



RCE
YOGYAKARTA
Regional Centre of Expertise on
Education for Sustainable Development

Youth Leadership Program on Sustainable Development

SUMMER COURSE

12th - 21st September

2017

*“Community Resilience for Promoting Sustainable
Development Goals in Changing Climate”*

I am very glad that the 1st Youth Leadership Program on Sustainable Development (YLPSPD) runs as we expected. This year, in conjunction with the 2nd Indonesian Youth Conference on Sustainable Development we arranged the event through event-like summer course. The important point about this program is that this is a part of university roles in addressing various problems within community, while reminiscing that it has become center of information and education for students and community in general. Youth is absolutely considered as a group of people, who might contribute toward the settlement of various issues. Considerably, they are being an agent of change and future leaders as they will live up by now and coming time. In my point of view, I forecast youth will be playing significant roles in changing status quo, including several agenda in tackling problems caused by climate change. Therefore, Directorate for Community Services of Universitas Gadjah Mada (UGM) in collaboration with Regional Center Expertise (RCE) on Education for Sustainable Development Yogyakarta hosted the 1st Youth Leadership Program on Sustainable Development with the theme “Community Resilience for Promoting Sustainable Development Goals in Changing Climate”. It is definitely part of a responsive role to support community resilience in related with climate change, of being our task to link knowledge and community services. It was held in ten days from 12 to 21 of September 2017.



This program aims are:

- 1) to provide transformative learning space for young individuals to contribute to sustainable development and their community;
- 2) to create young leaders that are passionate and motivated in making initiatives and its implementation related to climate change issues; and
- 3) to strengthen networking and share the good practices and experiences in managing and implementing the SDGs related to climate change.

Last but not least, I am very grateful and saying our great gratitude to our sponsors and supporters.

Director of Community Services
Universitas Gadjah Mada

Prof. Ir. Irfan D. Prijambada, M.Eng., Ph.D.

Contents

Day One – Tuesday, 12th September 2016

Transformative Action toward Accelerating Implementation of SDGs
Academic Responsibility for Sustainable Society: The Role of Transformed Leadership
Climate Change and Its Challenge Solutions for Sustainability
Community-based Adaptation towards Climate Change

Day Two – Wednesday, 13th September 2016

Policy and Strategies for Community in Adopting Technology of Renewable Energy
Strategy towards a Lower Carbon Future
Industry and University Partnership in Promoting Renewable Energy within Community
Working Group Discussion I and Presentation

Day Three – Thursday, 14th September 2016

Increasing Community Resilience by Optimizing Local Biodiversity to Support Food Security
Traditional Knowledge and Endogenous Development
Sustainable Consumption and Production in Related to Food System

Day Four – Friday, 15th September 2016

Climate Change Impact on Water Resources
Community Local Adaptation and Mitigation towards Climate Change
Debate Session about Important Issues Related to Forests, Biodiversity Conservation, and Natural Resource Management & Approaches

Day Five – Saturday, 16th September 2016

Transformative Learning in Strategies Dealing with Sustainable Consumption and Production
Trip to Nglanggeran and Pentingsari Village

Day Six – Sunday, 17th September 2016

Merapi Volcano Adventure
Pentingsari Eco-Tour

Day Seven – Monday, 18th September 2016

Building the Integrated Watershed Management of Sensitive Volcanic Hazard Area through Micro Catchment Model (MCM)
Building Resilient Future for Rural Areas
Applying Science and Technology to DRR Decision-Making

Day Eight – Tuesday, 19th September 2016

Education and Knowledge in Building Culture of Resilience
Ecosystem Management and Resilience
Interaction of Human Activities and Hydrometeorology System around Indonesia

Day Nine & Ten – Wednesday & Thursday, 20th & 21st September 2016

The 2nd Indonesian Youth Conference on Sustainable Development

Attachments

The Organizing Committee
List of Participants

Day | Tuesday

One | 12th September 2016

08.00 - 09.00	13.00 - 15.30
Registration	Course 1
09.00 - 09.30	15.30 - 16.00
Opening Ceremony	Afternoon Break and Group Photo
09.30 - 12.00	16.00 - 17.00
Introductory Session	Exploring synergies the themes
12.00 - 13.00	18.00 - 21.00
Lunch Break	Welcome Dinner

Opening Ceremony

The Summer Course was started by the speech of Director of Directorate of Community Services, Prof. Ir. Irfan Dwidya Prijambada, M.Eng., Ph.D and continued with the speech of Vice Rector for Research and Community Service UGM representative, Prof. Dr. Suratman.

The speech of Director of Directorate of Community Services.



Transformative Action toward Accelerating Implementation of SDGs

Prof. Mario Tabucanon
ProSPER.NET

Material

Leadership for sustainability is a primer. Leadership and decision making for the implementation, a rational decision will be discussed. Building transformational leadership true education for sustainable development.

What is empowerment?

Empowerment is freedom, freedom to choose capacity, participation and agency. Leadership is about empowerment and transformational change for creating sustainable society.

- What is the process?
 - a. We see the future and we say, “I want to go there”. Future state
 - b. Change. There’s always change and future. It must be led.
 - c. Leadership doing the right things, each one can be a leader in his/her own right.
- Elements of the change process just same as First Thermodynamic Law. Sustainability: transform for 1 thing to another.
 - Desired future state: sustainability.
 - Framework for sustainability:
 - a. Society, ecology, economy.
 - b. Development country focused on economy.
 - c. Focus between is society and economy.
 - Element sustainable development:
 - a. Prosperous
 - b. Planet
 - c. People
 - d. Peace
 - e. Partnership
 - f. International to national to local agenda

Hierarchy of Sustainable Development

- Personal/Individual domain: The person as a leader.
 - human capital: decision making



- social capital: social network,
- personal values: leadership for sustainable and obligation to serve for the common good.
- Relational domain: a leader must relate to others. They need to have communication, building with team, inspiring and motivating, building relationship and alliance, building trust.
- Contextual domain: know the context and the goal, organizational design and culture, ability to look at the whole system, and global perspective.



Classroom

Conclusion - A person with values, capacity, and knowledge need to find way to relate to communities and understand the problem (context).

Leadership and the Sustainable change process

- a. Visioning global vision on SD (without vision we are blind)
- b. Communicating vision make people understand that we ve a contribution
- c. Challenging: don't say "why" but "say not", challenge the status quo
- d. Inspiring
- e. Developing capacities: education and training
- f. Motivating people to want to follow
- g. Having a plan

Understanding Sustainable Development

- Challenge for future: we need to upscale and accelerate, we need to understand the relation and target.
- Science development interface: sustainable in science (support the bridge) and education. Disciplinary sciences, sustainable development
- Key message focus on problem solving, ensuring science policy.
- Transdisciplinary: natural, social, engineering, practice stakeholder

ProsPER.NET

- Established since 2008 at GA meeting in Japan. Currently has 37 members.
- Mission transform net: transform higher education toward sustainable.
- Integration of sustainable into the curricula (Business, engineering and built environment, biodiversity, health, sustainable, and others), capacity development (build capacity for young leaders: young researcher school), policy (higher education policy)

Question and Answer

None

Academic Responsibility for Sustainable Society: The Role of Transformed Leadership

Prof. Yuji Suzuki,
National federation of UNESCO Association of Japan

Material

Introductory

- a. Peace is major topics for a research. Even scientist start to jump in into this crucial topic. Political science won't bring peace, but it need inter discipliner.
- b. Young professors, academics, business need to get together (next generation) to create peace. What is their role, and how to achieve them?

What is leadership?

There are 3 types of leadership:

1. Traditional - Relatives family leadership, for example Gandhi's daughter become prime minister (orthodox vs heterodox)
2. Legality as against legitimacy. Lead beyond limit, use their imagination such as Dubai.
3. Charisma – compelling charms or divinely conferred

But, today leadership is bureaucratic authoritarianism vs citizens' participation

The role of leadership

- Role 1: Critical review of the reality. What to do?
- Role 2: Collect data and analysis
- Role 3: Articulate appropriate policy making
- Role 4: Advocacy
- Role 5: Implementation

Question - Who does what?

Methodology: How they do?

- Pattern 1: Result or outcome based approach
- Pattern 2: Outcome oriented approach – Number is important, but more is its effects on those in need
- Pattern 3: Particularism: unique problem need unique solutions
- Pattern 4: Holism: one solution is not enough

Question – What does “transformed” mean?

Why leadership? Today's need

- Reason 1: Human beings are social beings, always someone must lead.
- Reason 2: Modern society or urbanized one needs organizers
- Reason 3: Emerging civil society needs ideological leader as prophets.

Conclusion: transboundary, trans-border, and trans-discipline.

We need to upgrade our leadership and it takes time for the next generation to make new role of leadership.

The role of higher education

1. The whole instruction approach
Sustainability must be embedded across the whole institution in curricula and campus operation
 - a. Change must lead by 'turnaround' leadership
 - b. values must be placed w/ convincing transformative tools
 - c. Horizontal structures linking vertically established discipline and generation
 - d. Variety stakeholders
2. Engagement across boundaries
Promote long term, multi-form, and multi-stakeholder approaches to engage with society and to transform people's mindsets.
 - a. Intergrade sustainability science into society. Bridge gap between science and society
 - b. Integrate traditional knowledge and worldview
 - c. Integrate science-policy inter-linkages
 - d. Foster collaboration between university students & communities.
3. Working with critical sectors and groups

Transforming HE is a big task w/ engagement by all internal (faculty & student) and external stakeholders

4. Engagement with policy



Classroom

Prospering as source of research

Go beyond syndrome of "the day after". How to recover from stress and illness.

ASIAN experienced – reconsidered: The commune feature was political stability rule by law or simply force. Economic growth by introduction of foreign technology.

From resilience to sustainability

Many Asian nation have shown 2 tendencies: globalization & localization. For example, the vision like global thinking, act locally.

Human sustainability issues: demographic onus, decline of population specially decline of working age. Needed are resilience rather than efficiency, cooperation rather than competition, and so on. Leadership need social, politic, science and to change mindset of the society.

Question and Answer

1. Australia - Jenny M. Fitzgerald

Q	How to encourage the government to join the program?
A	<p>a. Example in Tokyo garbage collection: The university students suggest 7 different garbage into 7 days. It took 10 years to ask Tokyo's government and to finally supported by national government. But now, there are 7 different garbage in local community depends on the society.</p> <p>b. RCE in UGM: lead to solve local SDG's lead by university.</p>

2. Vietnam - Le Hong Hai

Q	Where the information of proSPER.net?
A	From the website UNU IAS you can find the proSPER.net website. There are researcher, programs, case study, and many more.
Q	How can we connect the people with higher education who usually has the difference thoughts?
A	Start to change the curricula in university to create trans-boundary of research. Using sustainability topic in text book from elementary school to higher education. And it's already done in Japan. It's important for local community to connect with local schools. Push student to go away from the university to service the community. Understand local need, national need, global needs.

3. Pakistan - Adeel Tariq

Q	I'd like to be apart and convincing people
A	Fill out the applying form and there are Question to be answer about your interest and background related to SDGs. We don't reject but we need to know. Collect United nations benefits. UNU could protect us and give only to research. Your research can become a policy. Get to work with many UNU colleagues to be part of global issue.

4. India - Pallas Chandel

Q	Can you highlight What's happening in poverty and hunger issues?
A	It depends on the country. There are hundreds of indicators and you could see which your country is suffered and then you can find the actions what you need to do. There are also scoring in the website about the country and collect data more before knowing what exactly happened from any country to another.

Course I

Session I

Climate Change and Its Challenge Solutions for Sustainability

Dr. Satyawan Pudyatmoko, S.Hut., M.Sc.
Universitas Gadjah Mada

Material

Are we already beyond limits?

Future of human kind, planet, and organism will depend on what action we take. There's a symptom of weather we are living in sustainable way or not. Mineral, water, etc. is not enough to satisfy the human. Water source is the most serious problem for many countries and also areas in Java, especially in dry season. Degradation of ecosystem: reduction of biodiversity and genetic resources. Pollution is a global level problem like climate change, GHG emission, and ozone depleting substances.

Ecological footprint

Indonesia is not too bad. Indonesia almost near the land capacity. US, Canada etc. larger than Indonesia. Indonesia

will not enough if we apply the developed country method.

Indicator of Global non Sustainability

1. Climate change: predicted by the temperature
2. Deforestation: 7.3 million hectare
3. Species loss: lost 68
4. Land loss: degradation
5. Over fishing
6. Water scarcity
7. Ozone layer depletion

Pollution will affect not only for us but also for future generation.

UNFCCC Treaty (1992)

The UNFCCC established a goal of stabilization of atmospheric greenhouse gases to prevent dangerous climate change. IPCC: human caused climate change is real, human caused climate change is dangerous, action is needed to prevent dangerous human climate change.



Dr. Satyawan Pudyatmoko, S.Hut., M.Sc

Consequences of Climate change: environmental impact and economic sustainability

1. Indonesia's sea level raise has made some village disappear. Many people lost their home and property. People must mitigate to other area and spending much money than before.
2. Ecosystem, human health, and economy
3. Climate change is overriding challenge facing our global civilization
4. Climate change disrupt economic and social activity
5. Climate change is unlikely to be catastrophic
6. Temperature increase of 0.6°C is not a dramatic divergence

Climate change and economic growth

Sometime in developing country there are some efforts to gain the economic growth. Economic growth is not sustainable, it's high and suddenly drop and give some disaster to the country. World estimated the economic loss of 7 %.

Impact of Climate Change

Impact of CC is not same between countries, but they have negative impacts.

Climate Change Policy

Scientific solution is not enough to solve the problem because CC is not only because of technological but government policy.

5 Policy Frames

1. Mitigation: how the government and people reduce the emission
2. Adaptation: if the CC replace what human being do, so they can life in changing environment
3. Building new infrastructure to generate Electrical power without emit CO₂. Ex: direct air capture
4. Solar radiation management
5. Mitigation structured to reduce incentives for opposition

General Structure

Global Issue has been adopted in 1992, continued by Kyoto Protocol, and Paris Agreement.

Kyoto Protocol

1. Binding commitments of 19 industrialized nations: reduce their emission of green house gases
2. Top down approach
3. No adaptation
4. Carbon economic mechanism: clean development mechanism, International emission trade
5. Reporting to National Communication



Paris Agreement

Adaptation, Mitigation, and Support.

Key elements of Paris Agreement

1. How to keep the increase in global average temperature to well below 2°C and to 1.5°C if possible,
2. Objective
3. Principal
4. Mean
5. Finance
6. New Mechanism
7. Entry into force



What is the position of Indonesia?

Indonesia among the developing countries, and has a greenhouse effect compare to Turkey and Thailand.

Paris Agreement: Two Long Term and Tree Cycle

NDC Indonesia

Indonesia's targets to reduce CO₂ in energy sector, agriculture, and forestry. Emission of gas in Indonesia is more than other developing countries. NDC has 2 main programs: mitigation and adaptation of CC. Two concerned subjects are energy and forestry.

- A. Forest:
Decreasing deforestation rate, implementation of sustainable forest management in natural forest as well as in plantation, rehabilitation of 12 Mha of degraded land, and restoration of 2 Mha peatland.
- B. Agriculture:
Planting low emission of rice varieties, biogas production
- C. Waste and Industry:
3R, better management of solid and liquid waste.
- D. Adaptation programs:
Economic resilience, social and livelihood resilience, ecosystem and landscape resilience. To achieve it, according to UNFCCC policies, and measure to protect the climate system against human induced, all of aspects should be integrated.

Climate Education

Climate education is very important, it's stated in Art 6 UNFCCC: education, training, and public awareness.



Session II

Community-based Adaptation towards Climate Change

Prof. Dr. M. Aris Marfai, M.Sc.
Universitas Gadjah Mada

Material

Opening

Speaker set expectations from the audiences. The expectation concludes as knowing the experience and contribution of high educationist into community level. Comparing between 3 cities (Jakarta, New York, Rotterdam), in Rotterdam, government set more attention for disaster management. Rotterdam has dynamic dam in front of the sea. But in Jakarta, doesn't have insolent system.

Climate Change

Climate change is the changes on temperature, precipitation, and sea level rise. Indonesia has 2 seasons those are dry and rainy. But recently, Indonesia could have longer dry season than rainy season or heavy rain on dry season. Unfortunately, the farmer who doesn't have the knowledge to farm, will depend on the change on the seasons so they get more confused now because of unstable changing of the seasons.

From data, Netherlands will lose 6.7% of land, Bangladesh 20.7% and Indonesia 1.9% if they did nothing about climate change.

In Indonesia, biggest community mostly located in coastal area such as Jakarta and Semarang.

One of important point of big city is the location. In coastal area, there are chances to suffer from tsunami, flood, even landslide.

Coastal dynamic and multi-use purpose: Fishing, Harbor and industrial activity, trading (port), Population growth, coastal hazard, groundwater anticipation, etc.

The next disaster when the earlier disaster is forgotten

To minimize to negative effects, people need to improve the capacity of the people, the government. Kalimantan Island is the only island with very less chance to the disaster.

Semarang landslide

The rapid growth of community in Semarang until 2007 cause problem of land, food and water. Another impact is the heavy load of building on the land. Because of the excessing of groundwater, the flatter land will be. The houses are sinking because of land subsidence. Impact of sea level rise on 2009: A picture destroyed house in the middle of the sea. A whole village is sinking sea level arise and land subsidence. Even the grid electricity is slowly sinking into the sea.



The speakers

What should we do?

Ecosystem based disaster risk reduction could be one of the solution: technical engineering - Coastal green belt. Vegetation - Mangrove plantation

There are not many research in Indonesia about disaster risk reduction.

Benefit of general concept of eco-DRR:

- Cost of effectiveness
- Socially environmentally friendly
- Sustainable

You can use Hybrid engineering from Marine and Fisheries agency Semarang to build let and divide The Sea and the land.

In Netherlands there is coastal dike, beach & groins to avoid sea level rise.

Concept & theory of social capital

Bonding social, capital bridging and linking social capital

Why youth?

- Employing 40% of the total world population
- Technologically inform
- Physically capable
- An active, productive, and passionate generation
- Youth basically is OUR FUTURE LEADER

The role of youth Leadership in adaptation to Climate Change

- Youth volunteerism
- Youth in Research & science
- Youth in Civil society

For example, in UGM, it's compulsory for the bachelor student to stay 2 months on local community and serve the community depend on your background for example, giving advice, mapping, teaching, etc.

Question and Answer

1. India – Sudeshna Mayasen

Q How to start the program to the community?

A Sometimes, it's important to know the culture, the people, and the character so we can invite them to join us. Some of community will reject the project with external funding. If there is project with external funding from NGOs or factory, we need to learn deeply about the community. There are supportive and hard community. The way is to approach them, educate them, test with small responsibility before implement the project.

2. Indonesia - Dewi Wulandari

Sharing experience from community service in Mutilan

The village has a lot of coconut tree and didn't optimize the trees. We trained them on how to make food from coconut and optimize from the root until the fruit. We equip them with skills not money. Give them something sustainable. It's been 5 years now and they're managing to continue producing the coconut product. The difficulties are they're expectation on infrastructure of their village such as bridge, road, mosque, etc. But we need to make sure that the student only emphasizes with the train and education and they need to manage their self. Capitalize the knowledge not the money.

3. Indonesia – Yetty Mustar

Sharing experience in community service

We make plan and present in local government to provide us the equipment needed before jump in the community.

Q How far this community based adaptation impact to climate change and how the people react about this?

A For example, in Semarang. We can't work in whole are and only in special area. We have different approach toward different community. Some want to have personal interests since they don't understand the importance of the project while some really understand and get involved to plant that mangrove that already provided by us. For long term study we have monitor the change. More issue is about sustainability and this is the most challenging issues since we need to provide them all the time.

4. Australia – Jessica Campion

Q What do you suggest for us to help the community in the area that has high potential in sinking?

A It's important to involving the capital social before we start to help.

Day Two

Wednesday
13th September 2017

Climate Change: Sustainable Energy and Industry

08.00 - 10.00

Course 2

1. Policy and Strategies for Community in Adopting Technology of Renewable Energy
Prof. Yuji Suzuki, National Federation of UNESCO Japan
2. Strategy towards a Lower Carbon Future
Aditya Wira Santika, MBA, PT. Pertamina
3. Industry and University Partnership in Promoting Renewable Energy within Community
Dr. Eko Agus Suyono, Centre for Energy Studies, Universitas Gadjah Mada

10.00 - 12.00

Working Group Discussion I

The students will work with several cases in regard to different positions relevant to company/industry strategies in the area of renewable energy

12.00 - 13.00

Lunch Break

13.00 - 16.00

Working Group Discussion I (presentation and discussion)



Course II

Session I

Policy and Strategies for Community in Adopting Technology of Renewable Energy

Prof. Yuji Suzuki

National Federation of UNESCO Association of Japan

Material

Climate change and its impacts

- Human influence on the climate system is clear
- The more was disrupted our climate, the more we risk severe. Pervasive & irreversible impacts
- We have the mean to limit climate change & build more prosperous future

Research & education

- Whole intuiting approach
- Engagement across boundaries
- Critical sector & group
- Engagement with politics

Policy making – case Japan

- SDGs in action – 8 priorities by multi stakeholders meeting
- Need in collaboration in global, regional, national, & local government, industries, & civil societies
- Especially local government units: “Future city plan” by Yokohoma – hydrogen station
- Private firm with SDG “Sustainable tree” by Sumitomo chemicals without government request but as a respond to the future city plan

All aspects involved on policy making for sustainable future

Policy implementation from above

1. Practice at locality 1

- Renewable energy: 1. Solar energy with new technology, 2. Renewable energy use up to 13% of total
- Local energy & local economy development
- Case study:
 - Manawa city, Okayama, encourages biomass power generation with more job at locality
 - Higashi-Matsuyama-city, Miyagi, set up ‘smart eco-town’ in the post tsunami debacle. Even the society doesn’t have enough knowledge, but with the big help from the government they maintain to make it happen.

2. Practice at locality 2: Upgrading energy efficiency

- a. Toyama adopted Toyama frame work from reducing the loss of food. For example, “3010” action (first 30 min & last 10 min: eat not talk). The society asked to start it

and it create amazing efficiency in consumption of food.

- b. Re-use shop & sharing of car, hotels, etc. It reduces the number of car. In Japan, they won't buy car just because they want to drive car for their self. Reuse building decreased the huge load of infrastructure.
- c. Recycle & discover "resource rich" part of the city including pc, mobile phone, etc. People will buy unused electronics to renew it. Big city is rich reuse center to start recycling.

3. Practice at locality 3: Sustainable city

- a. Compact city: Toyama by using LRT (light railway transportation), subway, MRT. Reduce the number of car
- b. Green infrastructure: Kyoto city which one university in the city to create "rain park". Rain Park is to collect rain water
- c. Smart community: Fujisawa city for sustainable smart town.
- d. Better use of old houses for inbound tourist – Shinoyama city, Hyogo.

Jogja is a good city to become sustainable city. You have all the resources. For example, for the tourist, start to reuse old house to make it more interesting for tourist.

4. Practice at locality 4: National park as tourist attraction

Mid-term review

- 1. Government's role in emergency
- 2. Firms & NGOs – important stakeholders
- 3. Dilemma of long-term policy & short-term recovery
- 4. Recovery & resilience
- 5. Resilience & bio-diversity

- a. Foreign tourist to natural beauty in Japan now more than 24 million as for 2016.
- b. UNESCO's world heritage, now 20+.
- c. Globally appreciated "National parks" step up projects at 8 national arts.

In Indonesia, the national park is expensive and not interesting. Indonesia has many world heritages so you already have the seed to grow it well.

5. Practice at locality 5: Eco-financing

- a. ESG (Environment, social, government) investment now 60% of firms try to go ahead
- b. Green bond issued by local government and firm
- c. Government (ministry of environment) supports low carbon society building
- d. Carbon pricing as an effective means

Role of government: Special issues at work

Fukushima-debacle & control of radioactive damages

- 1. Decontamination work of affected soil
- 2. Re-stablemen of those forces to evacuate
- 3. Mid-term stage of contaminated soil
- 4. Rebuilding the citie
- 6. Top down and bottom up

Question and Answer

None

Strategy towards a Lower Carbon Future

Aditya Wira Santika, MBA
PT. Pertamina

Material

Pertamina introductory

- PERTAMINA approach in integrate energy for Indonesia. PERTAMINA is the only role for Energy Company in Indonesia because energy industries main points are high risk, Capital intensive, technology exposure.
- PERTAMINA's vision & strategic
 - a. To be world class national energy company
 - b. Agent of fulfillment of energy in Indonesia. We used to export energy but now we imported because the huge demand of Indonesia.
- PERTAMINA serves urge market domestically through an extension network & infrastructure from upstream to down stream
- PERTAMINA handle 150 million transactions per day
- PERTAMINA serve Europe, Middle East, and Asia-pacific.

The push towards a lower carbon future

- Short discussion: What do you think?
 - Pakistan - Adeel Tariq: It need the role of big stakeholder
 - Indonesia - Dewi Wulandari: It need government policy
- But in industry, we have disruptive events: Digital era, additive manufacturing 3D printing, Renewable, Electric vehicle, Battery storage, Resource abundance.
- Very soon Indonesia will taste the Tesla car and the renewable energy. It treats to the industry if we should change the gas station into charging station
- The demand of oil will peak in 2025.
- How big companies react for this? Renewable investment as proportion OD cages.
- In Indonesia, the drive towards a greener energy already start with 23% of demand covered with renewable energy
- The government has issued a regulation to push the production & utilization of Euro, 4 standard fuel.

Pertains vision changed into

To be world class national energy company & realizing national energy self-supplied.

1. To develop & optimize the geothermal potential in Indonesia
2. To engage partnership with and invest in potential NRE player
3. To develop domestic NRE source such as DME (Dimethyl Ether) as the replacement of LPG.

Geothermal potential in Indonesia

- Indonesia has 40% of world geothermal resources with less than 5% utilization rate.

- PERTAMINA operates 14 working area and installed capacity of 587 MW.
- Indonesia start to produce High quality fuel.
- Indonesia now in Euro 2 while the car importer in Euro 4. And now Indonesia jumping it Euro 5.
- PERTAMINA also established research and technology center and is currently developing technology partnership including renewable. PERTAMINA has commissioned the installation of small scale Solar Pore Generator in PERTAMINA's office.

Question and Answer

None

Industry and University Partnership in Promoting Renewable Energy within Community

Dr. Eko Agus Suyono, Centre for Energy Studies
Universitas Gadjah Mada

Material

Background

- ASEAN countries are heavily dependent upon fossil fuel
- Most energy consumption come from transportation sector because the increase income of people, low oil price, and inadequate public transportation.
- Indonesia become the biggest energy consumer in 2011-2040.
- CO emission in Indonesia is high.

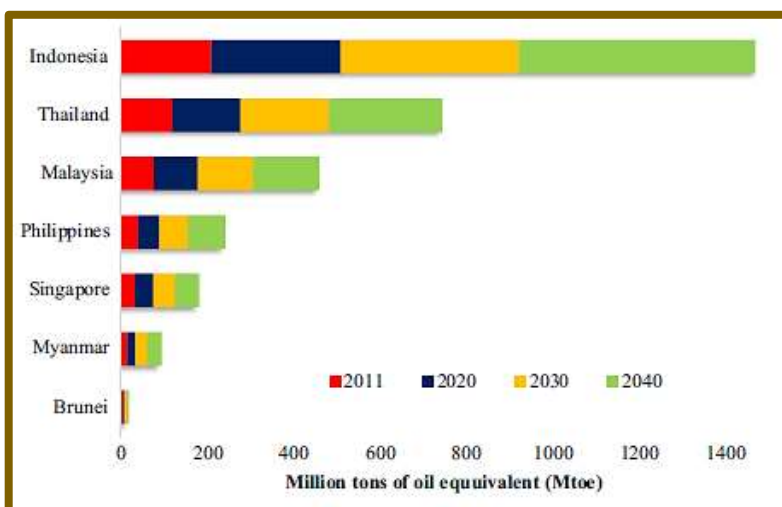
Biofuel

“The fuel of the future is going to come from fruit like, such apple, weed, and sawdust – almost anything. There is fuel in every bit of vegetable”

- Biofuels are categorized the subject of ongoing research,
- Technologies to produce into first-generation biofuel and advanced biofuel & third generation.
- Currently, biodiesel & bioethanol are 2 most promising biofuels and being projected to replace conventional fossil fuels in transportation.

Indonesia policies

- Supply and utilization of biofuels as alternative energy (presidential intrucsion number 1 year 2016)
- National energy policy. Targeted: 5% biofuel in the energy mix by 2025



ASEAN Primary Energy Consumption (2011-2040)

- Biofuel mandatory to use Bioethanol 15% in 2009 and Biodiesel 25% in 2025.

The role of university and community

- International sustainable frame work as our hierarchy to open global path toward sustainable development. With national sustainability platform to fulfill national target.
- In integrating sustainability system to Indonesia, it's important to considered Economic aspect: maximizing policy efficiency, Environmental aspect: protecting the environment, Social aspect: Improving social environment

Algae bio refinery system

- We sell multiple product instead of only fuel so we can get surplus to continue produce biofuel. From algae, beside biofuel, it can be also beauty soap and antioxidant capsule. By using this system, I get to minimize CO₂.
- Community service & empowerment: IP Power collaboration, making products, Algae Park, algae village.

Question and Answer

1. Vietnam - Lee Hong Hai

Q	What is the difference between biofuel and hydrogen fuel?
A	The biofuel has more water than the normal biodiesel but it will no problem for the boat.

2. Australia – Jessica Campion

Q	Is it possible to produce big mass pf biofuel?
A	Yes, we blend it not only biofuel only for the usage in transportation

3. Vietnam - Nguyen Vuong Thao Vy

Q	How long does it take to produce?
A	It took 5 years for the pump but the tree will last for 10-25 years

4. India – Zeba Zoariah Ahsan

Q	What is the example of a problem and what is the solution in implementing change in community?
A	Let's use the Fukushima Nuclear case. It's not natural disaster but disaster cause by human. The major problem of it is the evacuation. The government, the prime minster responsible to protecting the people. We even for long discussion, it still no settle. We have 3 layers of government, each responsible for each population. But unfortunately, some government worker need to evacuate from the city. To solve it, prime government ask global help from other countries. But, soon after they know the true condition, they move from japan. There are 14 embassies move outside Japan to stay safe. Even some countries stop import products from Japan. In Thailand, Japanese product was once prohibited due to the contamination. Also, the local community in the village doesn't want to be evacuated. They want to die at the village. The solution for this is work together, from the government, the society, and envy elements. Because this is big. Citizens should push more just so the government will act more instead of hiding.

Working Group Discussion I and Presentation

Company/Industry and Strategies
in the Area of Renewable Energy

Group Task

Making program and roadmap for 10 to 15 years in Renewable energy, for example biofuel, solar, wind etc. Give an explanation about the collaboration between university, industry, and community

GROUP 1: Solar PV Program

Solar energy are available everywhere and has a lot of application, commonly for solar PV and solar thermal. Solar thermal application won't work if we don't have a radiation, but solar PV can use everywhere on earth. Solar PV is an abundant energy, viable for both commercial and residential use. The price is more affordable to recent price cuts. The countries that lead to use solar PV are China (no. 1), Germany, and India. Germany build a solar PV everywhere. The stakeholder function: students in university will be received funding from industry, and community can influent one after another. The university people has a course about energy like the theory or technical to support it.



Group Discussion

GROUP 2: Geothermal > CCS > Biomass RE

Geothermal is the heath from earth. It is clean and sustainable. A breakthrough comes to CO₂ that can extract the geothermal energy higher than previous. CCS is Carbon Capture Storage. CCS is a process to capture CO₂ in atmosphere that comes from industrial waste and help to reduce the impact of fossil fuel used. By 2050, the combination of CCS and biomass has a potential to produce 10 GT of negatives CO₂ emission. Collaborations in Indonesia are creating an enabling policy and regulatory environment. Industry, university, and community make the policy together so it can brings to the decision and briefing the technical and financial viability gap. Working together will build awareness and capacity building for the community by inviting them to make the policy together.

GROUP 3: Wind Energy

Offshore is a good place for wind energy system that can produces much electricity there. India has much land to build the huge technology of wind energy there. On March 2018 the power capacity was 32.17 GW in India. The benefits of using wind energy are reduce energy, air pollution and green gases, but the problem is the cost. The solution to make the economically more viable are: economic modeling optimization cost, reduce weight, turbine and rotor design to minimize the hurricane and typhoon damage, and improving the wind performance model. Plans for wind energy among the stakeholders are:

- ❖ University has knowledge, technology and engineer that can gives a good things to community.
- ❖ Community has human research to reach the goals
- ❖ Industry funding the university
- ❖ Industry gives a cheap price of the power, power maintenance, and eco village tourism to community.
- ❖ Community pay the power to industry

GROUP IV: Rice Husk

Six hundred million tons rice produced per year, but there are still a problem in rural area that they don't have electricity and makes them hard to process the rice. For the strategic planning, this group suggest about the husk power system plans. Tactically, collaboration between industry, university and community is needed. Collaboration is focused on local university around the rural area. Industry funding the installation and the program, and community gain the spirit to achieve the goals together. Strategic plans in 15 years is to eradicate the energy poverty and provide sustainable energy resources.

- ❖ 5 year: get positive return on investment, establish capacity building for the local community, provide clean and renewable energy
- ❖ 10 years: upscaling the plant operation to serve the villager elect 70% in Indonesia, Bangladesh, and Pakistan
- ❖ 15 years: explore more opportunities with biofuel, and serve all of the SDGs in the areas of operation through partnership and collaborations

GROUP V: Solar Energy

Solar energy can be harnessed from the sun, and it's important cause a renewable energy and clean. The reasons why choosing solar energy are: largest source, low carbon emission, low maintenance cost, and easily to access by remote control. Right now, the price of installation solar power is decreasing while the installation is increasing. We need three ways of interaction between university, community, and industry. To achieve the goals, we need to understand the local context from the local community to build the capacity building, grit, and willing about the solar energy power.





Day Three

Thursday

14th September 2017

Climate Change: Agriculture and Food Security

08.00 - 10.00

Course 3

1. Sustainable Consumption and Production in Related to Food System
Dr. Zianida Fadeeva, UNU IAS
2. Traditional Knowledge and Endogenous Development: Biodiversity, Health and Nutrition
Dr. Unnikrishnan Payyappallimana, UNU IAS
3. Increasing Community Resilience by Optimizing Local Biodiversity to Support Food Security
Prof. Dr. Eni Harmayani, Universitas Gadjah Mada

10.00 - 12.00

Working Group Discussion II

Students will work with cases focusing on strategies in the area of Climate change, Agriculture and Food Security including Sustainable Consumption and Production

12.00 - 13.00

Lunch Break

13.00 - 15.00

Working Group Discussion II (continued)

Students will work with cases focusing on strategies in the area of Climate change, Agriculture and Food Security including Sustainable Consumption and Production – paper work

15.00 - 16.00

Working Group Discussion III

Student will be requested to prepare a debate dedicated to important issues related to forests, biodiversity conservation and natural resource management and approaches- preparation for next day

16.00 - end

Project Announcement

Poster and power point on good practices and experiences in managing and implementing the SDGs related to climate change



Course III

Session I

Increasing Community Resilience by Optimizing Local Biodiversity to Support Food Security

Prof. Dr. Eni Harmayani
Universitas Gadjah Mada

Material

Introduction

Yogyakarta special region, to beautify the nature.

- ❖ Universitas Gadjah Mada vision: Locally rooted wisdom to globally respect.
- ❖ UGM consist of 18 faculties, 1 post-graduation school, and 1 vocational school.
- ❖ Potential: Comprehensive solution: Health, Agro, socio humaniora, science & technology

Nature & health problem

- ❖ Poor diet: quantity, quality & variety
- ❖ Rapid lifestyle changing
- ❖ Neglect of traditional health food system
- ❖ Loss of traditional health food knowledge
- ❖ Increasing consumption of highly processed calorie rich

“You are what you eat”

Food plays an important role in life. Food consumption affect nutritional status and health of individual & community. It's important to improve awareness on the people on healthy lifestyle & sustainable food consumption in choosing food.

Health & biodiversity

- Eat habit connected to nature & availability food material.
- Biodiversity ifs founded for human health
- Health problem in south Asia: It's the 2nd highest prevalence & total number of children who are stunned, sated & underweight. Prevalence of non-communicable diseases is growing rapidly.
- Indonesia has high biodiversity traditional food has been a daily diet: Combined variety of natural ingredients & devoid any armful chemical in ingredients.

Sustainable food: SDG 2&3

- ❖ Good food should be produced, processed, traded and eaten in ways that:
 - contribute to thriving local economies & sustainable livelihoods
 - Protect the diversity
 - Provide social benefits
- ❖ Then let mankind look at his food (QS Abasa: 24) means that you should be thankful for the food.

Indonesia culinary

- ❖ Indonesia rich in local exotic food:
 - every region has its own unique local foods
 - The food based on local resources
 - categorized as ethnic food
 - rooted from the local culture
- ❖ Indonesia culinary divers from geography, landscape, diverse ethnic heritage, rich of history & culture.
- ❖ Indonesia fermented food: Fermented fish, fermented rice, fermented soybean, fermented milk, and fermented fruit

Global food system

- ❖ Currently global food system more uniform
- ❖ Most consumer utilize more animals than plants
- ❖ This trend risking the production distribution and availability of food as health

Problem & challenge of traditional food & food diversification

- ❖ Human health depends on diverse nutrient source
- ❖ Only 3 staples crops contribute 60% of all calories consumed
- ❖ 7000 species used UN agriculture throughout history
- ❖ Local food potency
 - made from local sources
 - processed through the local wisdom
 - contribute to lack acronym & sustainable food
- ❖ 99.9% food industry come from micro economical business

Food security

- ❖ Exist when all people have physical and economic access to sufficient, safe, and nutritious food for an active & healthy life.
 1. Availability: Assure food supply copied with the need
 2. distribution: Realize the effectiveness & efficient food
 3. Consumption: Directing to the efficient food utilization
- ❖ 3 pillars of food security: Food availability, foods distribution, food consumption.

The rice consumption is very high in Indonesia

- ❖ 1971: 105 kg/capital/year and 2004: 128 kg/capital/year
- ❖ Study on Under-utilized local tuber biodiversity and functional food (High nutrition & functional)

Agroforestry

- ❖ Local tuber naturally grows in the forest
- ❖ Developing local tubers, a source of staple and functional foods has many benefits in environmentally, social & economically
- ❖ It naturally grows in mixed forest
- ❖ The function also: Carbon storage and water regulator
- ❖ Local Indonesian tuber: Porang, gembili, arrow root
- ❖ Traditional local food can identify local wisdom. This improves human well-being in biodiversity.

Local food diversification strategy through:

- ❖ promotion of healthy local food
- ❖ incentive to industry which use local food
- ❖ develop program to support local food
- ❖ commitment from leader
- ❖ partnerships with stakeholder

Question and answer

None

Traditional Knowledge and Endogenous Development (Biodiversity, Health, and Nutrition)

Dr. Unnikrishnan Payyappallimana
UNU IAS

Material

The course talk about how to synchronize negotiation process between practice and policy.

Sequences:

- ❖ Climate and ecosystem transition
- ❖ Biodiversity health and nutrition
- ❖ Thematic Area
- ❖ Case Studies

Health and Sustainable Development

Health is both a resources as well as an outcome of sustainable development. In 1970, there was a *chart*: it talks about we need to going back to community, look at the practice and strength the community.

Health – Broadening perspective

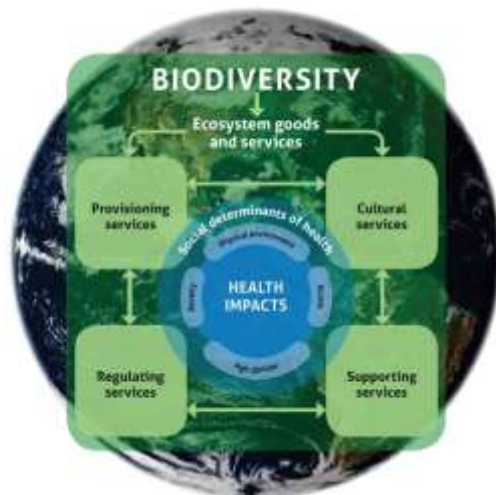
- ❖ Not only physically healing or curative care but also mosaic of resources mind body nature relation, nutrition, lifestyle practice and livelihoods
- ❖ Planetary health eco social health, one health (not only just human health, but also human health link to animal health, animal health link to human health, and environment health), global health, conservation health (IUCA, migration, food, etc.)

Climate and Ecosystem Transition

- ❖ Emerging evidence of climate change on the effects
- ❖ Formal climate adaptation program to many sectors
- ❖ Understanding nature society interaction of advance adaptation practice and policy for human health.

Global food system and nutrition

Today's facts: 2 billion people are suffering malnutrition and 1.45 billion people are overweight: 200 woman 200 men



Biodiversity health and nutrition

Human being are an integral, inseparable part of natural world and that our health depends ultimately on the health of its species on the natural

functioning of its ecosystem.

Strategic Plan

- 2010 living harmony with the nature
- 2050 biodiversity is valued, conserved, etc.

A complete linkage we can check in: www.cbd.int/en/health/stateofknowledge/HealthImpacts

Social challenges

Satoyama applied in these challenges. Satoyama talks about biodiversity, culture that integrated the living. It comes from Japan. Satoyama is observed to provide a “backyard” for rice paddies, to accommodate biodiversity hotspots, to act as a model of sustainable ecosystem management, and it represents Japan’s beautiful ancestral homeland

Sustaining Life

Sustaining life is how human health depends on biodiversity

Policy outcomes

Collaboration and partnership : help bridge the gap between science and policy

Level of utilization

Talks about the traditional knowledge

- Antibiotic reduction in livestock farming:** extra payment, quality, medicinal plants, strategic business, and improve animal and farm management
- Biodiversity and Community Health (BaCH) Initiative of UN University:** community-to-community dialogues.

SDG about the topic are

Goals number: 2, 3, 13, and 14

Question and Answer

1. Australia – Jenny Fitzgerald

Q	Using less antibiotic livestock will have impact on extra payment, how's the solution?
A	Reduce animal stand for longtime, will reduce productivity also an Eco-social farming.

2. India – Archita Razkumari

Q	In India, they do not have premium cow, how is the solution according to the nutrition of the milk?
A	We should know how to optimize resources and try to see.

Sustainable Consumption and Production in Related to Food System

(Food, Health, Biodiversity)

Dr. Zianida Fadeeva
UNU IAS

Material

Performance of various countries about SDGs

According to the SDGs map among country, it shows that the color of Red means significant, yellow means serious and green means doing well. Hunger and health got a significant problem almost in every countries. Australia, Germany is number 6, Denmark is number 2, Sweden is number 1, why they're best? The reason is their international trade and supply chain. They attempts to calculate the SDG, pay attention and have a huge program to reach the SDGs. Timor Leste has green in number 12/13 because it's not industrial yet.

Our challenges are 60% ecosystem damaged or used unsustainably, and 3°C of rising temperature by the end century due to doubling GHG emission by 2050, under BAU.



The Sustainable Development Goals (SDGs)



Global material consumption would nearly triple between 2008 and 2050 tons annually assuming that per capita consumption would globally average current OECD levels from 2030 onward. Price grow, and low class (poor country) will be suffering.

Cambodia economically poor country, the data shows that their bio capacity and ecological footprints same. Indonesia and Malaysia have an intersection that their bio capacity decrease and ecological footprints increase, but Laos has steady ecological footprints.

When discuss Sustainable Development and Consumption, decoupling economic development will increased natural resources consumption and aggravated by negative environmental impacts. Human well-being, economic activity (GDP), resource use are increase, but environmental impact is decreasing. Green economy; decoupling



natural resources and giving impact from economic growth.

Paradigm shifts

From natural environment, pollution to disperse to control to recycle to prevent. Natural resources: scarcity (run out the material) to replace to protect to recover to reduce. So, resources efficient and cleaner production. Sustainable Consumption and Production starts from environmental protection.

Sustainable Consumption and Production defined today as a holistic approach to minimizing the negative environmental impact of consumption.

A global mandate for Sustainable Consumption and Production: Goals in 2030 agenda and Sustainable Development Goals, also followed by the Issues from

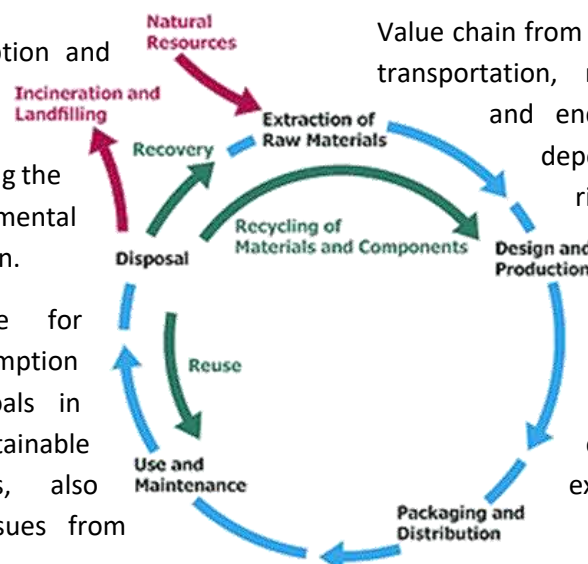
Agenda 21 RIO, Johannesburg Plan, Mataketch Process 2003, and JIPO 2002.

From the SDG mapping, shows that the interconnection, a small bubbles is targets and big bubbles is main aspects.

Life cycle and value chains

There are three main cycles: natural resources and environment, production (new technology), and recycling (3R and new material).

Value chain from WBCD: process raw material, transportation, manufacturing, distribution, and end use. It is not universal dependent of the product, human rights, government, and environment. There are so much problem in every aspects of the value chain, example: child labour, long working hour, corruption, contract bring, and social excursion.





Classroom

Question and Answer

Q How is the Asian Economic Country progress and the solution? Please explain about decoupling.

A The problem of the Asian Economic Country is the infrastructure. If they are not follow the rules, they will be locked about the infrastructure and economic.

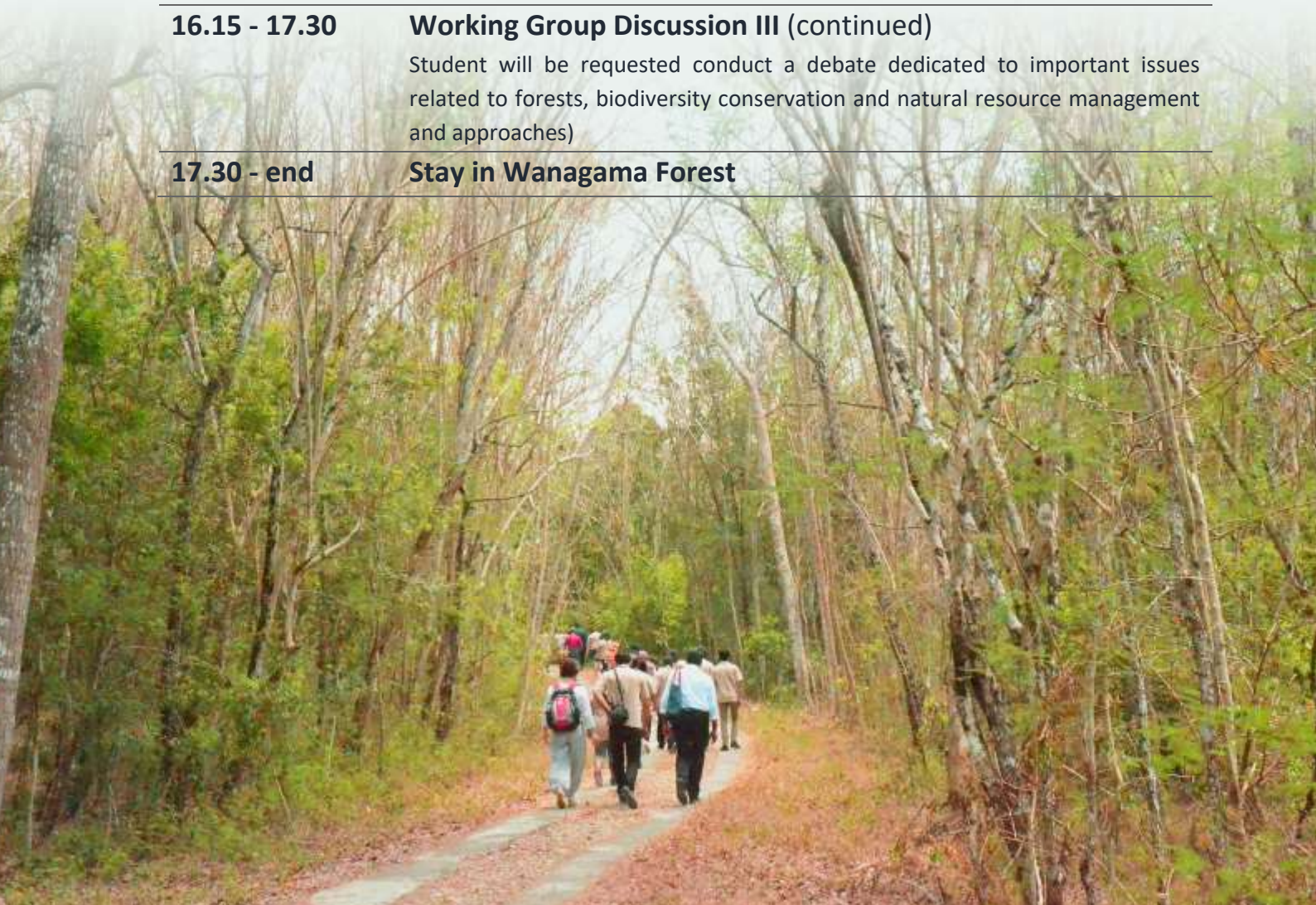
$$I \neq P$$
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Day Four

Friday
15th September 2017

Climate Change Impacts on Forests, Biodiversity
Conservation, and Natural Resource Management

07.30 - 09.00	Trip to Wanagama Forest
09.00 - 11.30	Field trip Students will be exposed to forest and its surrounding environment including tree planting
11.30 - 13.00	Lunch Break
13.00 - 16.00	Course 4 <ol style="list-style-type: none">1. Climate change impact on water resource Dr. M. Pramono Hadi, M.Sc, Universitas Gadjah Mada2. Community local adaptation and mitigation towards climate change Prof. Dr. Suratman, M.Sc, Universitas Gadjah Mada
16.00 - 16.15	Break
16.15 - 17.30	Working Group Discussion III (continued) Student will be requested conduct a debate dedicated to important issues related to forests, biodiversity conservation and natural resource management and approaches)
17.30 - end	Stay in Wanagama Forest



Course IV

Session I

Climate Change Impact on Water Resources

Dr. M. Pramono Hadi, M.Sc.
Universitas Gadjah Mada

Material

Situation now

- Global water crisis: Over 1 billion people don't have access to clean drinking water; more than 2 billion lack access to adequate sanitation, and millions die every year due to preventable water-related diseases.
- 5 million people (mainly children) die every year from preventable, water-related disease is surely one of the great tragedies of our time.
- Over 34 million people might perish in the next 20 years from water-related disease.
- Hundreds of billions of dollars are needed to bring safe water to everyone who needs it. The experts claim that privatization of water services is the only way to help the poor
- Solutions to the global water crisis that don't involve massive water dam or large scale of water storage.

Water resources

Water Resources planning & management is becoming an increasingly difficult task because:

- Conflicting demands
- Increasing population
- Rapid urbanization
- Projected climate change

Water and climate change

- Climate change will lead to more precipitation – but also more evaporation (in warm area)
- Precipitation will probably increase in some areas and decline in others
- Changing precipitation patterns will affect how much water can be captured (depend on the area)
- The drier the climate, the more sensitive is the local hydrology
- High latitude regions may see more run off due to greater precipitation (because of the condensation in the high latitude area)
- The effect on the tropical area is harder to predict
- Reservoirs and wells would be affected

- New patterns of runoff and evaporation will also affect natural ecosystem
- Rising seas could invade coastal freshwater supplies

Puncak Jaya

On 1984 in Papua, there was snow in 6000 m. But in July 2010 the snow is melting because the activity of mining. In August 2016, became worst because of the increasing of temperature.

Drivers of Change

Water resources stress: change in exposure (population demand for water), change in vulnerability (rivers flows: groundwater quality), and change in resources (wealth, equity access). Most of water are flowing to the sea during rain.

Measure of stress

- Indicator of exposure (number affected by flood/drought)
- Indicator Access (number with access to safe water)
- Indicator Availability (resources per capita)

Population density vs water scarcity

- The rank: Kalimantan, Sumatera, Papua, Sulawesi, Java and others.
- In Papua the population is estimated 3,600,000 people.
- Java has the greater population of 136,510,590 people. Population density of Java is the highest 1,078.22 people/km² and the lowest is Papua with 8.53 people/km².
- Indonesia has 2000 mm of annual rainfall, and Kalimantan has the highest potential water with 1,078,920 x 10⁶ m³, and the lowest is Java with 253,400 x 10⁶ m³.
- The potential per person (l/p/day) in java only 4,065.55 while Papua is 513,827.70.
- Water needs to support the life (based on research) is 1800-2000 l/p/day and effective of Run off is 80%.
- The percentage of potential of person in Java is 44.27% and in Papua is 0.35%.

Estimating the future

- Future impacts depend on future climate and future exposed population
- Simulate water availability using a macro scale hydrological model
- Construct climate change scenarios from global climate models
- Construct consistent scenarios for change in exposed population

Effects of Climate Policy

- Rescale changes in runoff to different global temperature changes
- Calculate water stress indicators for different temperature increases
- 2°C target (0.8°C above 1961-1990 mean by 2020; 1.2°C above 1961-1990 mean by 2050)



Group Discussion

What to look for specifically

- Percentage amount (will increase as global temperature rise, more rain over high-latitude land areas)
- Precipitation of frequency and intensity
- Evaporation and transpiration etc.

Question and Answer

None

Community Local Adaptation and Mitigation towards Climate Change

Prof. Dr. Suratman, M.Sc.
Universitas Gadjah Mada

Material

We do the action not only the theory. Our mission is to live together, work together, and plan together with the community. We should be closed to SDGs. We should happy and happy, smile and smile. Peace is our SDGs program. We should make peace and pride. Save our planet.

Aspect of climate change:

- ❖ Planet's climate change among geological time
- ❖ Increasing the atmospheric & land temperature
- ❖ Each day new greenhouse gas emission Further accelerated global warming

Impact of global climate change

- ❖ Disaster: Agriculture & food, biodiversity species
- ❖ Health: Water & energy, Air temperature & snow
- ❖ Environment: Uprising sea water level, Economy

Learning from paleo climate in Java (before century)

- ❖ Java was populated 5000 people
- ❖ Many tropical forest
- ❖ Highly biodiversity resources
- ❖ Average temperature (-6°C before present)
- ❖ Traditional agriculture living

Save our planet by staying healthy and happy.

Systemic sensitivity of atmosphere

- ❖ Temperature change
- ❖ Wind characteristic/anomaly
- ❖ Humidity & evaporation change
- ❖ Cloud density & distribution
- ❖ Sun radiation
- ❖ Rain intensity & distribution

Factor of climate degradation

- ❖ Increasing population in our planet
- ❖ Decreasing vegetation cover/forest
- ❖ Natural resources exploitation/land use change
- ❖ Industry & transportation
- ❖ Life style
- ❖ City & development

Global crisis (Nagoya meeting)

Water – food – energy – health – climate change

Nagoya declaration ESD for sustainable development 2014

- ❖ Education for all
- ❖ Transdisciplinary education for global humanity purpose

Aspects of cc mitigation

- ❖ Limit the magnitude or Rate of long term climate change
- ❖ Refers to cutting and prevent emission of greenhouse
- ❖ To use new and green technology and change people's behavior

Create local community action

- Transferring SD's program directly
- Planning program community & stakeholders
- Community working group & action.

Rural community movement program

Green village – healthy village – resilient – smart

Best practices local community action

- Local community movement:
 - River community movement
 - River school movement
 - Women river movement
 - Student goes to river movement
- Declaration of river restoration, river community action, river school,
- Indonesia river restoration movement: 44 Whatsapp Group, 200 communities, 25 river school
- UGM develop local community empowerment: Create, support, develop, and communication



Wanagama Forest

Question and Answer

1. Australia – Jenny Fitzgerald

Q How to make the community join the project?

A It's easy, because the Hinduism is very concern in nature. Many NGO and hotels active in prevention. And you must remember to always finish your food and drinking all your water because it's come from nature and don't waste it. Farmer work hard for it. I wish this community movement is happening in your country.

2. Indonesia – Dewi Wulansari

Q What about other country with individualistic people, how to encourage them?

A The answer is education. By education, we change the behavior. Educate people will serve our planet. What about the material? In Indonesia, we start in Jogjakarta and separate along the nation. We can motivate them. We have different culture, religion, and economy but we manage to motivate them.

Session III

Debate Session about Important Issues Related to Forests, Biodiversity Conservation, and Natural Resource Management & Approaches

Debate Session

Team 1: Ecosystem service principles are the most critical for framing sustainable development trajectory

Team 2: Resource efficiency is most critical for sustainable development

T2	How do you value ecosystem trust worthy?
T1	There is monitoring evaluation with stakeholders by scientific approach in every aspects within the system.
T2	How do you manage the concept of individual belonging feel about nature rather than belonging to everyone?
T1	For example, in California, if you have neighbor and your neighbor didn't do energy efficient, you can tell the government because there is the policy about that and they might move to other part of the country. It's important to implement this in our society to remind each other about reducing on energy consumption
T1	What is the challenge the efficient of the resource?
T2	When microscale industry do the resource efficient, they expect incentive from the government so they will motivate. And also, other company will follow knowing the benefits of it, but the biggest challenge is when they're not motivated to do the efficiency
T1	Is it applicable?
T2	It is measurable and comparable. So we can apply it to industry and other sectors. We can measure the water intensity, energy intensity, even the land intensity. And it's applicable to almost all of the kind of industry.

Conclusion

T1	Government should have specific company to manage the amount of the ecosystem and encourage the community & company to maintain the resources and provide by the government. For example, the forest that we are now can be ecosystem efficiency because we can manage the resources as well as get the profit from the tourism. By doing energy efficient, many aspect receive the benefits.
T2	Resources efficiency must be recognized as important target in science, technological and social. We should promote the sustainable environment. Doesn't matter what approach to the SDGs, we should giving support to it.

Team III: For realization of SDGs, bottom-up initiatives will play the major role on the road to more sustainable development

Team IV: For realization of SDGs, global & national governance framework will play the major role on the road to more sustainable development

T3	Bottom up approach highlight the micro industry and local community to initiate the sustainable development to overcome poverty, securing resource, and etc.
T4	Framework acts as standard for every sector and community to do the sustainable development. It have major role because it took analysis for both majority and minority and everyone will aware of the importance of sustainable development.
T4	How to interconnect to the social and other aspects because you highlight the local community?
T3	Every local community set thir own goal so it would be easier to connect each community. For example we do it via univeristy and expert. This approach is achieveable but it takes time.
T4	What about the power of government?
T3	Power is important, but to make long-term sustainable development, education is more important.
T4	How important of changing the behavior?
T3	Behavior very important to change. In the process in community service, we evaluate the lack of problem, educate them and give effective way to them is the core to bottom up them
T3	How do you answer practice and adaptable to community while community has many level, cause global sometimes doesn't know the problem
T4	Education is important. Measure it and compare it.
T3	We know that top down regulation is beneficial in health complain, but people don't know what is the important the policy benefit. How to ensure the community?
T4	No policy will work to everybody
T3	Everybody needs but not everybody agree.
T4	Local is necessary but global is needed. Without global we can't reach and connecting each other cause outside is very complexity. Funding financial is very important to support community to reach the SDGs. To be stabled we need to connect each other between local community and policy maker.

Conclusion

Education is important, but government has big power. Participation mechanism is important to told to that woman and child have the same role along the man to reach the SDGs. Knowledge system: critical thinking and synchronize system.



Day Five

Saturday

16th September 2017

Cultural and Eco-Camp

07.30 - 11.00	Students will be exposed to transformative learning in strategies dealing with sustainable consumption and production Prof. Dr. Purnama Darmaji and Prof. Ir. Irfan D. Prijambada, M.Eng., PhD, Universitas Gadjah Mada
11.00 - 11.30	Trip to Nglanggeran
11.30 - 15.00	Geopark, Gunung Sewu, Nglanggeran
15.00 - 17.00	Trip to Pentingsari
17.00 - 19.00	Pentingsari Village Doto Yogantoro (Dewi Peri Management, Community Leader)
19.00 - end	Stay in Pentingsari Village



Transformative Learning in Strategies Dealing with Sustainable Consumption and Production

Prof. Dr. Purnama Darmaji and Prof. Ir. Irfan D. Prijambada, M.Eng., PhD
Universitas Gadjah Mada

The cacao field and factory was established in 1989, but it was exist in 2004. 10 years was needed to make the community believed and knew how to utilize the field. In 2015 Universitas Gadjah Mada taught how to manage the cacao field became a chocolate bar. Unfortunately, the cacao bean price was very low because of the bean did not fermented well that made no flavor. To ferment the cacao been, it needs 1 tons but it was a social problem cause the community only had 2 kilograms of cacao. So, Universitas Gadjah Mada helped the community to develop the technology.

The plantation

It needs 4 years to grow after the seeding and the years for grafting. After that, we can cutting the fruits and harvesting. To manage the leaves that left behind, we need to put all into the hole as an organic waste. In the plantation, there are two types of cacao fruit: green and red, but green is the original one. Besides that, the diversity of the cacao types are planted in the field to keep the diversity that come from Papua, Sulawesi, Java, and Sumatera. Dragonfly is used for the pollination. For the grafting technique, we can cut the crown of the young leaves and put it in to the main stem until the cambium touch the stem. Then, we can tie it and waiting for 2 years until it's fruity as well.

Cacao never stop harvesting and it only needs 6 months to harvesting. In this area, they have peak season for harvesting in December until May.

Fermentation

The fermentation did in the box. After two days in the box, it will be fermented by alcohol that has glucose from *saccharomyces cerevisiae*. Next, it will become an acid fermentation for 6 days. If the bean is too acid and aerobic, it will turned black. If the bean is too much alcoholic, it will become flat and purple also both of the flavor is not taste bitter. In the field, the farmer using big box for the peak season and small box for the stagnant season. The bean that we're looking for is the black and flavored one.

Factory

The community around the plantation manage the bean that has been selected into a chocolate bar. Many equipment are used to grind the bean, cook, mold and package. Less than 10 people obtain the factory and the store. The store only stand in the same house of the factory, and it makes them only sell it door to door or they only have a consumer if there is a visitation to the plantation.

Trip to Nglanggeran and Pentingsari Village

Students are given free time to enjoy the beauty of ancient volcanoes and embung (reservoir) Nglanggeran. Continued with trip to Pentingsari Tourism Village located in the district of Cangkringan, Sleman regency. Students are warmly welcomed by the villagers. They held kenduri (welcome party) to pray for all activities to be carried out. Dinner was served with accompaniment of Javanese traditional music, Gamelan. Students stay in villager's house which have organized into homestay.



Nglanggeran



Pentingsari



23 APRIL 10.30 WIB
• Persembahan
• Persembahan Ronggong Maranggol
24 APRIL 19.30 WIB
• Persembahan
• Persembahan Ronggong Maranggol
25 APRIL 19.30 WIB
• Persembahan
• Persembahan Ronggong Maranggol
26 APRIL
• Galang Padi 09.00 - 15.00 WIB
• Persembahan Ronggong Maranggol 19.30 WIB
27 APRIL 09.00 WIB
• Khas: Tarian Lirisan Maranggol dan
kesenian Cagayogan Maranggol



**Day
Six**

Sunday

17th September 2017

Merapi Volcano Adventure and Eco Tour

07.30 - 09.00	Merapi Volcano Adventure
09.00 - 02.00	Pentingsari Village EcoTour
12.00 - 13.00	Lunch
13.00 - end	Back to Hotel





The day begins with a lava tour. In lava tour students were shown what's remains from the eruptions of Mount Merapi in 2010. The first stop is Museum Sisa Hartaku. The museum contains left items after the eruption. This mini museum has a fairly complete collection. From melting bottles, documents, melted household appliances, vehicles, and animal bones. There is also a wall clock which stopped right at the time of eruption. The next stop is Batu Alihan that resembles a human face, and Kaliadem bunker.





Day Seven

Monday
18th September 2017

Climate Change and Disaster Risk Reduction

08.00 - 11.00

Course 5

1. Building The Integrated Watershed Management of Sensitive Volcanic Hazard Area Through Micro Catchment Model (MCM)
Dr. Ir. Ambar Kusumandari M.E.S, Universitas Gadjah Mada
2. Building Resilient Future for Rural Areas - Educational Practices and Challenges The Case of landscape Planning and Design Study
Dr. Danai Thaitakoo, Chulalongkorn University
3. Applying Science and Technology to DRR Decision-Making
Dr. Wahyu Wilopo, ST., M.Eng Universitas Gadjah Mada

11.00 - 12.00

Case Building IV

Student will be exposed to several cases related to disaster in several countries and design strategies and approaches to DRR

12.00 - 13.00

Lunch Break

13.00 - 16.00

Case Building IV (continued)



Course V

Session I

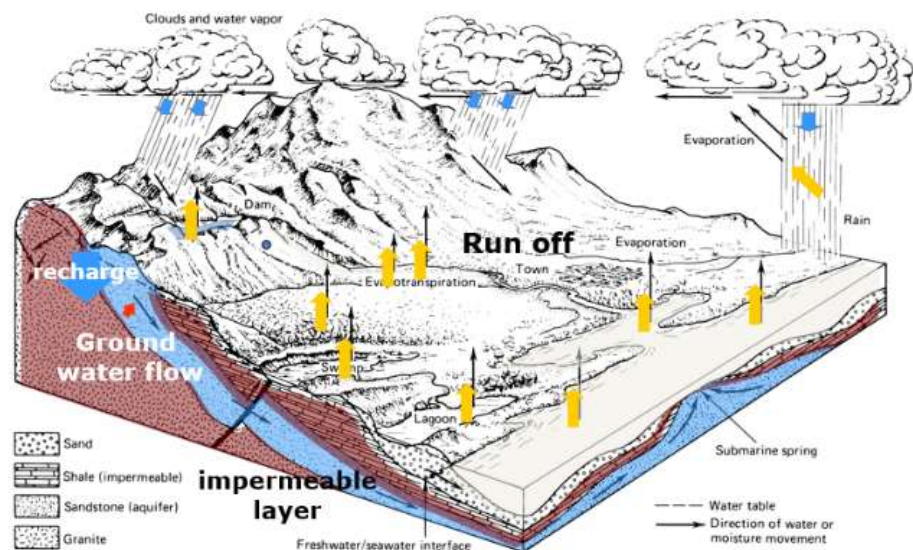
Building the Integrated Watershed Management of Sensitive Volcanic Hazard Area through Micro Catchment Model (MCM)

Dr. Ir. Ambar Kusumandari M.E.Sc.
Universitas Gadjah Mada

Material

Hydrological Cycle

- Rainfall is the source of water. After the rainfall, it's directly going to soil, then to the ground water. Some participant: to permeable stone, vegetation, stem flow to infiltration. The water that doesn't filtered in soil is called runoff.
- Factor in filtration: texture, soil structure, porosity, chemical condition of soil, organic matter contains. In some area the water that filtered can goes up to up area: called spring water.
- Spring water is a water that saved in soil and goes up. When the water is not filtered into soil. Forest area and non-forested area are different because in no-forested area, a bare land, there's no interception, no stem flow.
- The vegetation has a lot in conserving the water because especially through the interception process. The very good



Hydrological Cycle

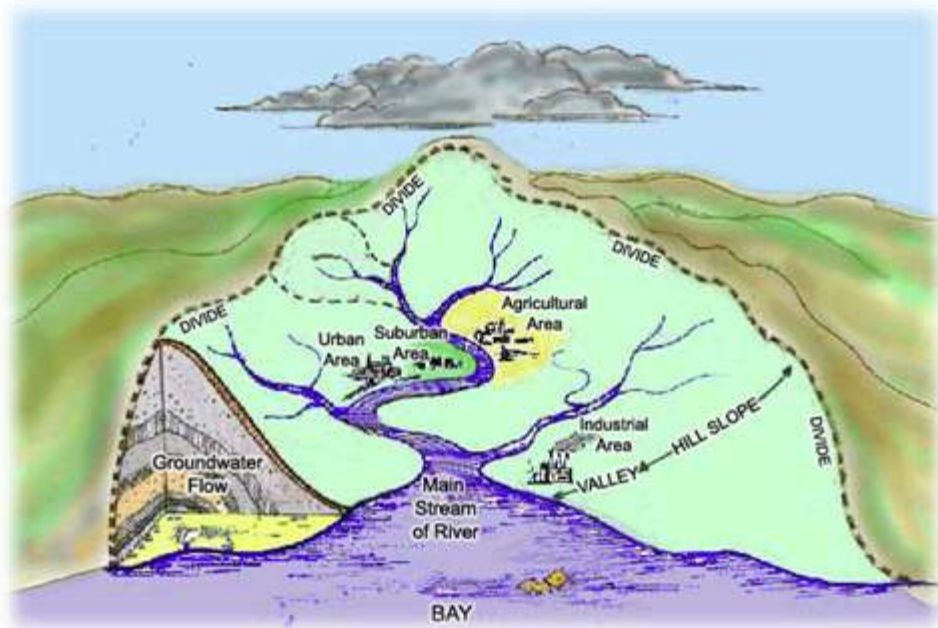
forest can intercept around 25% of the rain water.

- Forest is an important role in hydrological cycle, and furthermore in water conservation.

Watershed

Watershed can be defined as a geo-hydrological unit that drains to a common point by a system drain. All lands on earth are part of watershed

or another. What is the boundary of watershed? A natural boundary is boundary of watershed. In Europe, around 3-5 countries covered by watershed boundary. The watershed, catchment, basin, drainage area, are synonymous are depend on the area. Basin is very big watershed. The terms micro, mini, sub-watershed or any other variation of the terms indicate hierarchical division of the watershed of a stream, river or a drainage line. In Indonesia, a watershed divides by area. Several sub watersheds, several sub watersheds can be divided to sub watershed or we called it catchment.



Water Sheed

Mount Merapi

Forest in Mt. Merapi was established as protected areas since the year at 1931 in other to conserve the water resources, river, and as a buffer of the living area of Yogyakarta city and Selman, Klaten, Boyolali and Magelang regencies. Mount Merapi is a volcanic, and return of period eruption (average): 2-5 years (short period) and 5-7 years (middle period). The eruption impact on biophysics, social, culture, and economic.

Indicators of Ideal Catchment

1. The zonation is suitable with its function
2. The quality and quantity of the water yield is sustained
3. The soil erosion rate can be controlled
4. Reduce the natural hazard level
5. Land productivity and capacity are well managed to support the social and economics of the society in watershed.

Criteria of Micro Catchment Model in Sleman

- Biophysics
 1. Status: watershed priority of BP DAS SOP
 2. The geology condition is not karst with an area of 1000 s/d 5000 ha. In Karst area we don't understand, the rainfall went down to the crack of the karst then going to the river that deep inside of the earth. Karst comes from the process of uplift of bottom of the sea, but volcanic area comes from the process of the eruption. We can identify by the color, structure, and in Karst area we can find a seashell and the structure is very "ashy". In volcanic area contained fine soil and more silk.
 3. Consists of critical land
 4. It has agricultural land, forest, and settlement
 5. It has a good accessibility
- Main Issues
 - Restoration and rehabilitation of Sensitive volcanic hazard area of Mount Merapi
- Supported by local government and society

MCM

The MCM sample is taken in 3 areas: Boyong, Bedog, and Opak.

- DTA Opak
 1. In May 2006 full of forest
 2. In Sept 2013 all the forest is gone cause of eruption
 3. In 2016, the natural succession makes the area has forest again
- DTA Boyong

The Boyong sample data showed the differences, the result is quite smooth between the upper and lower are
- DTA Bedog
 1. Upland of Bedog MC is far from top of mountain (5km)
 2. The direct impact of the eruption is relatively small

Question and Answer

None

Building Resilient Future for Rural Areas

Educational Practices and Challenges the Case of Landscape Planning and Design Study

Dr. Danai Thaitakoo
Chulalongkorn University

Material

Research

Science: Projection-Model-Understanding

Planning

Design: Understanding-Projection-Model

- Landscape: the context in which biological, the cultural, biophysical all interact and unfold into flush manifestation of life and growth.
- Resilience: The green to which system is capable of self-organization. The ability to build by self
- Landscape dynamic, resilience and adaptation

“Adaptive capacity of a socio-ecological system is its ability to experience, shocks, and novel input and still remain in each domain of attraction”

Case study

Small water and small rice field should maintain big community. But then they manage the water to put a pond and stream then it irrigates the whole community. The landscape is divided into rice field, pond, and after irrigation as man modified landscape. The bamboo help to make a structure to divide each pond of water also for bridge structure and using wood to flow water.

The case study is about action in community. They went to the villages 3 times just to discuss about the landscape development before they get into the action using local materials. The dry landscape slightly become rice farming, village, food hill, and river valley.

On man modified landscape it's important to also educate the local villagers and for social organization to maintain the landscape of the ecosystem change. The landscape is the system to support the life of the villagers and the proof of evolution of human & nature. Along the year there are different type of food that can be plant and how the water will flow to village.

Lesson learned towards resilient communities and ecosystem

- Comprehending the landscape as an ecosystem
- Localized strategies must be deployed on the ground
- Revaluation of the landscape
- Cultural production
- Careful reexamination



Classroom

- A bottom up approach
- Recognizing patchy rather than centralized urban development
- Physical connection provides feedback loops between farmer, consumer and policy makers
- It's not just an engineering solution toward sustainability

Question and Answer

None

Applying Science and Technology to DRR Decision-Making

Dr. Wahyu Wilopo, ST., M Eng
Universitas Gadjah Mada

Material

Introduction

Natural catastrophes worldwide 1980 to 2011 keep increasing. And mostly ASEAN country has the highest natural disaster number. Comparing to the past, it increase both in economic damage and time trend. We want to reduce the impact because we cannot reduce the natural disaster. The Sendai Framework for disaster risk reduction

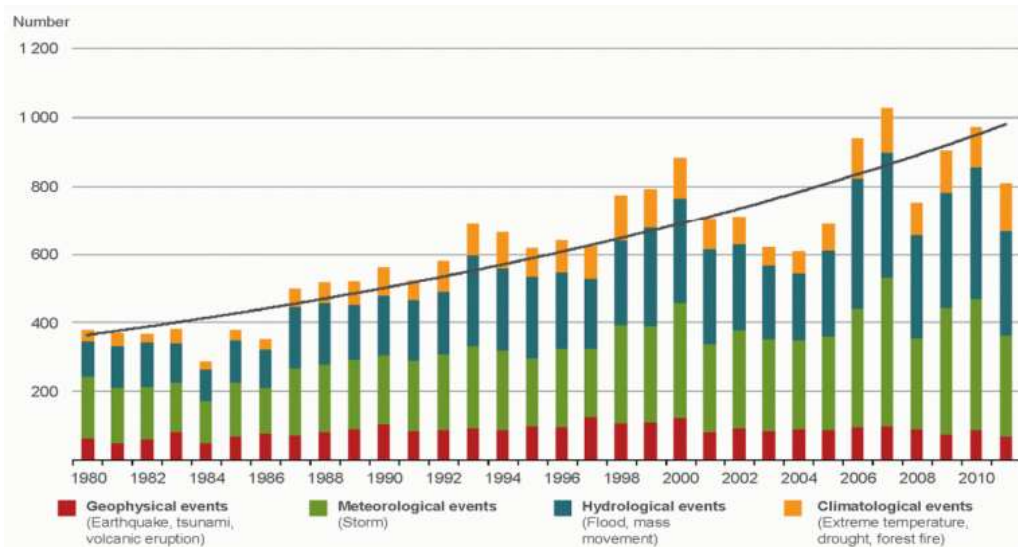
1. Reduce global disaster mortality
2. Reduce number of affected people
3. Reduce direct disaster economic loss
4. Reduce Disaster damage to critical infrastructure
5. Increase number of countries with DRR strategies
6. Enhance international cooperation to developing countries through adequate and sustainable
7. Increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to the people

Mission to achieve:

1. Understand disaster risk
2. Strengthen disaster risk governance
3. Invest in risk reduction
4. Enhance disease preparedness for collective response and to “build back better” in recovery, rehabilitation, and reconstruction.

Level of relative engagement of science & technology in Sendai Framework area

1. Understanding disaster risk (assessment, data, baseline, capacity)
2. Strengthen disaster risk governance (Standards, certification, capacity building)
3. Investing in DRR (innovative product with private sector)



Source: www.disaster.zone

4. Enhancing disaster preparedness (guidance, instruments)

Strategy of science technology academia advisory group for Asia

1. Enhance and strengthen communication of science technology academic communication in terms of disaster risk reduction
2. Assist the governments for science-based decision aiming of implement SFDRR
3. Enchain the networking for better utilization and higher education.

Application of DRR decision making

1. Development of safe zone from disaster (land use planning)
2. If not possible: structure mitigation, early warning system, increasing awareness, increasing capacity of community

Disaster management cycle

1. Hazard event: Hazard severity probability, vulnerability, root causes, social process, unsafe conditions
2. Response: Resource & evacuation, relief and external support
3. Recovery: Long-term recovery, internal and reconstruction process
4. Prevention/ mitigation: Ongoing process to lessen the severity of Hazard on people/ property
5. preparation: Actions prior to event to activate necessary resource

Virtuous spiral of risk reduction Case study: Yogyakarta area

- ❖ We made disaster mapping to find the source of earth quake. We also made early warning system. The practice is using knowledge and the implication into disaster risk management.
- ❖ Liking in harmony with disasters (structural mitigation): Barrier, gravity retaining wall work, learning wall work, catch wall work, anchor work, cast-in-place concrete work
- ❖ Blue line tsunami and road sign: increasing awareness in Sulawesi. The sign is also telling you how many minutes did you take to walk or run to save yourself. From the beginning blue line, it took 30 minutes' walk to be safe. The sign is to guide the local people to safe place.
- ❖ Landslide poster: increasing awareness. It shows warnings. There also the calendar of higher risk of the landslide.
- ❖ Criteria Technology for DRR:
 1. Suitable with existing infrastructure and resources
 2. Low cost and simple
 3. Easy maintenance
 4. Considering a local wisdom
 5. Community base

Component of disaster risk in Urban Setting

- ❖ Informant settlements with high exposure and vulnerability to flood (Floodplain)
- ❖ School building exposed to earthquakes (Fault line)
- ❖ Building exposed to landslides (Steep slope)

Increasing Risk Due to development

Growing city (future) must be far from volcano, not near to volcano.

Regional Assessment

1. Rainfall
2. Sub-catchment hydrology
3. Susceptibility to landslide
4. Nature of Debris
5. Basin Hydrology
6. Travel path
7. Consequence

Background LEWS in Indonesia

1. It's difficult to relocate community living in landslide vulnerable area
2. Warning system which mainly emphasize
3. Improve community
4. Integration between human and technology

15 million people stay in vulnerable area. We need to build a EWS. The basic concepts are:

1. Integration between technical and social system
2. Sustainable Guarantee: community empowerment, commitment
3. Sustainable Innovation.

Example in Padang, Sumatera

- ❖ Signal movement. During the rainfall, the signal is not strong. If the movement is rapid, the action is to evacuate all of people.
- ❖ Landslide different with Tsunami. Tsunami has a good warning, and landslide we hardly to warning also for volcano eruption. The sensor placed in the side of landslide symptom, and the receiver in landslide area (the settlement).

EWS is only tool, the important thing is to build awareness to community.

Question and Answer

1. India - Pallas Chandel

Q Is the technology match the community?

A Community become safe, the technology is simple because doesn't have maintenance too much and only need to change the battery. The life time is 2-5 years.

Day Eight

Tuesday

19th September 2017

Climate Change: Community Resilience

08.30 - 12.00

Course 6

1. Education and Knowledge in Building a Culture of Resilience
Dr. Djati Mardiatno, Disaster Studies Centre, Universitas Gadjah Mada
2. Ecosystems Management & Resilience
Dr. Danai Thaitakoo, Chulalongkorn University
3. Interaction of Human Activities and Hydrometeorology System around Indonesia
Assoc. Prof. Osamu Kozan, CSEAS, Kyoto University

12.00 - 13.00

Lunch Break

13.00 - 15.00

Presentation on Good Practices in Response to Climate Change in Regional or Country of Origin

15.00 - 15.30

Afternoon Break

15.30 - 16.00

Closing (Certificate Awarding)



Course VI

Session I

Education and Knowledge in Building Culture of Resilience

Dr. Sandy Budi Wibowo, M.Sc.,
Disaster Studies Centre, Universitas Gadjah Mada

Material

Basic Concept of Risk

Basic concept of Hazard, Risk and Vulnerability (belong to Risk), it different for every country. Example: Peru and India floods (Peru, India); forest fire (Australia).

The definition of resilience depends on the context toward what kind of resilience that you direct to. For examples: In India, when the governments are dictator, people try to be resilient of being tortured.

Resilience of a Researcher: Education, Knowledge, Experience, Technology and Mentality. Delivering about community resilience: Public awareness, knowledge (observing risk identification and preparedness of community; understanding strong points and vulnerabilities; share among residents; going to discuss how to manage), and education. Delivering about a map of geographical information system. Delivering on socialization on community disaster preparedness, related to hazards; showing on the importance of evacuation sign board and meeting point.

Hazard is potentially damaging events; vulnerability is conditions increasing the susceptibility to the impacts of hazards. Risk is probability of loss. And disaster is serious disruption of a community due to hazardous events.

Resilience

Resilience is related to the ability of a community to recover from shocks and to positively adapt themselves in order to overcome long-term hazards. He shows that when the *resilience* mark going up, then *vulnerability* mark going down. The resilience is not for the survivor only, but also for the researcher as well. How come any researcher report their research, while they are not able to rescue themselves? That is why, it is necessary to have such resilience capacity for the researcher. Several elements, that they need are education (class, literature); knowledge (fieldwork); experience (time); technology (telemetered seismometer, geophone, satellite image, video camera) and mentality (patience, determination). That is working with the community, whereas they have several ways, that little bit

different with the researcher does, such as belonging of public awareness and knowledge; information management; education and training; culture, attitude and motivation; and learning and research.

Knowledge

Knowledge is the one, that is exactly important to consider. In the case of resilience of the community, where located in Kotagede, it aims to observe preparedness behavior of the community through participatory method. As he experienced before, the output are HVR PGIS Mapping and Participatory Evacuation Mapping. So, on the event, they have several activities, which direct to share necessary knowledge. There are two things, which they want to introduce, like understanding strong points and vulnerabilities of community (physical and social), while the community have shared common understanding about element at risk and vulnerable groups as well as share among residents, which means they obviously have very strong commitment among neighboring groups to be informed about particular activities, related to disaster. What about Participatory Evaluation Mapping, that we have discussed above? There are two kind of things, that divided into smaller elements, such as Evacuation Route Identification and Meeting Points Identification. The first one consists of efficient routes and community routes, while the second are Fire Extinguisher distribution and Available Points.

After that, he emphasizes about the explanatory map of an area, where the potential disaster happen. For example, he

examples Desa Candirejo, which has several disaster within, like heavy landslide, landslide, cold lava – Merapi, and Erosion at Progo River. He highlights on the map of where settlement, irrigation water ricefield, dry land farming and plantation/garden are located.

Education

Education is another aspect, of which we do not definitely ignore. He sets a figure of tsunami and earthquake happening and see what the local residents response about. More specifically, they can direct us to see about certain program, organized by them to deliver such knowledge about disaster preparedness. As we can see on the pictures, there is some socialization program on community disaster preparedness, related to hazards at Candirejo Village. The residents were quite enthusiast about what important knowledge they are going to acquire. They are so curious about what they ought to do, when the disaster come. It is not enough to give them any theoretical purpose. So, they introduce such Installing Evacuation Map and Fire Extinguisher at area, where the residents publicly access. Setting off Evacuation Signboard and Meeting Point are also important tough. At last, he shows the education from scientific point of view, that coupling between Video and Seismic Data Analysis for the Study of Lahar Dynamics at Merapi Volcano, Indonesia. Certain measurement is used to know the dynamic of lahar erosion monthly, in order to know whether something has altered or not, in accordance upcoming disaster might come.

Lahar Modelling

In this case, there are few videos, of which ready to be played. But, all of them are about the current of lahar flow. It is explained the change of its volume, from 0, 500.000, 750.000, 1.000.000, until 1.500.000 m³. Each volume shows a high number of lahar debris loaded. As we see together, the biggest one is almost loading

the body of the river. Several important lessons learnt are as follow

- a. Literature has to be completed by fieldwork in specific site;
- b. Researchers deal with real hazards in motion
- c. With this insights in mind, careful field analysis may find evidence to successfully interpret the hazards.

Question and Answer

None

Ecosystem Management and Resilience

A Landscape Approach

Dr. Danai Thaitakoo,
Chulangkorn University, Thailand

Material

Introduction

First of all, he demonstrates the physiography of Rice Land in the Chao Phraya Basin of Thailand. It is considerable landscape, naturally happen. Even so, it changes gradually. Then, there is also hydrographical subregions of the Delta, as well as period of Inundation, maximum depth of inundation, date of the maximum inundation, drainability, and the plant height of rice in delta: a case study in the chao phraya delta of Thailand.

Landscape Hydro-Ecological Infrastructure

Landscape and people evolved together. And, there is unique phenomenon by the change of rice cultivation with indispensable water into a rice-economy. That is why there is some alteration upon the landscape created. Consequently, there is also something we need to change, in the sense of produce food, particularly rice. The rice economy was significantly influenced by water availability, thus traditional water management, was in place for distribution of water and flood control at a small scale in according to hydrological and

topographical characteristics with unique local social organization. He quotes Takaya of “the center of the geographical living space”. It tells that the capability of the landscape to provide functions or potentials for human inhabitation and exploitation, such as the capacity to produce foods and resources, the capacity to build human’s habitat and places, a self-regulated environment, based on the resilience of the landscape’s ecosystem and the capability to link with aesthetic, scientific, cultural and other interest of human kind. There are three main services, provided by the environment to serve the human kind, which are provisioning services (products obtained from ecosystems: food, fresh water, fuel wood, fiber, bio-chemicals, and genetic resources); regulating services (benefits obtained from regulation of ecosystem processes: climate regulation, disease regulation, water regulation, water purification, and pollination), and cultural services (nonmaterial benefits obtained from ecosystems: spiritual and religious, recreation and ecotourism, aesthetic, inspirational, educational, sense of place and cultural heritage).

Question and Answer

None

Interaction of Human Activities and Hydrometeorology System around Indonesia

Assoc. Prof. Ozamu Kozan,
Center for Southeast Asian Studies (CSEAS)
Kyoto University, Japan

Material

Introduction

In this case, Mr. Ozamu Kozan wants to deliver about the interaction of human activities and hydrometeorology system around Indonesia by taking special case in Sumatera area. At the beginning, he wants to explain about certain case of burning and haze tragedy, happening in Sumatera, of which become huge phenomenon across the south east Asian countries, especially Malaysia, Brunei Darussalam, and Singapore. He demonstrates how the firefighters are trying to cure the burning by carrying over needed equipment. The huge intensity of the burning happens, make president Joko Widodo came and inspect what really happens there.

Furthermore, he also explains about the capability of Drone/SUAV in identifying hotspot amongst the area, which based on “thermographic camera image” and fly on the peat land”. By utilizing those tools, guarantee the identification process of disaster would be known in more accurate way.

Contents

There are several point of today’s contents, such as

- Hydrology: What is it?
- Land-Atmosphere-Ocean Interaction (LAOI)
- Sources of Hydrologic Change
- Role of large-scale vegetation and land use on water cycle and climate in monsoon Asia
- Human Activity Impact in Indonesia

What do we really mean on hydrology? In this way, he demonstrates certain concept, such as hydrologic cycle, which means circulation of water in the environment. Besides that, hydrology examines the relationships of geologic materials and flowing water. So, as we can see from the picture, that water circulates from one spot to another spot.

At the beginning, water flows from the mountain up to the stream of rivers. Some of them are being flowed to be runoff, while some are absorbing into the ground. After that, they go to the sea. While at the same time, it is precipitated over ocean and evaporated from the leaves. They would be watered cloudy. And, when it is blow up by the wind, it becomes raindrop.

To understand the relationship between climate and hydrology, we can see to the picture, that presents atmosphere, ocean, vegetation and human activities interactions. Shortly, human influence certain way of water to be cycled any time. Human interactions influence on how the mountain, river flow, forest, and ocean may change their feature, in accordance to their contribution toward the climate. When human try to enlarge the high intensity of raindrop, it would affect toward what such season could be wet enough or over-wet. For instance, the human can affect what such season look like.

Moreover, he compares the climate of Indonesia and Japan, as Japan has four season and the other has two season only. Tropics is a source region of heat for ocean and atmospheric circulation. Global Circulation

Energy from the Sun heats the entire Earth; however this heat is unevenly distributed across the Earth's surface. Equatorial and tropical regions receive far more energy than the mid latitudes and the Polar Regions. It should be noted that daily rotation makes the three circulating cells, which are Hadley, Ferrel, and Polar. Westerlies in temperate zone is also interesting to know about. Westerlies (Strong East Wind in temperate zone) keeps three cells. Most of developed countries are located on the westerlies area. Westerlies carries high/low pressures which brings clear/rainy weather. Weather forecast technologies are developed in this zone.

As additional, he also explains "planetological" Monsoon. It is explained by "Terrestrial" Monsoon, "Monsoon-driven Seasonal Ocean Current", and Monsoon Circulation. It is important to know about TRMM/PR monthly precipitation. He also really concern on El-Nino Southern Oscillation (ENSO). Several short summary, that we may know as follow.

- The monsoon is manifested as an atmospheric circulation system of land-atmosphere-ocean interaction (LAOI) between continents and oceans in the seasonal cycle.
- The ocean has a large heat content with longer climate memory of more than a year (e.g El Nino, La Nina)
- The land has a small heat content and its climate memory is believed to be short (of less than a season)
- However, the land shows strong and rapid heating (and cooling) in the seasonal cycle which in turn has a large impact on seasonal atmospheric heating (and cooling) processes.
- The land surface processes are affected by land use and human activity.

I. Sources of Hydrologic Change

- Climate Variability
- Climate Change
- Human Modifications in the River Basin
 - Dams and diversions
 - Aquifer Pumping and Compaction
 - Land Use changes
 - Drainage of wetlands
 - Consumption
 - Channel Modifications

○ *Feedbacks to Regional Climate*

Main points:

- Hydrologic change may be more important/interesting than climate change – both as a line of scientific inquiry and as an avenue for societal response
- Need: Detection, Attribution and Prediction
- "Local" hydrologic changes are often documented with some attribution
- However, no systematic efforts have evolved to understand hydrologic change or evolution at regional to global scales
- Prediction is consequently not possible. Requires the development of an understanding of long term system evolution
 - Climate variability and change need to be understood as a bi-directional process linked to human activity mediated by the hydrologic cycle – hydrologic change – climate change impacts

He was ever experiencing about USSR developed Irrigated Farmland since 1960s in Kazakhstan, Central Asia. It was really important to map out farmland design across the countries. In India, there is the distribution of abandoned cultivated farmland. Ecological threshold:
- The point at which a relatively small change in external conditions causes a rapid change in an ecosystem
- When an ecological threshold has been passed, the ecosystem may no longer be able to return to its state
 - The scholar introduce GEWEX (Global Energy and Water Cycle Experiment), which is an integrated program of research, observations, and science activities ultimately leading to the prediction of global and regional climate change. Each region of the world has their own GEWEX, such as (1) GEWEX Asian Monsoon Experiment (Asian countries); (2) Murray Darling Basin

Water Budget Project (Australia); (3) Baltic Sea Experiment (Baltic countries); (4) Large Scale Biosphere Atmosphere Experiment in Amazonia and La Plata (South American countries); (5) GEWEX Americas Prediction Project (United States); (6) Mackenzie GEWEX Study (Canada); and (7) Coupling of the Tropical Atmosphere and Hydrological Cycle (Africa countries).

The Case of Thailand

Looking at the Thailand as a country, in which he lives, there is also special disaster happening. It is deforestation. As we can see from the picture, deforestation in Thailand is remarkably seen from Vegetation Index (NDVI). To see the mark of deforested area, we can stare at white colored- area, while the red one is full of the vegetation.

Although the deforestation in Thailand is still existing, it is decreasing during 1960 to 2000. Moreover, the decreasing trend of rainfall (1951→ 1995) is remarkable over the whole of Thailand in September. Afterwards, the area where the rainfall in September decrease are Phisanulok and Sakon Nakhon in Northeast Thailand. Hereby, the impact of deforestation is investigated by Regional Climate Model (RAMS). As the short summary, he highlights that deforestation in Southeast Asia is likely to affect rainfall decrease in monsoon season, as well as large area of water-fed rice paddy field may reinforce rainfall and water cycle in monsoon area, e.g., in China.

The Case of Indonesia

As we can see from the pic attached, decrease of forest cover in Indonesia has been increasing year by year during 2000 to 2005.

Below are the schematic of the net radiation budget at the land surface;

- In areas with high soil moisture, the latent heat flux by evaporation and transpiration dominates, enhancing cloud formation and a tendency for cooling

- By contrast, if the soil-moisture deficit is high, the dry soils raise the sensible heat flux, producing a deeper, warmer, drier low-level atmosphere. This process inhibits convection and cloud formation and creates a positive feedback loop.

According to a research carried out in 1979 in Tanjung Leban village, Riau province, Indonesia, there was a deforested area of peat swamp forest. Haze crisis is one of the biggest impact of the peatland swamp burning. Let us see the statistic of the haze crisis 2015.

Damage caused

- 2.1 million ha of forest, many of them peatlands, burned
- Disaster: 45 million people affected
- Asthma: 10,000 people; Upper respiratory tract infections: 0.5 million people
- 12 people killed, including three-month old infant.

Response measures

- Government: mobilized Army to fight fires
- Presidential Decree: Stopped issuing new peatland development permits to companies
- Searching for fire starters: 270 people arrested (17 people from private companies)
- Residents: Raised lawsuits against private companies (34 companies in Sumatra)
- Foreign assistance: Helicopters and airplanes, water bombing

Hereby, the concluding remarks from him.

- Seasonal Cycle is dominant in Asian Monsoon Region, Diurnal cycle is dominant in Indonesia
- Land-Ocean heat contrast in Asian Monsoon Area and Indonesia is one of the driving forces of hydrological and meteorological systems
- Land use Change/ Human Activity Impacts has a possibility to change ecological and hydrological system
- Climate variability and change need to be understood as a bi-directional process linked to human activity mediated by the hydrologic cycle-hydrologic change-climate change impact

Question and Answer

None

**Day
Nine & Ten**

**Wednesday & Thursday
20th & 21st September 2017**

**The 2nd Indonesian Youth Conference on
Sustainable Development**

Reported on separated proceedings





Attachments

The Organizing Committee

<i>No</i>	<i>Name</i>
1	Dr. Puji Astuti, S.Si., M.Sc., Apt.
2	Dr. Hatma Suryatmodjo, S. Hut., M.Si.
2	Suparna, S.Sos.
3	Marinda Frida Anjasari, S.E.
4	Azri Faisal Nabhan, S.S.
5	Isnani, S.IP.
6	Joni Tri Wibowo, A.Md
7	Prayudhi Kurniawan, S.T.
8	Sri Andayani, S.Si.
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