Region		96,971	3.63%	33,332	13.85%	34.34
Barak Valley		202,079	19.87%	4,067	1.69%	2.01
Assam		1,016,828	100.00	240,796	100..00	23.68

Source: Statistical Handbook of Assam, 2019.

Utilization Pattern of Ground Water Resources

Geographical Zone		Utilization (2004) in Ham			Utilization (2013) in Ham		
		Irrigation	Domestic and Industrial Water Supply	Domestic Water requirement*	Irrigation	Domestic and Industrial Water Supply	Domestic Water requirement*
Brahmaputra Valley	Upper	100,906	15,112 (43.06)	35,094	101,824	16,863 (43.10)	39,119
	Middle	157,000	13,886 (48.73)	28,494	103,521	16,161 (42.57)	37,964
	Lower	225,280	21,406 (57.23)	37,401	196,674	24,945 (43.57)	57,248
Hill Region		775	2,228 (43.07)	5,173	3,461	2,575 (43.26)	5,952
Barak Valley		868	6,633 (42.85)	15,476	242	7,874 (42.71)	18,432
Assam		484,829	59,265 (48.72)	121,639	405,722	68,418 (43.10)	158,715

Source: Central Ground Water Board, Assam , 2004 & 2013.

•Domestic water requirement is calculated by considering daily requirement at the rate of 135 litres.
Figures in brackets indicate percentage of domestic and industrial water supply as against requirement.

Geographical Zone		Total Households	Total No. of Villages	Villages and Households with PWSS (Piped Water Supply Systems)		
				Percentage of Villages with PWSS	Percentage of HH with HH Tap Connection	Percentage of villages having 100% FHTC
Brahmaputra Valley	Upper	1571,210	7,505	67.18	10.96	1.61
	Middle	1583,246	5,075	81.44	10.12	0.89
	Lower	2215,748	7,119	80.69	11.32	1.45
Hill Region		207,392	3,387	34.28	4.62	0.89
Barak Valley		757,419	2,249	85.95	20.66	1.51
Assam		6335,015	25,335	79.10	11.83	1.31

Source: Department of Drinking Water and Sanitation, India, 2021

State/Country	% of rural population getting safe and adequate drinking water within premises through piped water supply (PWS)	% of rural population having improved source of drinking water	% of ground water withdrawal against availability
Assam	25.70 (26th & 35th)	74.72 (28th &37th)	11.25 (29th)
India	51.36	97.44	63.33
Target (2030)	100	100	70.00

Source: NITI Aayog, SDG India, 3.0, 2021

SDG-6 Index
Assam : **64**
India: **83**

In Conclusion:

- **Potentiality of water resources is least developed and utilised.**
- **This is true with respect to supply of drinking water, provision for irrigation and maintenance of proper sanitation.**
- **Both underground and surface water sources are least developed and utilised.**
- **Rainwater harvesting has also not been developed even in the urban areas like Guwahati City.**
- **The most important constraint s in this respect are lack of adequate capital investment, technological knowhow and management.**
- **The purchasing power of the population has also been very low.**
- **The overall performance of Assam from the point of view of SDG-6 in the country is at the bottom. Among the regions, lower and middle Brahmaputra valleys are slightly better placed. It means there is long way to achieve water security.**
- **Hence, lots of efforts are necessary to improve the situation.**

Thank You

ONLINE
1st Trilateral Symposium on SDGs 2021
Chiang Mai University (Thailand) National Chiayi University (Taiwan) Kagawa University (Japan)

Satellite Session: Sustainability and Society

Date: 02/09/2021

URBAN PLANNING IN CONTEXT OF TOURISM DEVELOPMENT: A CASE STUDY OF GUWAHATI CITY, INDIA

PRESENTED BY

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INTRODUCTION

Urban planning in context of tourism industry and trade

It helps generate revenue from tourists/visitors, hence is considered as industry.

It helps to develop local economic sector, also promote one's culture and tradition through trade for example art and craft, handloom market etc.

Therefore, it is needed to integrate with urban planning and plan for proper infrastructures, also blooming up new tourist spots to attract tourist to support the industry in the city.

Importance of Tourism

- Economic Progress
- Development of Infrastructure
- Cultural Heritage
- Source of Income
- Societal Progress

Tourism Infrastructure

- **Physical**: Hotels, Motels, Restaurants, Transportation, Communication, Water, Electricity
- **Cultural**: Culture, heritage fairs and festivals, Local art and music, dress and dance, Language and food
- **Service**: Banking facilities, Travel agencies, Insurance agencies, Tourist guides
- **Governance**: Law and order machinery, Customs and immigration

Brief current scenario in Assam

- Assam is basically known for **One horned rhino, Tea gardens, Ma Kamakhya temple and natural scenic beauty etc.**
- Though the total no. of tourists in overall Assam is increasing; but the **yearly growth rate is decreasing.**

This is mainly due to

- **Poor infrastructures and allied other tourism related services & facilities**
- **Lack of proper marketing.**
- **Insurgency.**
- **Lack of Coordinated Efforts.**
- **Absence of Tourist Guides.**

Objectives

- To study about the existing situation, and other allied information, tourism potentiality and demand of Guwahati.
- To learn about existing heritage, its value, potentiality, vulnerability also the environment and urbanization impact on it and to find out the problems which affect the tourism industry in Guwahati.
- To promote the tourism industry in Guwahati with the provision and up gradation of necessary infrastructures and facilities and services as well as blooming up new tourism potential area through urban planning.

STUDY AREA: GUWAHATI

Introduction

It is situated at the bank of the mighty river Brahmaputra, Guwahati, is the largest city of Assam, gateway to the entire northeast India.

Literacy rate
91.47%

Population
11.2 Lakhs

Sex ratio
933 females
per 1000 males

(Source: Census of India 2011)

History of Guwahati

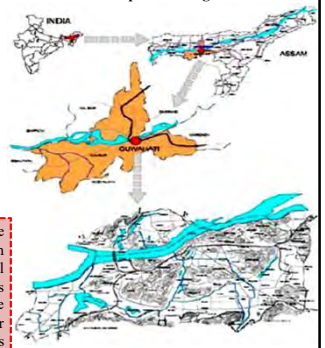
The ancient name of Guwahati was **Pragjyotishpura**.

It was the capital of the kings Narakasura and Bhagadatta according to the Mahabharata.

6th century: Varman Dynasty
8th century: Kamakhya Temple complex was built under varman Dynasty
9th century: Madan Kamdev complex built under Pala Dynasty
1228: Ahom Dynasty
18th century: Basistha and Navagraha temple were built by Ahom king Rajeshwar Singha
1826: First Anglo Burmese war commenced, British had occupied Guwahati and signed Treaty of Yandaboo

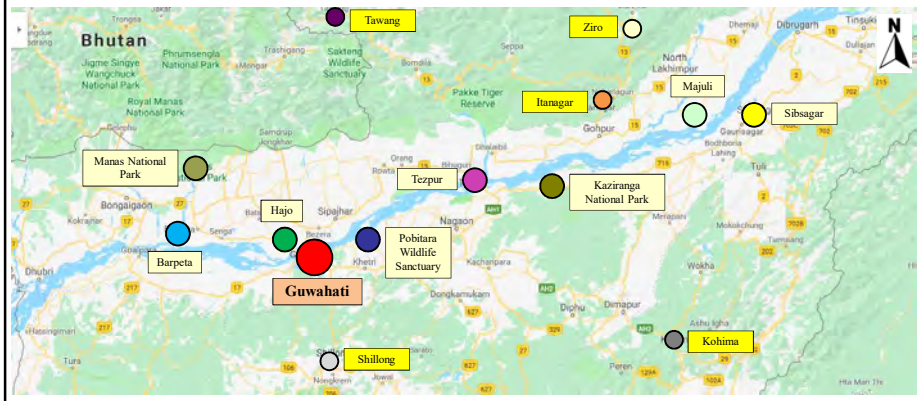
'Guwahati' name is derived from 'Guwa' means betel nut and hut means market. It was the market place for betel nut. It was also known as Gauhati during British period.

Location map of Existing GMDA area



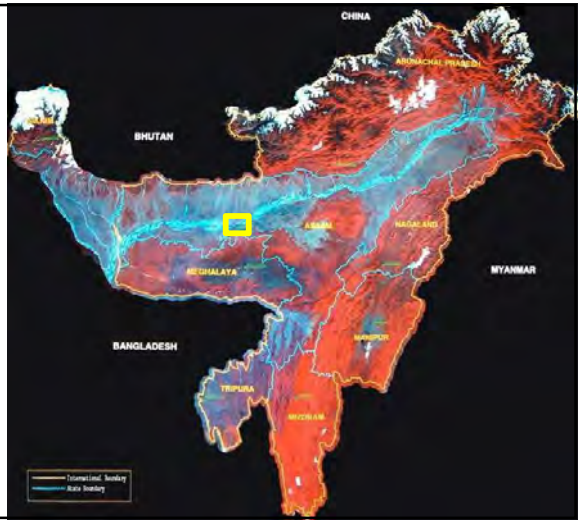
Approximately 9.9 lakh tourist have been visiting Guwahati and its increasing steadily during the last few years and the trend needs to be sustained through the provision of appropriate tourist facilities and services.

REGIONAL CONNECTIVITY TO SOME IMPORTANT TOURIST PLACES FROM GUWAHATI



North East India Context

Guwahati is the gateway of Northeast India. A large numbers of tourists places of entire north east has been connected with Guwahati through roadways, railways and also airways. In addition to that people wish to visit Bhutan also come to Guwahati to enjoy the scenic beauty and cultural heritage of North East India.



	Important Tourist places within the state	Distance	Importance
Guwahati to	Manas National Park	137.7 Km via NH27	Situated in the foothills of the Himalayas, one of the magnificent national parks in the country, the Manas river flows through it, famous for the tiger project, a habitat for various wild Animals.
	Barpeta	134.5 Km via NH27	Famous for a Vaishnava monastery
	Hajo	35.4 Km via NH27	Sacred place for Hindus, Muslims and Buddhists
	Pobitara Wildlife Sanctuary	47.7km via SH3	A wild life sanctuary
	Tezpur	184.7 Km via NH27	Ruins of an ancient capital of the Mahabharata time, famous for the love story of Usha-Anirudha
	Kaziranga National Park	193.1 Km via NH27	Internationally famous national park, the home of great Indian one-horn rhinoceros, tigers, elephants, buffaloes, deer, wild ducks and geese, breeding place of pelicans, habitat of reptiles and monkeys more particularly golden langurs and host of other species.

	Important Tourist places within the state	Distance	Importance
Guwahati to	Majuli	346.6 Km via NH27	The largest river island in the world, centre of Vaishnava culture, seat of many satras which are known as the centres of Assamese art, dance, drama, music, a safe haven for various migratory birds.
	Sibsagar	362.7 Km via NH27	Seat of the Ahom rule, famous for royal palaces, monuments, temples and massive ponds.

Source: Directorate of tourism, Guwahati

	Important Tourist places outside the state	Distance	Importance
Guwahati to	Shillong (In Maghalaya)	99.2 Km via NH6	Hill Station, water falls
	Itanagar (In Arunachal Pradesh)	330.9 Km via NH15 & NH27	Has a rich mixture of archaeological sites of great historical value and built up resources and institutions of great socio-cultural significance.
	Ziro (In Arunachal Pradesh)	438.3 Km via NH27	
	Tawang (In Arunachal Pradesh)	509.4 km via NH13	A place for monastery of Buddhists.
	Kohima (In Nagaland)	358.4 km via NH 27	Famous for the trading of livestock, Naga Bazar, Hornbill Festival, Dzukou Valley well known for seasonal flowers and flora and fauna and its natural beauty.

GUWAHATI MASTER PLAN, 2025

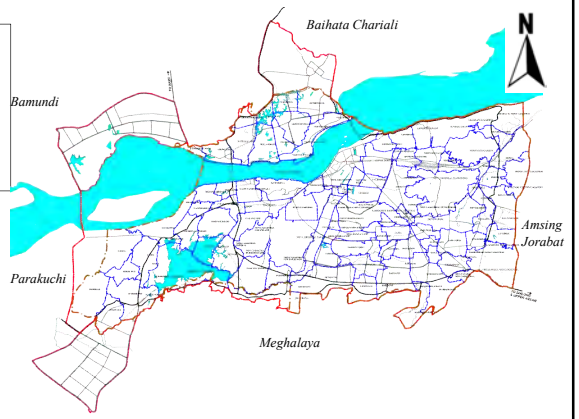
Delineated Area Profile

Districts : Kamrup (Metro) and Kamrup

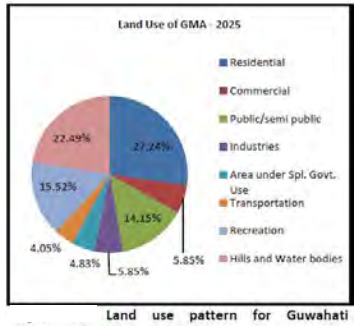
1. Approximate area : Existing Master Plan and Guwahati Metropolitan Area -**262 sq. km.**
2. Approximate new area : **66 sq. km.**
3. Approximate Total Area : **328 sq. km.**

Sl. No.	Addition	Location	Area (sq. km.)
1	New Town-I (Special Scheme Area).	Nort-East of GMA (Sila-Matiya-Najaikhat-Fulung area)	14
2	New Town-II (Special Scheme Area).	Nort-West of GMA (Charmajulipam-Gandhman-Amberi-Bamun Soalkuchi area)	23
3	New Town-III	South-West of GMDA (Panchnoyapara-Sajanpara-Gayapara-Alibari-Tarapahpara area)	19
4	Marginal adjustment in boundary and inclusion of Panchi Village (Special Scheme Area).		10
		Total	66

Source: GMDA report



LANDUSE



Land use pattern for Guwahati Metropolitan Area in 2025

Source: Master Plan-Guwahati, 2009

Proposed Land use Structure of Heritage/ Religious/ Tourism city

Sl. No.	Land use category	Percentage of developable area
1.	Residential	35-40
2.	Commercial	5-7
3.	Industrial	4-5
4.	Public & semi-public	10-12
5.	Transport and communication	12-14
6.	Recreational & water bodies	10-12
7.	Special areas (including heritage & religious areas)	7-10

Table: Land use structure for Heritage/ Religious/ Tourism City — *Source: GMDA report*

Landuse	GMA (in %)	Tourism City (in %)	Lacking (in %)
Residential	27.24	35-40	8
Commercial	5.85	5-7	--
Industrial	5.85	4-5	--
Public & semi-public	14.15	10-12	--
Transport and communication	4.05	12-14	8
Recreational & water bodies	15.52	10-12	--
Special areas (including heritage & religious areas)		7-10	

Comparison

Master plan for proposed metropolitan area-2025 by GMDA

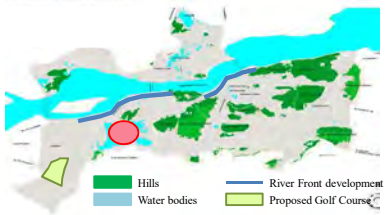
The area has a potential to be developed for adventure tourism, scenic picnic spots and riverfront/ water activities.

✓**Areas with scenic beauty to be developed as a picnic spot** for tourist attractions.

✓ **Large open ground to be developed for regional level fair site** where the handloom and traditional craft can be exhibited as well as sold.

✓ **Hills around the project area to be planned for adventure tourism.** Sports like rock climbing, trekking, parasailing, water sports, hand gliding and angling could be promoted in selected sports of the area.

✓ **Brahmaputra riverfront to be developed as are recreational** and/ water activity spot for attraction of tourist as well as for local population.

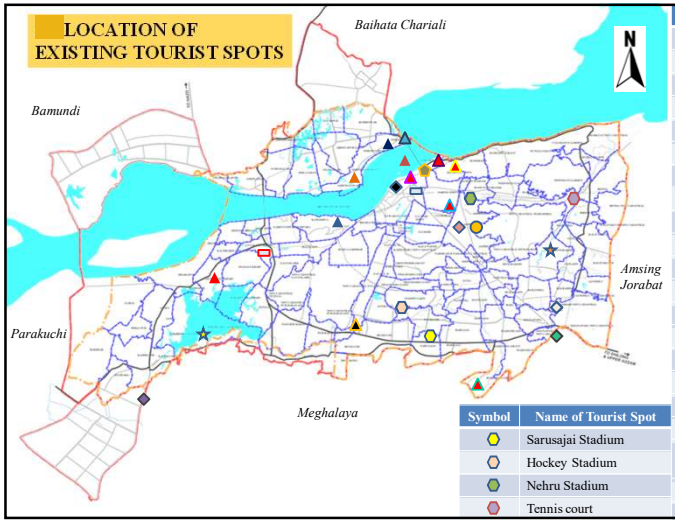


• Buffer belt of minimum 9-30m (depending on the area of the water bodies) around the Full Tank Level of existing water bodies is proposed as a **Conservation Zone-1**.

No development in and around Dipor beel area as it is eco-sensitive site except with the special permission from the GMDA. (It falls under **Conservation Zone-I**).

• Hills and area surrounding hills falling within the urban developable zone is proposed as a **Conservation Zone-2**; where low intensity construction will be allowed.

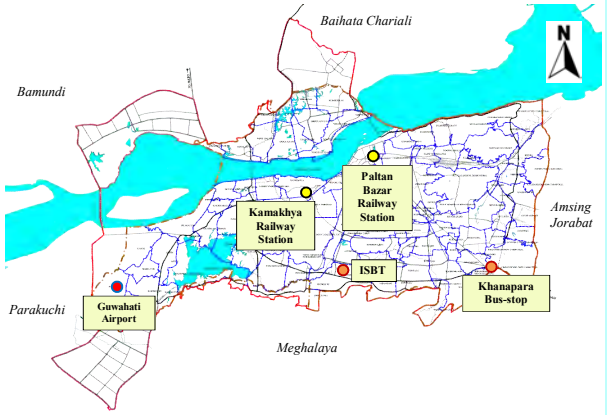
LOCATION OF EXISTING TOURIST SPOTS



Symbol	Name of Tourist Spot
	Sarusajai Stadium
	Hockey Stadium
	Nehru Stadium
	Tennis court

Symbol	Name of Tourist Spot
	Ashwaklanta Dewalaya
	Shradhanjali kanan
	Navagraha Temple
	Doul Govinda Temple
	Manikarneswar Dewalaya
	Umananda Temple
	Shukleswar Temple
	Bellevue point
	Kamakhya Temple
	Gandhi Mandap
	Lankeshwar Temple
	Assam State Zoo
	Kalakhetra
	Deepor beel
	Silsako beel
	Assam State Museum
	Accoland Amusement park
	Balaji Temple
	Dr. Bhupen Hazarika Samadhi Khetra
	Dreamland Amusement Park
	Basisthashram

LOCATION OF TRANSPORTATION HUBS



Roads:

• Guwahati is at the junction of **National Highway 31, National Highway 37 and National Highway 40.**

Railways:

• A broad gauge railway line connects Guwahati with major parts of India.

• Another railway line connects Guwahati to Dibrugarh, Tinsukia and togother places of northeastern states.

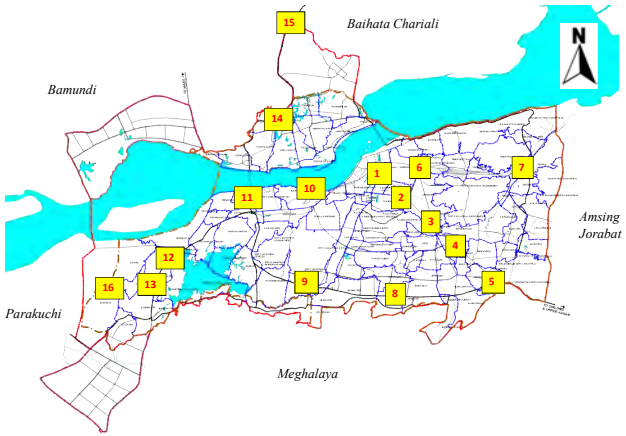
Airways:

Guwahati airport (Lokpriya Gopinath Bordoloi International Airport) is the largest and the busiest airport in this region.

Waterways:

At present the **north and south bank** of river Brahmaputra is connected by daily ferry service.

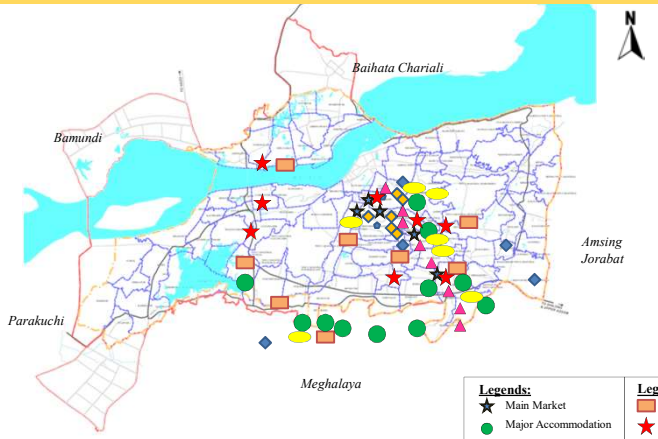
Map showing landmarks of GMA area



LANDMARK

1. Paltan Bazar
2. Ulubari
3. Ganeshguri
4. Dispur
5. Khanapara
6. Chandmari
7. Noonmati
8. Beharbari
9. ISBT
10. Adabari
11. Jalukbari
12. Dharapur
13. Azara
14. IIT Guwahati
15. Changsari
16. Guwahati Airport

TOURISM RELATED SOCIAL INFRASTRUCTURES



Total No. of

Accommodation: 366

Restaurants: 703

Markets: 5

ATM facilities: 281

Foreign currency exchange centre: 20

Tourism information centre: 2

Tourism institution: 49

Travel Agency: 272

Hospital/Medical: 230

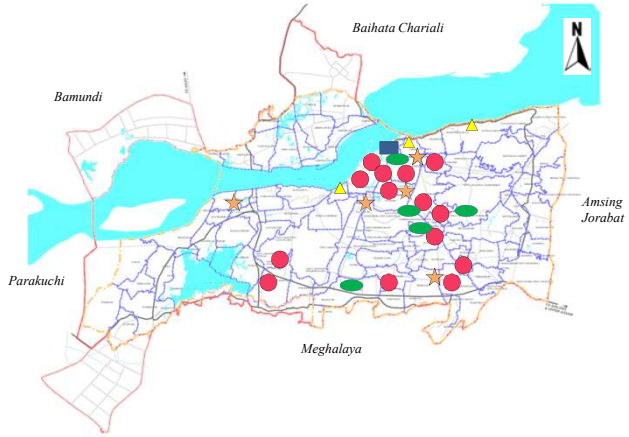
Police station: 60

Legends:
- Main Market
- Major Accommodation
- Main bank branch
- Tourism Institutes

Legends:
- Major Hospital
- Police Headquarter (safety & security)
- Foreign currency exchange centre
- Travel Agency

At present, total no. of **5151** beds are available in accommodation where **1 bed supports 143 tourists**.

PHYSICAL INFRASTRUCTURES



Total No. of:

Water treatment plant- 18

Water Intake point- 3

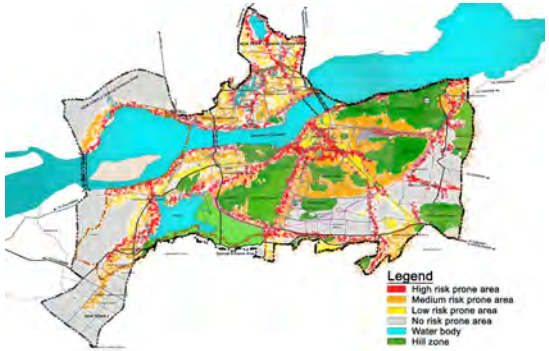
Water Service reservoir-16

Power distribution centre- 5

Sewerage treatment plant- 8

Legends:
- Water treatment plant
- Water Intake point
- Water Service reservoir
- Power distribution centre
- Sewerage treatment plant

Flooding in Guwahati



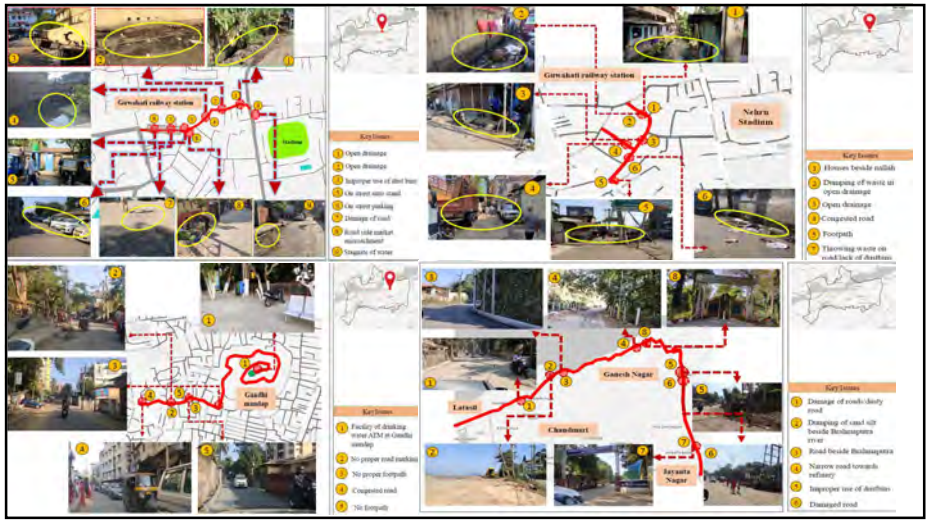
Reasons for flooding

physiographic condition of the valley
- Narrow elongated U-shaped valley opening towards the Bay of Bengal branch of approaching Monsoons.

Drainage congestion
- High stages of the Brahmaputra River over prolonged periods obstruct free discharge of tributaries causing back flow and congestion near outfalls.
- Restricted waterway of road and railway bridges and culverts obstruct the natural flow of water.
- Encroachment of natural drainages.
- Lesser Himalayas comprise of relatively younger rock formations and are in the process of building up, Friable in nature and easily erodible and prone to landslides.

Seismicity and Landslides
- Brahmaputra Valley is subjected to frequent tectonic activity. The valley falls under Zone V. Frequent tectonic activity causes geo morphological changes and landslides.
- Excessive sediment charge causes rivers to change course frequently. Carrying capacity is reduced thereby river either spills its banks or erodes.

Encroachment of Riverine Areas
- Narrowness of the valley and restricted availability of plain areas for habitation. Increase in population and developmental activities leading to encroachment of chars.



Primary Collection System

• GMC is divided into 31 wards and also GMC engaged one NGO each for primary waste collection and street sweeping within the respective ward.

• These NGO deposit the collected waste to the nearby secondary collection bins.

• The NGOs use tricycles, thelas, hydraulic mounted trailer auto tippers, etc. for the collection of household and commercial establishment's wastes.

Waste Generation	550 TPD
No. of wards	31
No. of NGO	58
Total Man power	450 workers
No. of Tricycles	480
No. of Auto Tippers	64

Source: Conservancy MSWM, Guwahati Municipal Corporation, Government of Assam, India.

Secondary Collection & Transportation

• The Secondary Collection and Transportation (C&T) is being handled by a fleet of modern compactors, tippers, etc. by GMC.

• There are modern vehicles being used for C&T like Compactor vehicles, Mobile Compactors, Transfer Station, etc.

No. of Bins	200
Garbage Compactors	18
Dumpers	22
Mini auto tippers	78
Excavator cum Loader	10
Auto van	11
Waste transported	85 – 90 %
No. of functional Transfer Stations	2 – Ganeshguri, Bhangagarh.

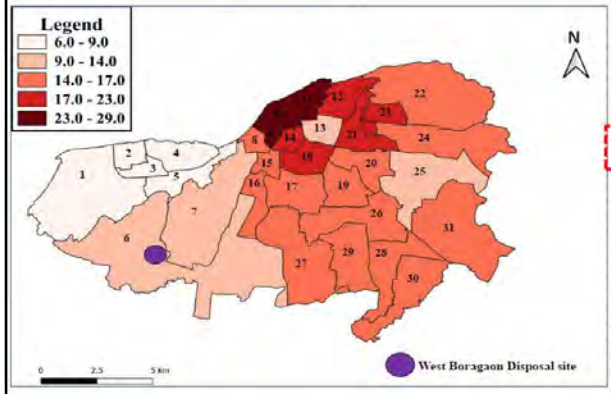
Processing & Disposal

• The waste collected is directly dumped at Boragaon disposal site without any processing or treatment.

• The site is 12kms away from the city.

West Boragaon dumpsite is the only disposal ground of the city. Now, no proper disposal method has been seen in the dumpsite. The municipal trucks simply carry the wastes to the dumpsite and dispose it without any processing, which has now become a health risk to the local people with the resultant pollution of the air and water.

GMC Ward Map



Ward Number 9, 10, 11 generates more amount of waste i.e. 29 tons per day and the least waste generating ward is 4 of about 9 tons of waste per day.

WARD	Number of HH	Waste quantity (TPD)
1	10153	7
2	8158	7
3	7543	9
4	7483	6
5	10835	9
6	6820	12
7	11451	12
8	8846	17
9	3011	29
10	5719	29
11	5504	29
12	5102	23
13	7235	14
14	8788	23
15	7659	17
16	7987	17
17	7598	17
18	9958	23
19	7460	17
20	8073	17
21	7705	23
22	7959	17
23	7270	23
24	8642	17
25	9722	14
26	9018	17
27	7836	17
28	6989	17
29	7532	17
30	8905	17
31	8977	17

Major Shortfalls / Issues

Segregation and Storage at source	Generally absent. Waste is deposited in bins/thrown on the streets / drains / rivers.	Frequency of removal	Regular along major roads and irregular in by-lanes and other areas.
Primary Collection	No organized system and Large percentage of waste is deposited on streets and picked up through street sweeping.	Processing	No processing is carried out except a small private initiative of Vermi Composting outside City limits.
Waste Storage depot	Very unscientific. Waste is stored on open sites / masonry enclosures / metallic drums.	Disposal	Crude unsafe dumping

The way municipal waste is disposed of in Guwahati by the citizens poses a greater problem because it leads to land pollution when dumped openly, water pollution if dumped in low lying areas and air pollution if burnt.

In addition to that there are many other reasons related to urban planning which directly or indirectly effect the tourism development of Guwahati. While looking at the SDG no. 11 there is an utmost need to do best possible effort for urban planning and management for achieving sustainable economy through tourism development.

Heritage cum Religious Tourism: Kamakhya Temple

Kamakhya Temple is one of the 52 oldest Shakti peethas of the India believed to be the site where Hindu deity Parvati's womb and genitals fell after she burned to death.

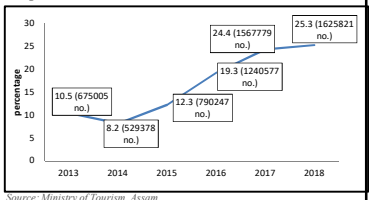
• Kamakhya temple is under **Prasad scheme** by central, year of sanction 2015-16. (Works are in progress.)

• Tourist peak season is June due to Ambubachi mela.

• At the time of Ambubachi mela, devotees stay in various temples of Guwahati. For eg, Basistha Temple for those 3 days.

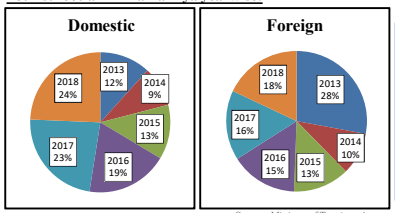
• This is because of lack of budget accommodation facility.

Tourist footfall in Ambubachi mela in Kamakhya temple:



Source: Ministry of Tourism, Assam

Tourist footfall in Kamakhya yearwise:



Source: Ministry of Tourism, Assam

•Average increase in rate of domestic tourists is 2.4%

• Average increase in rate of foreign tourists is 1.6%

• Average increase in rate of tourists in Ambubachi mela is 4.6%

Call to project Kamakhya as a religious place of nat'l importance

Source: The Assam Tribune, 28th Feb 2019

Major Issues
1. Haphazard Development
2. Huge solid waste generation
3. Lack of Budget hotel near the temple site
4. Unsustainable land use
5. Lack of drinking water

Suggestions
• Training and Workshop for Cleaners and Sweeping Staff
• Public Awareness Campaign
• Increase the Rate of Recycling
• Creation of Two Stream Waste System
• Promotion of Reduction, Reuse and Recycles
• Scheme for rain water harvesting for the people in the hill.
• An area for traditional handloom market.
• Proposal for a detail master plan in the concept of neighbourhood planning integrating Zone for Building Activity Control.
• Provision of temporary settlement/ space to stay at the time of Ambubachi mela by private house owner in the form of rent. Rent fare will be fixed by Govt.
• Provision of parking facility at the time of Ambubachi mela by private land owner in his own plot for an amount of fare fixed by Govt.

Landuse plan of Nilachal hill should include **urban forest** with **walking trail** in the **concept of botanical garden, recreational area, open space, hill climbing zone** that would help develop in **adventure tourism, design for Guwahati peak view** with amenities in the hill top that are of **low intensity construction**.

Medical Tourism

Nearby state/ countries to Guwahati for medical purpose

• Whole NE region.
• Bangladesh
• Bhutan
• Nepal
• Myanmar

AIIMS at Changsari, North Guwahati is under construction which would bring higher demand for medical tourism once completed.

Attraction of Medical Tourism in Guwahati
• Cost
• Quality of Care
• Ease of Travel
• Language

Other allied demands,
• Rental housing
• Hostel/paying guest
• Affordable accommodation with self cooking facilities.
• Restaurant with medical food concern.

Major Obstacles:
• Cross border trade barriers.
• No bank branch from Bangladesh, Bhutan and Myanmar.
• Limited railways connectivity to NE region.
• Poor road condition connecting Guwahati from NE region.
• No direct flight to Dhaka and Yangon.
• The bus service connecting Guwahati-Shillong-Dhaka is still not operational.
• No direct bus service to Thimphu or any other part of Bhutan from guwahati.

• No direct communication between Guwahati and Yangon.
• The consulate from Bhutan, Bangladesh, Myanmar, and Nepal is also not available.
• An integrated agency is in much demand to meet the need of person in need of medical care.
• Skilled workforce is missing in medical sector.
• Specialised travel agents from medical industry is lacking.

Source: Study of the Growth of Guwahati as An Emerging Hub of Medical Tourism

Medical Tourism

For overall Guwahati

• Main bank branch from Bangladesh, Bhutan, Nepal and Myanmar to be provided.

• Provision of railways connectivity to all part of NE region.

• Bus service connecting Guwahati-Shillong-Dhaka to be operational as soon as possible.

• Direct bus service to Thimphu or any other part of Bhutan as well as Yangon, Myanmar from Guwahati to be introduced.

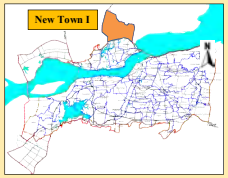
• Direct flight to Dhaka and Yangon to be provided.

• Specialised travel agents from medical industry need to be introduced to upgrade medical tourism to higher level.

• Consulate from Bhutan, Bangladesh, Myanmar and Nepal need to be introduced.

NEW TOWN I: AIIMS at Changsari

Integration of **Medical tourism** with the development plan of New Town I.



Future development plan must include,

• Rental housing facilities

• Hostel/paying guest facilities

• Affordable accommodation with self cooking facilities.

• Restaurant with medical food concern.

• Human resource training centre in special context of medical.

• Accessibility to the area.

• Sub bank branch from Bangladesh, Bhutan, Nepal and Myanmar.

• Bus station (Intra and Inter region)

Landuse Concern:

• No heavy industry in the zone.

• Provision of mix landuse.

• Recreational space

• Land use planning with the integration of green city concept

• Urban forest with walking trail.

• Bicycle track

Brahmaputra River Front development

Brahmaputra River Front development

• Water show displaying culture, traditional dance, village life style etc. Also Lachit Barphukan's active participation in Saraighat battle against Mughals.

• Water sports such as Jetski, parasailing, motor boats etc.

• Beach Valley ball court area.

• Recreational ground for multipurpose activities like fair and festival, playground etc.

• Embankment in the riversides for prevention of flood.

• Plantation in the concept of urban forestry.

• Open air theatre

• Vendor zone

• walking trail

• Tilted park- for the preservation of rainwater and flood and reduce the rate of flooding in the city. Also use of the stored water in the winter in various activities like drinking purpose, household , commercial and industrial etc.

SWOT Analysis for overall Guwahati

STRENGTH

• Guwahati offers picturesque landscape, river, fine picnic spots etc.

• Nearby wild life sanctuaries like Pobitora Wildlife sanctuaries and Amchang Wildlife sanctuaries give a lasting impression.

• Pilgrimage destinations such as Kamakhya, Basisthashram, Nabagraha Temple and other are there.

• This city is a land of fair and festivals. There are spring festivals, autumn festivals, food festivals.

• Trekking routes of Garbhanga forest, Kharghuli hill welcome adventure tourists etc.

WEAKNESS

• The lack of awareness in overseas state's of the city's natural and cultural features of outstanding attractions.

• Lack of sufficient awareness, education and publicity amongst local residents regarding economic, social and cultural benefits of tourism.

• Deficiencies in infrastructures like poor road conditions, drainage problem, water supply, poor solid waste management system etc.

• Lack of adequate professional training facilities for human resource development and quality of services.

• Lack of adequate security cover.

OPPORTUNITY

• Cultural features (heritage, monuments, events, music and dance)

• Built feature (tourist accommodation, tours and recreational facilities, urban and rival environment)

• Infrastructure and amenities (transportation, communication, shopping, comfort amenities)

• A welcoming environment (local inhabitants aware of the value of, and have strong positive attitudes towards tourism and tourists)

• Effective service (trained in technical, linguistic and social skills).

THREAT

• Tourists daunted long distances to access to Guwahati due to poor transportation system, conditions of roads and poor tourist facilities.

•Extreme flood in summer.

• Earthquake prone area.

THANK YOU

Risk Associated With Rohingya Refugee Settlement s At Ukhia Camp, Cox'sbazar, Bangladesh-------A Threat for Sustainable Development .

Hossain ATMS.[1] , Jafrin, S.J. [1], Dutta, T. [1], Khan, P. A.[1]. Haque, M.E[2]., Sayem, M.H[2].,Imam, H[2].& Khatun, M[2]
Engineering Geology, Geotechnics & Geohazards Group.Department of Geological Sciences, Jahangirnagar University, Savar, Dhaka,, Bangladesh. Corresponding Author's Email: shakhawathos2004@yahoo.com

Abstract

The humanitarian crisis due to ethnic cleansing Of Rohingya citizens from Myanmar to Bangladesh since 2017 has been creating a major environmental crisis for Bangladesh. Due to this cleansing more than one million people have fled from Myanmar to Ukhia, Teknaf, Cox'sbazar area Bangladesh. These refugees have been forced to build temporary shelters on the steep, deforested slopes of sand and clay hills of Kutupalong –Balukhali camps of Ukhia, Cox'sbazar. Thousands of hand-built tarpaulin (heavy-waterproof sheet used as a covering) and bamboo shelters on hill slopes are threatened by slope failures, slumping, sliding, strong winds, rains and cyclones during monsoon season. This low cost adaptation system with water proof sheets for Rohingya refugees housing helping to survive more than half million refugees in the camp area during monsoon in a unsustainable way of living (without light and air passing facilities) in addition to the risk of slope failure and earthquake induced liquefaction.

From the numerical stability & liquefaction analyses at different earthquake magnitudes suggest that these hills are at high risk and are not suitable for sustainable community based living in the camp area. At higher earthquake magnitudes (M= 5 or above) theses soils are susceptible to liquefy up to a depth of 5 m. An integrated rainwater harvesting system with other sustainable solutions are recommended to reduce the risks. Proper measures must be taken immediately by the concerned authorities for alternate sustainable housing and to relocate the refugees in a safer land.

Scales of Hydrologic alternations : How to relieve water stress in areas of abundant water resources

Hydrologic alternation is a feature in areas with seasonal drought like conditions across the globe. The areas just outside the influence of the Equatorial convective system experience a sequence of wet and dry periods in each calendar year. One such area in focus is the southern part of Meghalaya which receives a huge volume of rain each year yet water resources dwindles almost immediately after the rains cease.

The SDGs aim at a successful and equitable distribution of resources to the global population with an expectation to provide adequate amenities but the forces of nature exerts a negative role. Considering the efforts of reaching each household with reasonable amount of water, the unrelenting natural phenomenon may negatively outweigh human efforts.

Each year in this area there is an alternation of dry and wet period. The length of the dry period varies from year to year ranging from 2 months to 4 months starting from around November. The hydrological conditions over the area allows very less water retention and hence, sources of water run dry immediately as the rainfall ends. When the dry period is longer, the areas face a huge water stress. Paleoclimate studies have indicated extreme climate changes in these areas and the scale of such changes may even touch several years c.f. the Mega drought around 4000 years BP, affected almost the entire planet. Beyond this there were periods of extreme precipitation which must have brought unimaginable amounts of rainfall and may cause havoc. It is therefore a great need to understand different scales of hydrologic alternations occurring in this area while trying to achieve the SDGs.

Title: Student collaborative research on climate change with open data

Authors: Kuo-Hung Huang
Affiliation: Professor, National Chiayi University
Email: kuohung@mail.ncyu.edu.tw

Abstract:

A number of prior studies implied that climate change education would change students' awareness on the environment issues, instead of their behavior. Also, many studies suggested that students' hands-on experiences would change their attitude toward science. Therefore, in order to promote students' knowledge and attitude toward the issue of climate change, a collaborative research on climate change by college students with on-line data including GIS, satellite images, and open data is proposed. By holding workshop, implementing project, and sharing research findings for students, this cooperation will help to enhance their perception on climate change.