2015年度グリーンアジア国際セミナー
学生セッション 報告

Group A1 (Chair : Shinji Matsumoto)

Kibria Mohammad Tawheed, Omar Mohamed Ali Mohamed Ibrahim, Ryota Yoneda, Kitjanukit Santisak, Satoshi Takeichi, Alisa Bannaron, Chol Cheolyang

Group A2 (Chair : Hiroshi Akamine)

Takahashi Yoshiaki, Cheng Xiaoyang, Ryan Imansyah, Takayuki Maekura, Marzia Khanam, Sampad Ghosh, Ali Yousefian

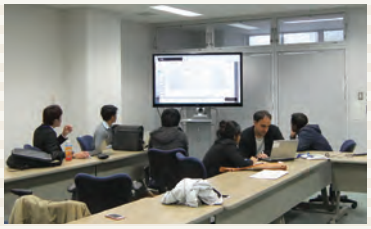
The discussion theme of our group in the student session was 'How can we keep the balance between resource developments and environmental conservation'. Since to what extent resource development is necessary is highly dependent on the current situation of each country, this question requires us to account for different aspects of this problem.

Before the Green Asia Forum, I told all the members of our group to think about the given question and prepare something in advance. Especially, I emphasized that including concrete numerical data or actual facts make our presentation more persuasive. In the discussion at the Forum, some students gave us good introduction to the detail discussion using prepared ppt files. Based on that, they developed their discussion to more detail subjects.

Specifically, they firstly focused on one specific accident which happened last month in Brazil and caused serious damages. They analyzed the reasons why or how the accident was caused. As a consequence, they pointed out that the reason is in lacks of management, manpower, inspection, law, etc. Their suggestions indicate that this is the highly complexed problem, and thus giving a simple answer to this question is difficult.

The presentation was very impressive and I was surprised at the quality of their ppt in spite of the limited discussion and preparation time. In my opinion, all of the presentation had enough qualities and sufficiently suggestive.

I was the chair of the presentation session, which was my first experience of the chair. Although I could not give any comments to the presentation or discussion, I found the difficulty of giving good opening and closing remarks and support smooth presentation and discussion. This experience must be a good step to my future work.



Group B1 (Chair : Takanori Hanada)

Azizah Intan Pangesty, Hong BingZhou, Islam Md Amirul, Masahito Tanaka, Shin Sakiyama, Wei-Chen Wen, M L Palash

Topic:

The increased concern for the security of the oil supply and the negative impact of fossil fuels on the environment, particularly greenhouse gas emissions, has put pressure on society to find renewable fuel alternatives.

Do you think that the Bio-ethanol produced from sugar or grain (starch) is a sustainable fuel?

Discussion

First of all, we defined what is bioethanol. Which are the fuels extracted from plants and crops are known as biofuels and most commonly extracted is bioethanol or biodiesel. It has some advantages such as renewable and cost effective. Not only those merits but also it is able to reduce green-house gas emission, environmental pollution and dependency on foreign oil related to economic security. Moreover, spills are more easily biodegraded or diluted to nontoxic concentration. Still we disagree bioethanol as a sustainable energy source. The reasons why are described following statements.

Table 1. Energy balance of Bio-ethanol[1]

Country	Type	Energy balance
United States	Corn ethanol	1.3
Germany	Biodiesel	2.5
Brazil	Sugarcane ethanol	8
United States	Cellulosic ethanol†	2–36††

† experimental, not in commercial production
†† depending on production method

All biomass goes through at least some of these steps: it needs to be grown, collected, dried, fermented, distilled, and burned. All of these steps require resources and an infrastructure. The total amount of energy input into the process compared to the energy released by burning the resulting ethanol fuel is known as the energy balance (or "energy returned on energy invested"). Table 1 point to modest results for corn ethanol produced in the US: one unit of fossil-fuel energy is required to create 1.3 energy units from the resulting ethanol. The energy balance for sugarcane ethanol produced in Brazil is more favorable, with one unit of fossil-fuel energy required to create 8 from the ethanol. Energy balance estimates are not easily produced, thus numerous such reports have been generated that are contradictory. For instance, a separate survey reports that production of ethanol from sugarcane, which requires a tropical climate to grow productively, returns from 8 to 9 units of energy for each unit expended, as compared to corn, which only returns about 1.34 units of fuel energy for each unit of energy expended.[2] A 2006 University of California Berkeley study, after analyzing six separate studies, concluded that producing ethanol from corn uses much less petroleum than producing gasoline.[3] Carbon dioxide, a greenhouse gas, is emitted during fermentation and combustion. This is canceled out by the greater uptake of carbon dioxide by the plants as they grow to produce the biomass.[4] When compared to gasoline, depending on the production method, ethanol releases less greenhouse gases.[5][6]

In conclusions, the bio-ethanol is impractical to implement and replace the existing gasoline power stations. It directly against the food security. It is not efficient, concerning the production process and performance. The production cost depends on geographical location. There are other promising technologies to replace fossil fuel, such as solar energy.

For my opinion and impression in this student session, I felt that the discussion topic should be related the international where invited speakers came from because we invited abroad speaker from Southeast Asia finding a concept in Green Asia.

Reference
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[2] "Portaria Nº 143, de 27 de Junho de 2007" (in Portuguese). Ministério da Agricultura, Pecuária e Abastecimento. Retrieved 5 October 2008.
[3] "01.26.2006 - Ethanol can replace gasoline with significant energy savings, comparable impact on greenhouse gases". Berkeley.edu. Retrieved 20 January 2015.
[4] "oregon.gov, biomass forum". Oregon.gov. 27 March 2009. Retrieved 27 August 2011.
[5] M. Wang, C. Saricks, D. Santini. "Effects of Fuel Ethanol Use on Fuel-Cycle Energy and Greenhouse Gas Emissions". Argonne National Laboratory. Retrieved 7 July 2009.
[6] M. Wang. "Energy and Greenhouse Gas Emissions Effects of Fuel Ethanol". Retrieved 7 July 2009.

Group B2 (Chair : Yusei Masaki)

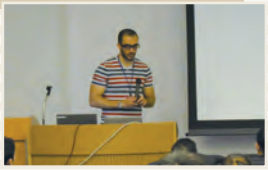
Pennapa Tungjiratthitikan, Ni'Mah Ayu Lestari, Tomy Alvin Rivai, John James Duckworth, Dabin Chung, Rezwan Ahmed, Yuki Furutani

This international "Green Asia Forum" was meaningful for me. The three invited speakers; Prof. Rudy Sayoga Gautama, Prof. Taweechai Amornsakchai, and Dr. Kyaw Thu, provided us interesting and useful talks. Among their talks, "Management of Acid Mine Drainage – Challenges for Responsible Mining Practice" given by Prof. Rudy Sayoga Gautama was very interesting for me, because I had been studying about biological remediation techniques of heavy metal pollution during my master course. In the study, heavy metal pollution in acid mine drainage was also one of the factors which I had focused on. This time, doctor 2 students including me, were given an opportunity to partially plan the forum, especially "student session". Determination of appropriate topics related to the contents of three invited speakers, was difficult. However, most of doctor students cannot experience this kind of activity. I felt that it was difficult to control discussion in a group. This was meaningful opportunity for me to understand how to control such kind of thing. This was, therefore, precious activity for me. This will surely contribute to my future life even in research field.

In the "student session", all of GA students had some discussion about the three different topics for approximately 100 minutes. I chaired Group B2 under the topic of "The increased concern for the security of the oil supply and the negative impact of fossil fuels on the environment, particularly greenhouse gas emissions, has put pressure on society to find renewable fuel alternatives. Do you think that the Bio-ethanol produced from sugar or grain (starch) is a sustainable fuel?". The key point of the discussion about the above topic was comparison between advantages and disadvantages of production of bio-ethanol. We divided the problems into the points of "plantation", "production", and "application" in order to make it simple. In my opinion, I am really agree to "We cannot rely on only bio-ethanol to provide sustainable energy." which is our final outcome of the discussion, because I think that energy diversity that a nation possesses is important. Therefore, it is better to have various kinds of choices in order to achieve sutable supply of energy to industrialized society.

Group C1 (Chair : Tsuyoshi Sato)

Hatem Omar Amin Mostafa Elserafy, Takaya Fujisaki, Konadu Kojo Twum, Zayda Faizah Zahara,Tsubasa Oji, Gede Dalton Surya Prayoga, Tomoaki Hirakawa



Our group discussed water desalting technology is available as a dominant approach for ensuring the water resources in Singapore. Most of the land of Singapore is covered with flat geometry. Thus the water supply of Singapore is rely on limited reservoir and import from Malaysia. However, the contract of water supply between Singapore and Malaysia will expire in the middle of this century; therefore, now ensuring alternative water resource is one of the most important problems for Singapore.

For present situation, desalting technology of sea water is focused as a strong candidate of water resources in the future. However, there are some disadvantages about water desalting technology in current situation. So this time our group members discussed whether water desalting technology truly can become an alternative water resource of Singapore in the future.

At first, our group summarized the disadvantages of water desalting technology. First, water desalting spends much energy, the water supplying performance per day is low, and the plant system is complex and it needs much maintenance fee. In the next step, we investigated the possibility whether we can overcome these disadvantages with reference of academic papers and other documents.

As the result of investigation, we were able to learn that the cost of water desalting method is gradually decreasing in present days. Moreover, the supplying performance per day is also improved recently owing to the efforts of academic and industrial sectors. Moreover, a data indicates the usage of renewable energy is in the progress in Singapore so we predict the energy needed for water desalting plant might be provided by these new energy resources. The sea water is inexhaustible resource for water desalting, so we can establish a completely renewable water supplying system by utilizing the green energy.

In our discussion, it was interesting for me that all members of our group payed large attention to economical cost. In our academic life, we learn many excellent and innovative technologies and moreover, we sometimes learn actual application examples of these technologies. However, there are not common to talk about the application cost of these technologies. In this group work, our group member discussed the possibility to utilize water desalting technology in Singapore mainly focusing on economical efficiency. Economical cost is one of the most important factors for engineering research especially in industrial sectors, so now I expect the experience of this discussion will help me after I graduate and start my career in a society.

Group C2 (Chair : Hiroki Gima)

Tarek Mahmoud Atia Mostafa, Sendy Dwiki, Animesh Pal, Natsuhiko Hamada, Keishi Oyama, Cao Cong

1. Topics

Our topic was set water management so we discussed as case study. Water was supplied to a limited number of consumers in Singapore. As population grew, new sources of water supply had to be found so that we discussed whether desalinated seawater can be used for solving a problem.

2. Discussions

Firstly, we do brainstorming three points as below; a)water stress in Singapore, b)technology of desalination and c)feasibility of desalination. In case of a), weaccording to world resources institute, water stress in Singapore by 2060 is expected worst in the world (Fig. 1). In b), we investigated desalination process, it is as follows; 1) 180 million literes of water are pumped from the Thames each day though giant pumps. Chemicals are added to bind together any suspended material. 2) Water is filtered through sand in steel containers. 3) Water is then pumped at high pressure through thousands of membranes to remove salt. 4) Remineralization: Calcium and magnesium are added. In light of above, we could recognize disadvantages of desalinated water such as cost and energy use, water quality, water disposal and so on. Finally, we determined priority of water supply in Singapore as follows; 1) collection of collection of rainwater in the region (main source) 2) import of water from Johore Province in Malaysia 3) utilization of NEWater 4) desalination of seawater.

▲ Figure 1.
Water stress by country:2040

▼Figure 2. Picture of discussion

3. Conclusion

As a result, we concluded that desalinated seawater can release water problem but can not be the only solution.

Acknowledgements
Author express gratitude to C2 group and their positive discussions (Fig. 2).