ASEAN - 2°C

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Our Story

• Global warming and climate change is a continuously increasing environmental issue all over the world. All of the countries worldwide are responsible for its ever increasing. According to the Global Climate Risk Index, four of the world’s ten countries that contributed to climate change are located in Southeast Asia: **Myanmar, Philippines, Thailand** and **Vietnam**. Therefore, It is necessary for the ASEAN countries to give 100% of the commitment to reduce global warming and climate change.

• In this story, we will discuss the challenges faced by ASEAN and recommendations introduced in order to realise Paris Climate Agreement by ensuring the worldwide temperature rise was limited to below **2°C**

• This story will only discuss five of the ASEAN country (Indonesia, Malaysia, Philippines, Thailand, Vietnam)
Basic Statistics

• Temperature rising by 0.1-0.3 °C /decade in ASEAN

• In 2000, Southeast Asia was responsible for 12% of the world’s GHG emissions

• In 2014, only 9% of renewable energy available in ASEAN

• ASEAN as the 2nd largest road vehicle fleet in ASIA

• Agriculture is one of the MAIN economy sector contributed to GDP in ASEAN
From the forecast data, the Carbon Dioxide Emission of all of the country has a continuous increase after year 2011.

Challenge: Increase in Carbon Dioxide Emission Year By Year
GDP per Capita by Year

CO2 Emission by Year
Correlation ($CO_2$ Emission vs GDP per Capita)

Indonesia

Malaysia

Philippines

Thailand

Viet Nam
Challenge: Increase in GDP lead to increase in Carbon Dioxide Emission

How to decrease Carbon Dioxide Emission without sacrifice GDP?

From the result of Pearson Correlation, all of the five countries results in positive correlation between GDP per Capita and Carbon Dioxide Emission

<table>
<thead>
<tr>
<th>Country</th>
<th>GDP</th>
<th>Pearson Correlation</th>
<th>Sig(2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>GDP</td>
<td>0.927</td>
<td>0</td>
</tr>
<tr>
<td>Malaysia</td>
<td>GDP</td>
<td>0.932</td>
<td>0</td>
</tr>
<tr>
<td>Philippines</td>
<td>GDP</td>
<td>0.711</td>
<td>0</td>
</tr>
<tr>
<td>Thailand</td>
<td>GDP</td>
<td>0.817</td>
<td>0</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>GDP</td>
<td>0.982</td>
<td>0</td>
</tr>
</tbody>
</table>
Correlation ($CO_2$ Emission vs Food Production Index)

Indonesia

Malaysia

Philippines

Thailand

Viet Nam
Challenge: Increase in Food Production Index lead to increase in Carbon Dioxide Emission. How to decrease Carbon Dioxide Emission without sacrificing Food Production Index?

<table>
<thead>
<tr>
<th>Country</th>
<th>Food Production Index</th>
<th>Pearson Correlation</th>
<th>Sign (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>CO2 Emissions</td>
<td>0.964</td>
<td>0</td>
</tr>
<tr>
<td>Malaysia</td>
<td>Food Production Index</td>
<td>0.98</td>
<td>0</td>
</tr>
<tr>
<td>Philippines</td>
<td>CO2 Emissions</td>
<td>0.805</td>
<td>0</td>
</tr>
<tr>
<td>Thailand</td>
<td>Food Production Index</td>
<td>0.957</td>
<td>0</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>CO2 Emissions</td>
<td>0.98</td>
<td>0</td>
</tr>
</tbody>
</table>

From the result of Pearson Correlation, all of the five countries results in positive correlation between Food Production Index and Carbon Dioxide Emission.
Correlation ($CO_2$ Emission and Electricity Access)

Indonesia  
Malaysia  
Philippines  
Thailand  
Viet Nam
Challenge: increase in Access In Electricity lead to increase in Carbon Dioxide Emission. How to decrease Carbon Dioxide Emission without sacrificing Access In Electricity?

From the result of Pearson Correlation, all of the five countries results in positive correlation between **Access in Electricity** and **Carbon Dioxide Emission**.
Correlation With Carbon Dioxide Emission

- GDP per Capita: Yes
- Food Production Index: Yes
- Electricity Access: Yes
Challenge: Most of the ASEAN country has a negative annual change rate of forest which indicate that the area of the forest is decreasing year by year.

<table>
<thead>
<tr>
<th>Country</th>
<th>Forest area ('000 ha)</th>
<th>% of land area</th>
<th>Annual change rate 2000 – 2010 ('000ha/yr)</th>
<th>%</th>
<th>Publicly owned (%)</th>
<th>PFE (%)</th>
<th>Area with FMP (%)</th>
<th>Certified Forest Area (%)</th>
<th>Area under SFM (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia</td>
<td>10,094</td>
<td>57</td>
<td>-145</td>
<td>-1.33</td>
<td>100</td>
<td>82</td>
<td>16</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Indonesia</td>
<td>94,432</td>
<td>52</td>
<td>-498</td>
<td>-0.51</td>
<td>91</td>
<td>70</td>
<td>19</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Lao PDR</td>
<td>15,751</td>
<td>68</td>
<td>-78</td>
<td>-0.48</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Malaysia</td>
<td>20,456</td>
<td>62</td>
<td>-144</td>
<td>-0.54</td>
<td>98</td>
<td>68</td>
<td>69</td>
<td>26</td>
<td>47</td>
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<tr>
<td>PNG</td>
<td>28,726</td>
<td>63</td>
<td>-141</td>
<td>-0.48</td>
<td>3</td>
<td>36</td>
<td>3</td>
<td>n.s.</td>
<td>1</td>
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<tr>
<td>Philippines</td>
<td>7,665</td>
<td>26</td>
<td>55</td>
<td>0.74</td>
<td>85</td>
<td>79</td>
<td>28</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Vietnam</td>
<td>13,797</td>
<td>44</td>
<td>207</td>
<td>1.64</td>
<td>72</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Myanmar</td>
<td>31,773</td>
<td>47</td>
<td>-278</td>
<td>-0.81</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: Adapted from Sabogal et al., 2013. Note: ns = not significant.
Challenges

1. $CO_2$ Emission increase
2. GDP correlate to $CO_2$ Emission
3. FPI correlate to $CO_2$ Emission
4. Electricity Access correlate to $CO_2$ Emission
5. Deforestation
From the graph, transportation sector is ranked as the second contributors to the Carbon Dioxide Emission. Therefore, public transport plays an important role in fighting with climate change. Since most of the ASEAN countries are developing country, public transport service is still lack of complete. Investment in public transport not only reduce carbon dioxide emission but also increase the development of country.

Increase public transport also increase GDP – **Chain Reaction**

**$CO_2$ Emission increase**

**GDP correlate to $CO_2$ Emission**
Carbon dioxide from the fossil fuel is the top contributor to greenhouse gas emission. It is necessary to use renewable energy to replace with fossil fuel. Since ASEAN has a great potential in developing renewable energy such as solar, hydropower and biomass, thus renewable energy is definitely a good strategy to realise Paris Climate Agreement.

Example ways:
- Enforce Solar Leasing Plan in ASEAN
- Enforce Solar PPA agreement (Power Purchase Agreement)

Most of the ASEAN country has a negative annual change rate of forest which indicate that the area of the forest is decreasing year by year. In fact, Southeast Asia has the highest rate of deforestation of any major tropical region: 1.2 per cent of forest lost yearly, followed by Latin America (0.8 per cent) and Africa (0.7 per cent). Thus, reforestation is a compulsory.
The main principle of such system is to reduce pollution and increase income by combining different types of farming.

Examples:
Farmers can combine fish and pig farming. Pig manure creates a favorable microflora in the pond for the reproduction of fish and enriches the soil with useful substances.

$CO_2$ Emission increase

FPI correlate to $CO_2$ Emission