

# “SDGs and Climate Change: What would be the roles of STI”

## ASEAN-NEXT

March 20, 2018

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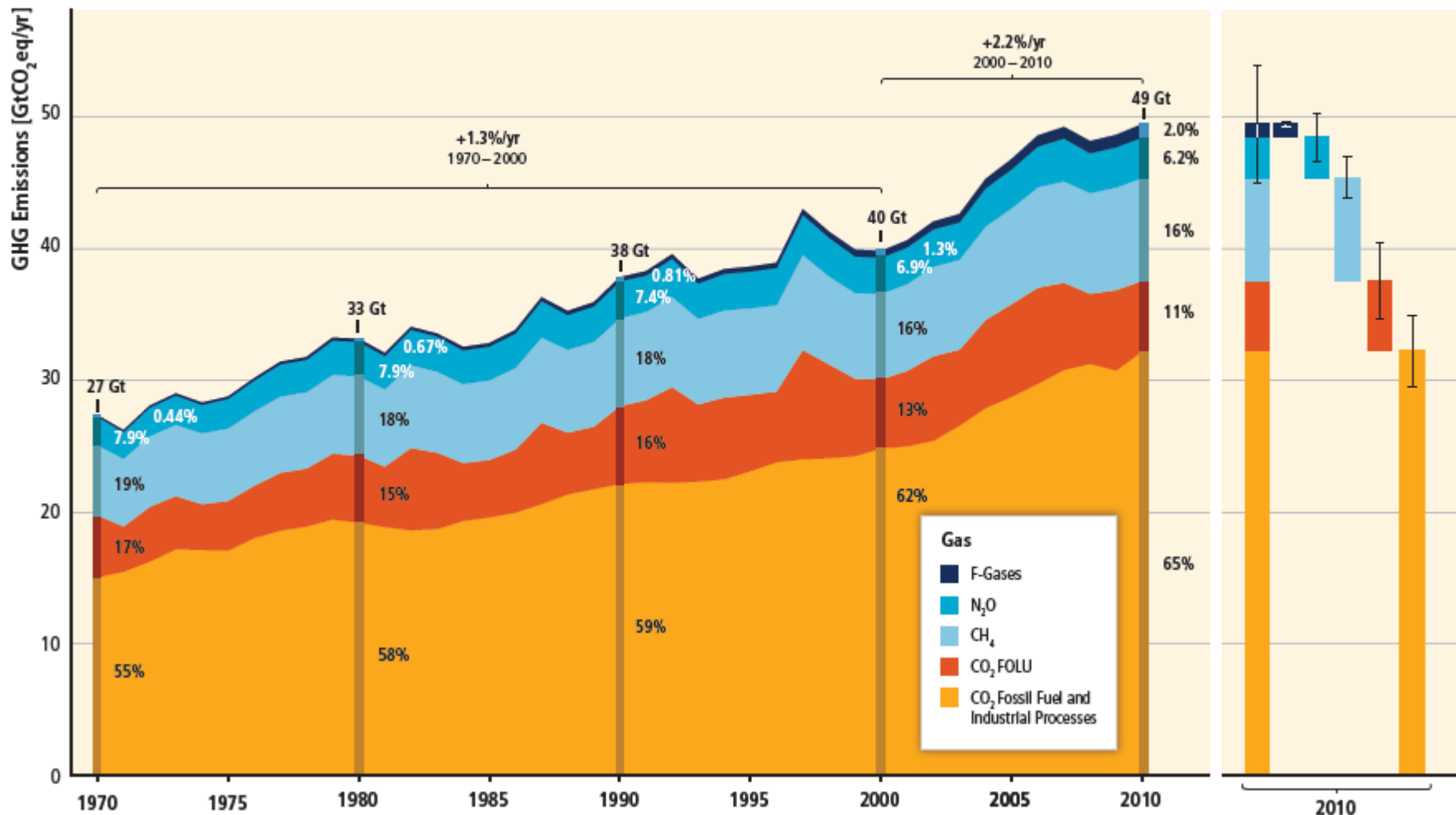
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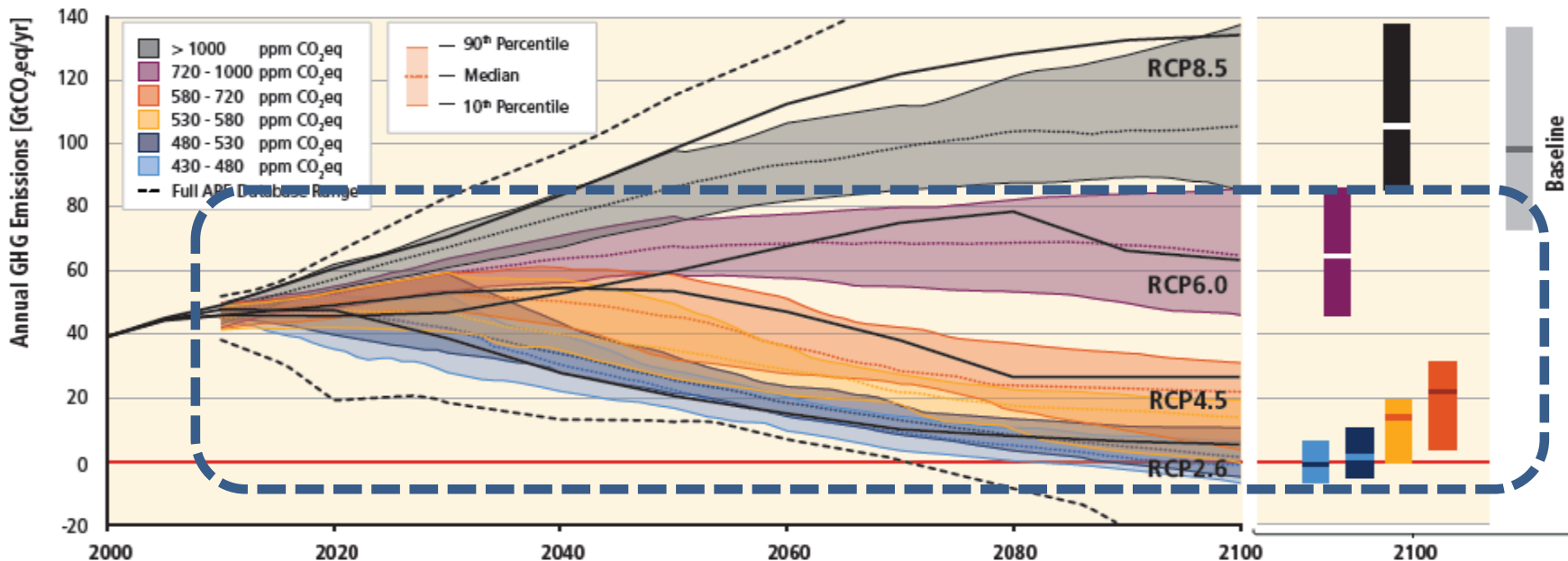
- | **SDGs and Climate Change**
- || **Cases of Climate Technology Gaps in ASEAN**
- ||| **Korean Collaboration and Implications**

# IPCC AR5 SPM (Assessment Report Summary)

Total Annual Anthropogenic GHG Emissions by Groups of Gases 1970–2010

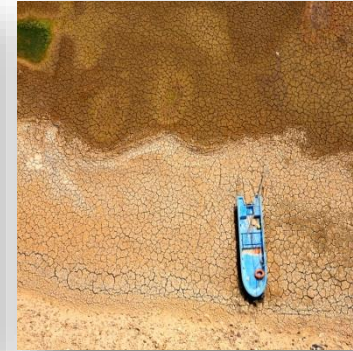


# GHG Emission Pathways 2000-2100: All AR5 Scenarios



| CO <sub>2</sub> eq Concentrations In 2100 [ppm CO <sub>2</sub> eq]<br>Category label (concentration range) <sup>3</sup> | Subcategories                                                                                           | Relative position of the RCPs <sup>5</sup> | Cumulative CO <sub>2</sub> emissions <sup>2</sup> [GtCO <sub>2</sub> ] |           | Change in CO <sub>2</sub> eq emissions compared to 2010 in [%] <sup>4</sup> |             | Temperature change (relative to 1850–1900) <sup>5,6</sup> |                                                                                  |                                         |                           |                           |
|-------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|--------------------------------------------|------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-------------|-----------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------|---------------------------|---------------------------|
|                                                                                                                         |                                                                                                         |                                            | 2011–2050                                                              | 2011–2100 | 2050                                                                        | 2100        | 2100 Temperature change [°C] <sup>7</sup>                 | Likelihood of staying below temperature level over the 21st century <sup>8</sup> |                                         |                           |                           |
|                                                                                                                         |                                                                                                         |                                            |                                                                        |           |                                                                             |             |                                                           | 1.5 °C                                                                           | 2.0 °C                                  | 3.0 °C                    | 4.0 °C                    |
| < 430                                                                                                                   | Only a limited number of individual model studies have explored levels below 430 ppm CO <sub>2</sub> eq |                                            |                                                                        |           |                                                                             |             |                                                           |                                                                                  |                                         |                           |                           |
| 450 (430–480)                                                                                                           | Total range <sup>1,10</sup>                                                                             | RCP2.6                                     | 550–1300                                                               | 630–1180  | –72 to –41                                                                  | –118 to –78 | 1.5–1.7 (1.0–2.8)                                         | More unlikely than likely                                                        | Likely                                  | Likely                    | Likely                    |
| 500 (480–530)                                                                                                           | No overshoot of 530 ppm CO <sub>2</sub> eq                                                              |                                            | 860–1180                                                               | 960–1430  | –57 to –42                                                                  | –107 to –73 | 1.7–1.9 (1.2–2.9)                                         | Unlikely                                                                         | More likely than not                    |                           |                           |
|                                                                                                                         | Overshoot of 530 ppm CO <sub>2</sub> eq                                                                 |                                            | 1130–1530                                                              | 990–1550  | –55 to –25                                                                  | –114 to –90 | 1.8–2.0 (1.2–3.3)                                         |                                                                                  | About as likely as not                  |                           |                           |
| 550 (530–580)                                                                                                           | No overshoot of 580 ppm CO <sub>2</sub> eq                                                              |                                            | 1070–1460                                                              | 1240–2240 | –47 to –19                                                                  | –81 to –59  | 2.0–2.2 (1.4–3.6)                                         |                                                                                  | More unlikely than likely <sup>12</sup> | Likely                    |                           |
|                                                                                                                         | Overshoot of 580 ppm CO <sub>2</sub> eq                                                                 |                                            | 1420–1750                                                              | 1170–2100 | –16 to 7                                                                    | –183 to –86 | 2.1–2.3 (1.4–3.6)                                         |                                                                                  |                                         |                           |                           |
| (580–650)                                                                                                               | Total range                                                                                             | RCP4.5                                     | 1260–1640                                                              | 1870–2440 | –38 to 24                                                                   | –134 to –50 | 2.3–2.6 (1.5–4.2)                                         | Unlikely <sup>11</sup>                                                           | Unlikely                                | More likely than not      |                           |
| (650–720)                                                                                                               | Total range                                                                                             |                                            | 1310–1750                                                              | 2570–3340 | –11 to 17                                                                   | –54 to –21  | 2.6–2.9 (1.8–4.5)                                         |                                                                                  |                                         | More unlikely than likely |                           |
| (720–1000)                                                                                                              | Total range                                                                                             | RCP6.0                                     | 1570–1940                                                              | 3620–4990 | 18 to 54                                                                    | –7 to 72    | 3.1–3.7 (2.1–5.8)                                         |                                                                                  | Unlikely <sup>11</sup>                  | Unlikely <sup>11</sup>    | Unlikely                  |
| >1000                                                                                                                   | Total range                                                                                             | RCP8.5                                     | 1840–2310                                                              | 5350–7010 | 52 to 95                                                                    | 74 to 178   | 4.1–4.8 (2.8–7.8)                                         | Unlikely <sup>11</sup>                                                           |                                         | Unlikely                  | More unlikely than likely |

# Global Crisis



**Depletion of Natural Resources**

**Increasing Energy Demand**

**Increasing Greenhouse Gases**

**Increasing Food Shortage**

**Increasing Water Scarcity**



Reserves-to-production Ratio  
(Fossil 42yrs,  
Gas 60 yrs., Coal  
122 yrs.)

50% Rise  
in World Energy  
Consumption by  
2030(EIA)

Cost 5~20%  
GDP per annum  
if left  
unaddressed

Rise in Nighttime  
temperature by 1 °C  
reduce rice yields by  
10% (IRRI)

Available  
freshwater  
decrease by 1/3  
within next 25  
years

**Economic, Financial and Environment Crisis**

**Table 1: Illustrative costs of a BAU trajectory by region**

| Region/<br>Costs under BAU<br>Trajectory               | North<br>America | Latin<br>America,<br>Caribbean | Europe | Middle<br>East &<br>North<br>Africa | Sub-<br>Saharan<br>Africa | South &<br>Central<br>Asia | South-<br>East Asia<br>& Pacific | East Asia |
|--------------------------------------------------------|------------------|--------------------------------|--------|-------------------------------------|---------------------------|----------------------------|----------------------------------|-----------|
| <b>Extreme Poverty</b>                                 |                  |                                |        | M                                   | H                         | H                          |                                  |           |
| <b>Food Insecurity</b>                                 |                  |                                |        | M                                   | H                         | H                          | M                                |           |
| <b>Risk of Conflict &amp;<br/>Instability</b>          |                  | M                              |        | H                                   | H                         | M                          | M                                | M         |
| <b>Relative Poverty<br/>and Inequality</b>             | M                | H                              | M      | M                                   | H                         | M                          | M                                | M         |
| <b>High Fertility</b>                                  |                  |                                |        | H                                   | H                         | H                          | M                                |           |
| <b>Inadequate<br/>Education</b>                        |                  | M                              |        | M                                   | H                         | H                          | M                                |           |
| <b>Gender Inequality</b>                               |                  | M                              |        | H                                   | H                         | H                          | M                                | M         |
| <b>Poor Health</b>                                     |                  | M                              |        | M                                   | H                         | H                          | M                                |           |
| <b>Water Stress &amp;<br/>Droughts</b>                 | M                | M                              | M      | H                                   | H                         | H                          |                                  | M         |
| <b>Poor Urban Housing<br/>&amp; Services</b>           | M                | M                              |        | M                                   | H                         | H                          | H                                | M         |
| <b>Poor Urban<br/>Environment &amp;<br/>Resilience</b> | M                | H                              | M      | M                                   | H                         | H                          | H                                | H         |
| <b>Extreme Weather</b>                                 | M                | M                              | M      | M                                   | H                         | M                          | H                                | H         |
| <b>Sea-Level Rise</b>                                  | H                | M                              | H      | H                                   | H                         | H                          | H                                | H         |
| <b>Ocean Acidification</b>                             | H                | H                              | H      | H                                   | H                         | H                          | H                                | H         |
| <b>Biodiversity Loss</b>                               | M                | H                              | M      | M                                   | H                         | M                          | H                                | H         |

# STI in SDGs 169 targets



Economic Sustainability



Agricultural research  
Entrepreneurship  
Innovation  
Environmentally sound technologies



Societal Sustainability

## UNESCO Science Report 2015

***Science will be critical to meeting the challenge of sustainable development, as it lays the foundations for new approaches, solutions and technologies that enable us to identify, clarify and tackle local and global problems***

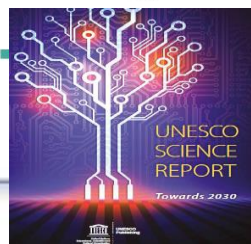
Environmental Sustainability








Clean energy  
Marine technology  
Knowledge sharing  
Dissemination and diffusion  
Technology Bank



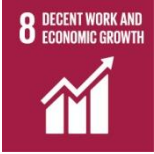


S&T, Innovation Sustainability









| Image                                                                              | Goals | Sector                     | Indicators | Related factors                                                                                                                    |
|------------------------------------------------------------------------------------|-------|----------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------|
|    | G1.   | No Poverty                 | 1.4.       | ✓ Appropriate new technology                                                                                                       |
|    | G2.   | Zero Hunger                | 2.a.       | ✓ Expand investment opportunities on agriculture research and technology development through cooperation with developing countries |
|    | G3.   | Good Health and Well-Being | 3.b.       | ✓ Support R&D for vaccination and medicine such as tropical diseases                                                               |
|   | G4.   | Quality Education          | 4.b.       | ✓ Increase scholarship of tertiary education program (ICT, engineering, science etc.) in domestic/abroad                           |
|  | G5.   | Gender Equality            | 5.b.       | ✓ Enhance ICT skills for Women's capacity building                                                                                 |



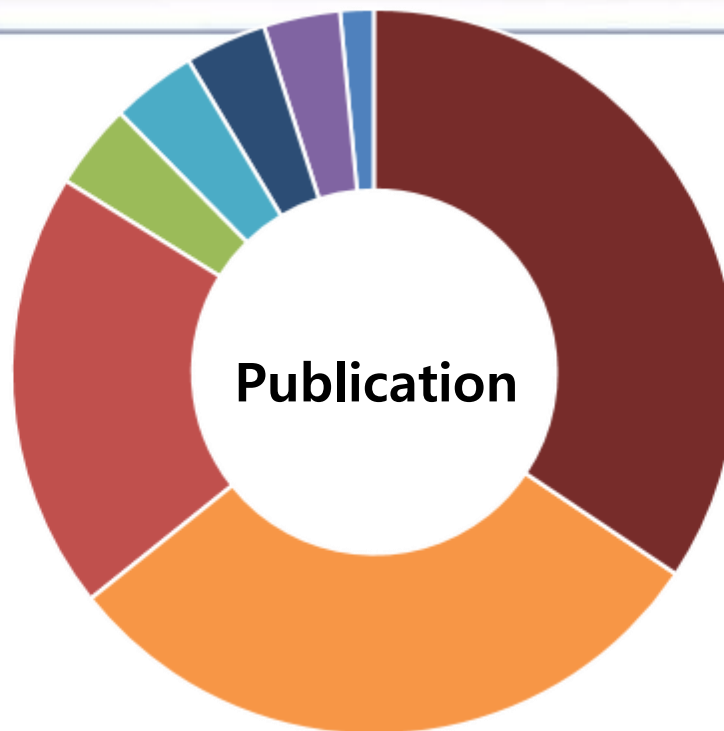
| Image                                                                               | Goals | Sector                          | Indicators | Related factors                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------|-------|---------------------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | G6.   | Clean Water and Sanitation      | 6.a.       | ✓Water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies                                                                                                                                                   |
|    | G7.   | Affordable and Clean Energy     | 7.a.       | ✓Facilitate international cooperation to enhance access to clean energy research and technologies (renewable energy, energy efficiency, clean fossil fuel technologies, etc.) and promote investment in energy infrastructure and clean energy technologies |
|                                                                                     |       |                                 | 7.b.       | ✓ Expand infrastructure with modern and sustainable energy services in developing and less developed countries                                                                                                                                              |
|  | G8.   | Decent Work and Economic growth | 8.2.       | ✓ Increase economic productivity through technological upgrades and innovations                                                                                                                                                                             |
|                                                                                     |       |                                 | 8.3.       | ✓ Promote development-oriented policies to support entrepreneurship, creativity and innovation                                                                                                                                                              |

| Image | Goals | Sector                                  | Indicators | Related factors                                                                                                                                                                     |
|-------|-------|-----------------------------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | G9.   | Industry, Innovation and Infrastructure | 9.4.       | ✓ Increase the adoption of eco-friendly technologies and industrial processes                                                                                                       |
|       |       |                                         | 9.5.       | ✓ Promote innovation through R & D and PPP investment, strengthening scientific research and industry skills in all countries, especially in developing countries                   |
|       |       |                                         | 9.a.       | ✓ Promote the development of sustainable infrastructure through technical assistance to African countries, especially underdeveloped countries                                      |
|       |       |                                         | 9.b.       | ✓ Support technology development, research and innovation in developing countries, including creating a policy environment for industrial diversification and value-added expansion |
|       |       |                                         | 9.c.       | ✓ Increase accessibility to ICT technology                                                                                                                                          |
|       | G10.  | Reduced Inequalities                    | -          | ✓ N/A                                                                                                                                                                               |
|       | G11.  | Sustainable Cities and Communities      | 11.c.      | ✓ Support for local resources in underdeveloped countries, including financial and technical support                                                                                |

| Image                                                                             | Goals | Sector                                 | Indicators | Related factors                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------|-------|----------------------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | G12.  | Responsible Consumption and Production | 12.a.      | ✓ Support the strengthening of the technological capabilities of developing countries to enable consumption and production of sustainable patterns                                                                                                                                                                                 |
|   | G13.  | Climate Action                         | -          | ✓ Climate technology (Adaptation, Mitigation, Cross-cutting)                                                                                                                                                                                                                                                                       |
|  | G14.  | Life Below Water                       | 14.3.      | ✓ Strengthen scientific cooperation at all levels to address the effects of ocean acidification and minimize                                                                                                                                                                                                                       |
|                                                                                   |       |                                        | 14.a.      | ✓ In accordance with the IOCCG (Intergovernmental Oceanographic Commission Criteria and Guidelines) on the Transfer of Marine Technology, it is necessary to contribute to the development of developing countries and strengthen the research capacity necessary for the improvement of the ocean, transfer of marine technology, |

| Image                                                                              | Goals | Sector                                 | Indicators | Related factors                                                                                                                                                                                                                                                                              |
|------------------------------------------------------------------------------------|-------|----------------------------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | G15.  | Life on Land                           | 15.6.      | ✓Promote to facilitate fair and equitable benefits from the use of genetic resources and promote appropriate access to these resources;                                                                                                                                                      |
|   | G16.  | Peace, Justice and Strong Institutions | -          | ✓N/A                                                                                                                                                                                                                                                                                         |
|  | G17.  | Partnerships for the Goals             | 17.6.      | ✓Strengthen access to science and technology innovation through cooperation between North and South, South and South and triangle, and strengthen the sharing of knowledge through mutual agreement by agreeing on strengthening system of global technical cooperation with UN              |
|                                                                                    |       |                                        | 17.8.      | ✓Promote technology development, transfer, and diffusion of environmentally friendly technologies from a reciprocal perspective in developing countries                                                                                                                                      |
|                                                                                    |       |                                        | 17.16.     | ✓Strengthen global partnerships for sustainable development by mobilizing knowledge, expertise, technology and financial resources through partnerships of diverse stakeholders to support the achievement of all countries, especially developing countries' sustainable development goals. |

# SDGs related thesis by quantitative analysis

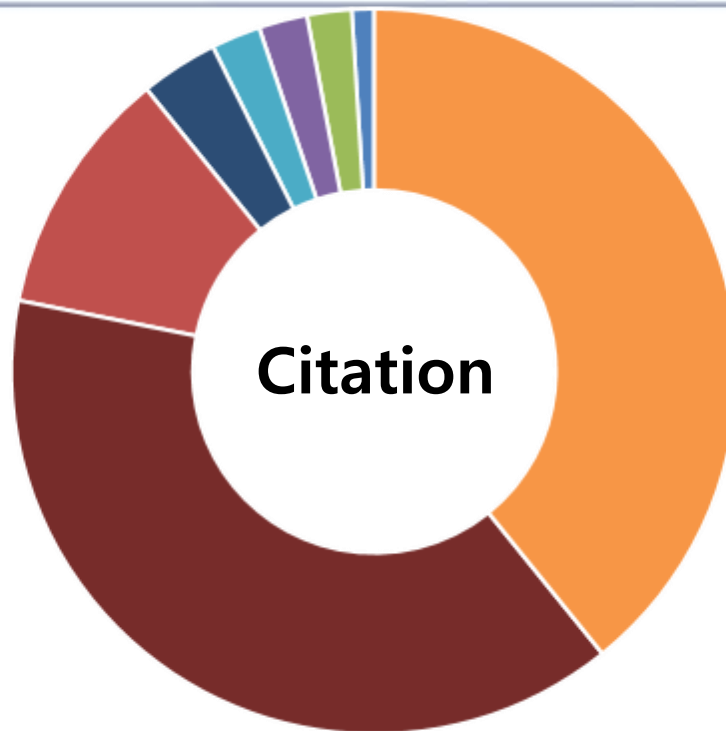


- Africa
- Asiatic Region
- Eastern Europe
- Latin America
- Middle East
- Northern America
- Pacific Region
- Western Europe

(단위: 건수)

| SDGs  | Africa  | Asiatic Region | Eastern Europe | Latin America | Middle East | Northern America | Pacific Region | Western Europe | Total      |
|-------|---------|----------------|----------------|---------------|-------------|------------------|----------------|----------------|------------|
| Total | 240,906 | 3,111,464      | 606,891        | 543,047       | 604,265     | 4,754,297        | 578,876        | 5,471,963      | 15,911,709 |

# SDGs related thesis by qualitative analysis



- Africa
- Asiatic Region
- Eastern Europe
- Latin America
- Middle East
- Northern America
- Pacific Region
- Western Europe

(단위: 건수)

| SDGs  | Africa    | Asiatic Region | Eastern Europe | Latin America | Middle East | Northern America | Pacific Region | Western Europe | Total    |
|-------|-----------|----------------|----------------|---------------|-------------|------------------|----------------|----------------|----------|
| Total | 2,388,320 | 264,755        | 4,750,540      | 5,182,497     | 5,257,493   | 93,811,713       | 8,279,333      | 93,272,020     | 159,1709 |

- | **SDGs and Climate Change**
- || **Cases of Climate Technology Gaps in ASEAN**
- ||| **Korean Collaboration and Implications**

## 1 Develop bankable climate technology projects

- Sector: Water, Energy, Agriculture
- Target Countries:
  - Thailand , Uganda, Philippines



## 2 Climate Technology Gap Report

- 7 AP countries : Vietnam, Indonesia, Philippines, Malaysia, Nepal, Cambodia, Myanmar
- Analysis on the status of climate technology projects , technology gap and funding gap



## 3 Identify project needs through ASEAN/APEC Network



## 4 Identify project needs linking with capacity building program





# Key findings

| Country     | Vulnerability<br>(world rank<br>1996-2015) | Emission level<br>(tCO <sub>2</sub> e / capita) | Most critical<br>sector | Focus                                                                                                       |
|-------------|--------------------------------------------|-------------------------------------------------|-------------------------|-------------------------------------------------------------------------------------------------------------|
| Vietnam     | Extremely high<br>(8th)                    | Low (2,83)                                      | Mitigation,<br>energy   | Forest & mangrove<br>restoration, Plant<br>genetics/ breeding,<br>Landfill gas & RDF, Wind<br>& solar power |
| Philippines | Extremely high<br>(5th)                    | Very low (1,63)                                 | Mitigation,<br>energy   | AWD, NRW, Rainfed<br>maize cultivation, Wind<br>power                                                       |
| Indonesia   | moderate (67th)                            | High (8,6)                                      | Mitigation,<br>LULUCF   | POME treatment, ESCO<br>contracts, ICZM                                                                     |
| Malaysia    | Low (103rd)                                | High (6,22)                                     | Mitigation,<br>Energy   | POME treatment, Green<br>technology financing                                                               |

# Key findings\_cont'd

| Country  | Vulnerability<br>(world rank<br>1996-2015) | Emission level<br>(tCO <sub>2</sub> e / capita) | Most critical<br>sector                 | Focus                                                                                                            |
|----------|--------------------------------------------|-------------------------------------------------|-----------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Cambodia | Very high (13th)                           | Low (3,43)                                      | Adaptation,<br>agriculture/for<br>estry | CSA, Improved livestock<br>management                                                                            |
| Myanmar  | Extremely high<br>(2nd)                    | Low (3,8)                                       | Adaptation,<br>agriculture/for<br>estry | CSA, Plant genetics/<br>plant<br>breeding                                                                        |
| Nepal    | Very high (24th)                           | Very low (1,2)                                  | Adaptation,<br>agriculture              | Improved agriculture and<br>land management (CSA,<br>IWM, CBNRM, SRI tec.),<br>Improved livestock<br>management. |

# Overview of major source documents

| Country     | TNA/TAP             | INDC | NDC | NAPA Projects | NAMA Projects | NAP |
|-------------|---------------------|------|-----|---------------|---------------|-----|
| Vietnam     | 2012                | Y    | n/a |               | 2             | n/a |
| Indonesia   | 2012                | Y    | Y   |               | 2             | n/a |
| Philippines | n/a                 | Y    | n/a |               |               | n/a |
| Malaysia    | n/a                 | Y    | n/a |               | 3             | n/a |
| Nepal       | 2010 n/a            | Y    | Y   | 9             |               | n/a |
| Cambodia    | 2013                | Y    | n/a | 20            |               | n/a |
| Myanmar     | Preliminary.<br>n/a | Y    | n/a | 12            |               | n/a |

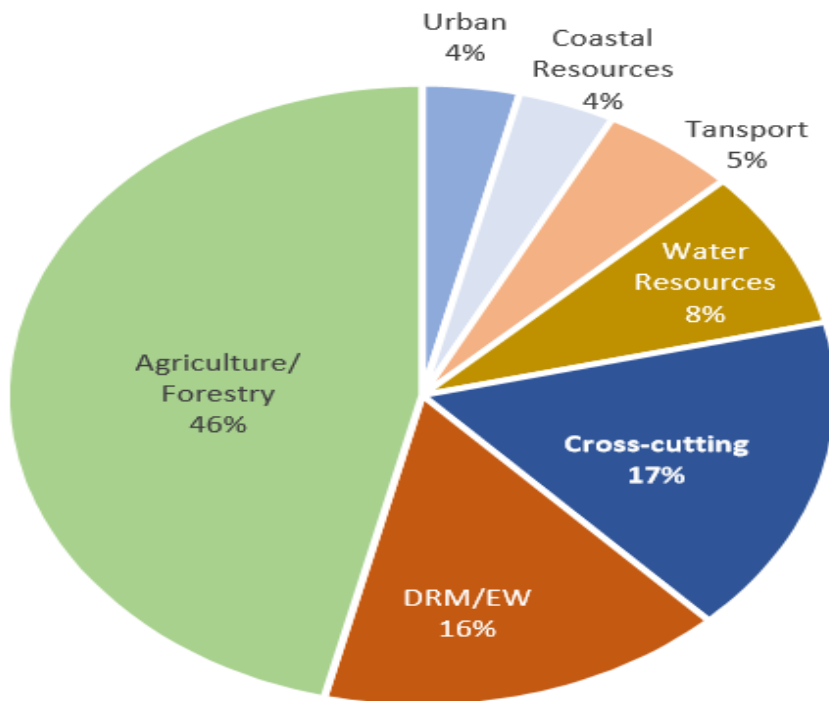
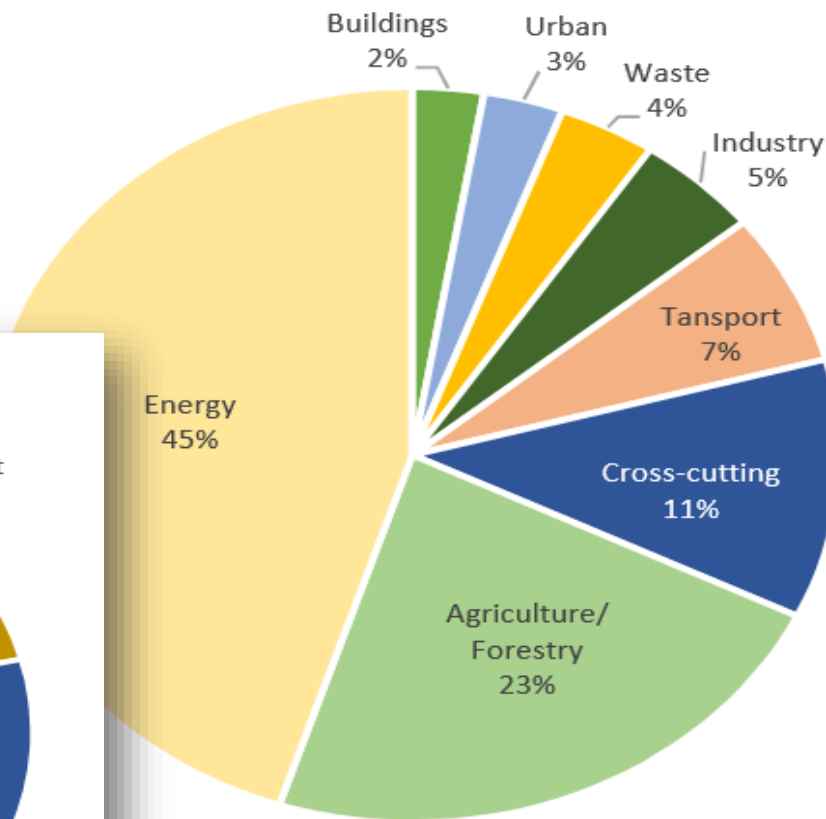
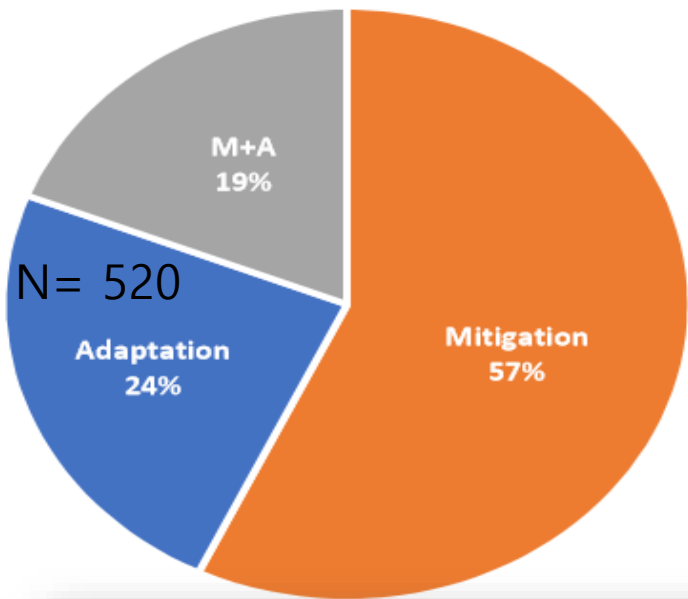
# List of Organizations for Project Database

| Organisation   | Source                                                           | Organisation           | Source             |
|----------------|------------------------------------------------------------------|------------------------|--------------------|
| NAMA           | UNFCCC Database                                                  | Gold Standard          | Markit Database    |
| World Bank     | Database                                                         | REDD                   | REDD Desk Database |
| IFC            | Database                                                         | JICA                   | Database           |
| GEF            | Database                                                         | ADB                    | Database           |
| UNDP           | Database                                                         | ACP-EU Energy Facility | Database           |
| UN Environment | Database, files by UN Env, UN Env Paris database for E- projects | EU                     | Database           |
| FAO            | Database                                                         | DFID                   | Database           |
| CIF            | Database                                                         | DANIDA                 | Database           |
| GCF            | Database                                                         | SIDA                   | Homepage           |
| AFD            | Database                                                         | NORAD                  | Homepage           |
| GIZ            | Database                                                         | SNV                    | Homepage           |
| VCS            | Markit Database                                                  | AusAID                 | Homepage           |
|                |                                                                  | USAID                  | Homepage           |

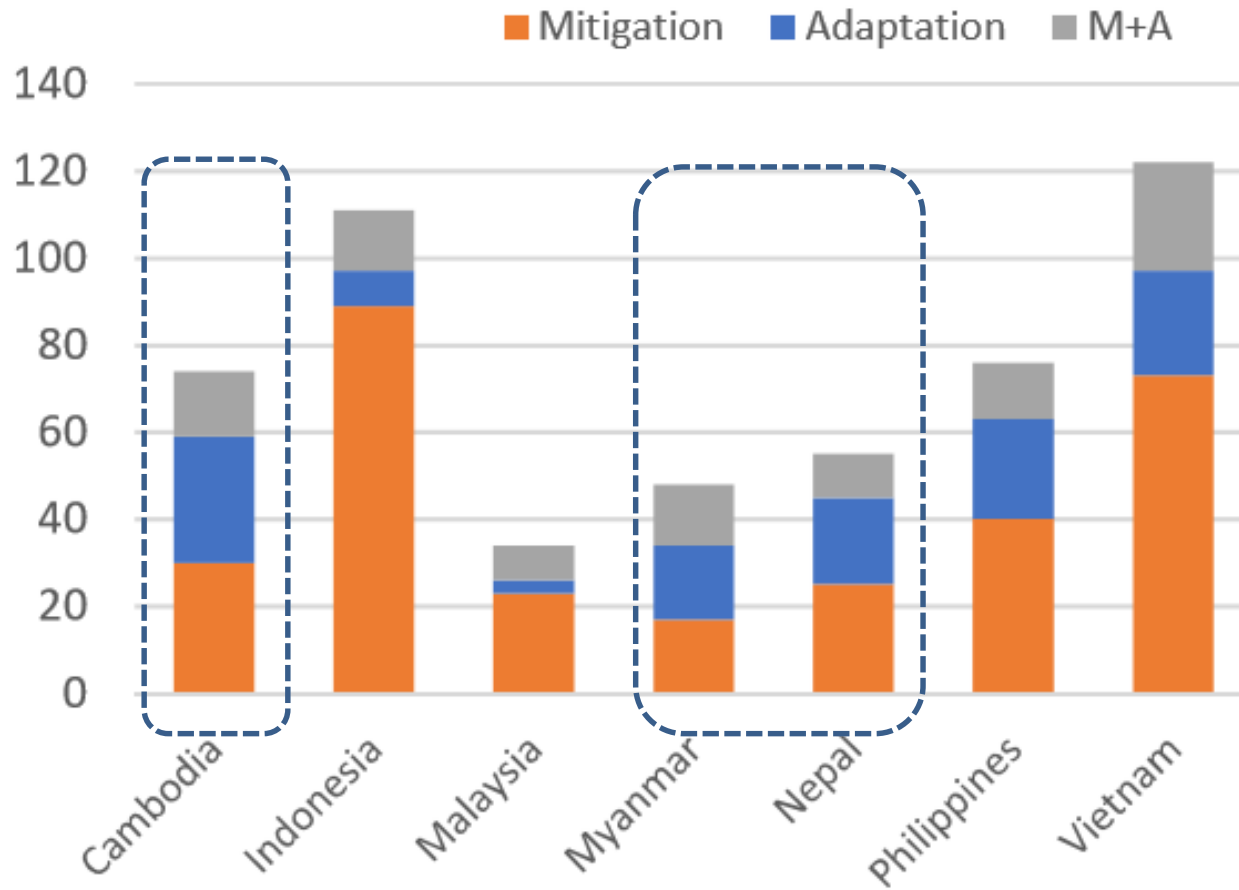
# Category of Sector, Technology, and Type of Service

| Sector                                               | Type of Service       |
|------------------------------------------------------|-----------------------|
| Energy                                               | Policy                |
| Transport                                            | Technology deployment |
| Buildings                                            | Finance readiness     |
| Urban                                                | Science               |
| Agriculture / Forestry                               | Capacity building     |
| Industry                                             | Planning              |
| Waste                                                | Carbon credit         |
| Water Resources                                      |                       |
| Coastal Resources                                    |                       |
| Disaster Risk Management /<br>Early Warning (DRM/EW) |                       |
| Cross-cutting                                        |                       |
| Health                                               |                       |

# Climate Projects Grouping

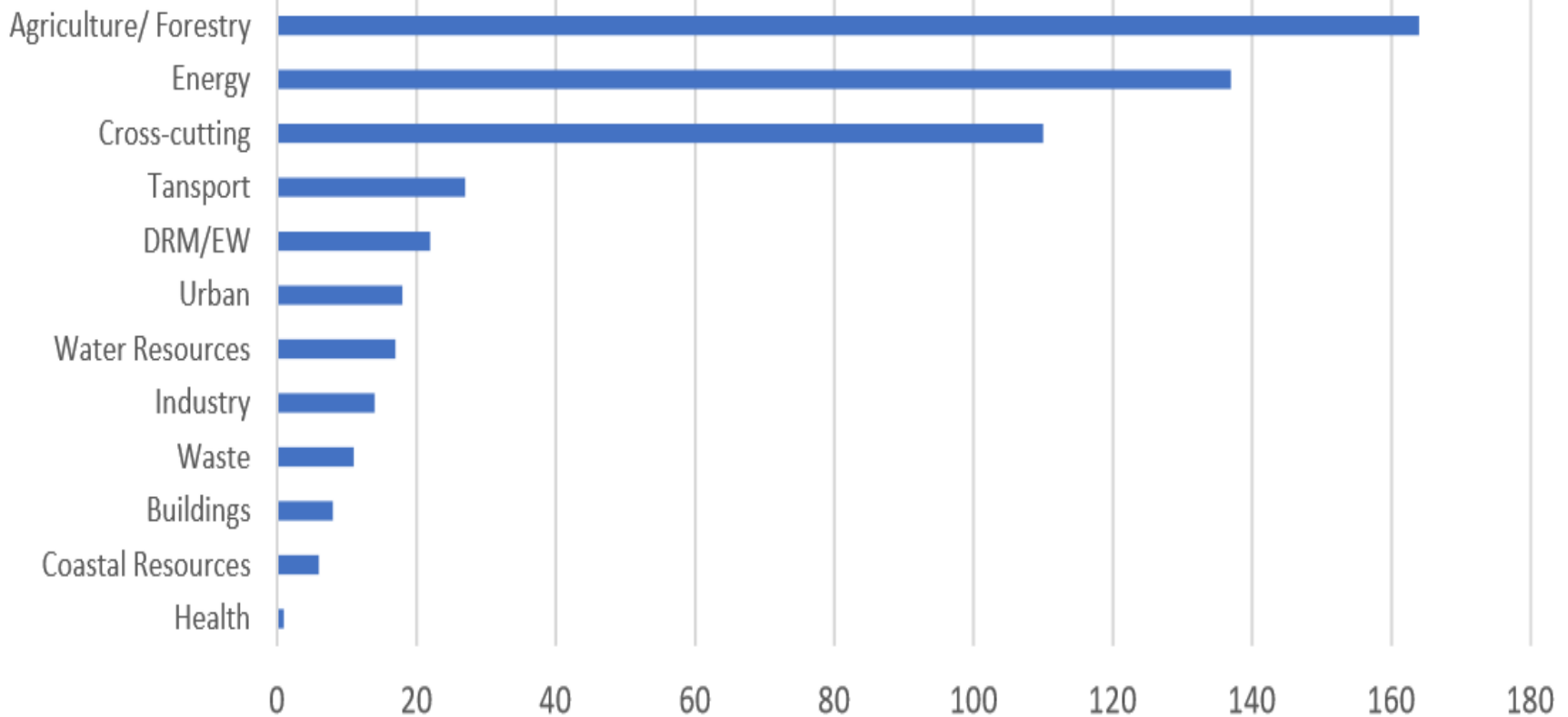


# Projects in Target Countries by Climate Action



Projects by country and climate action. N=520

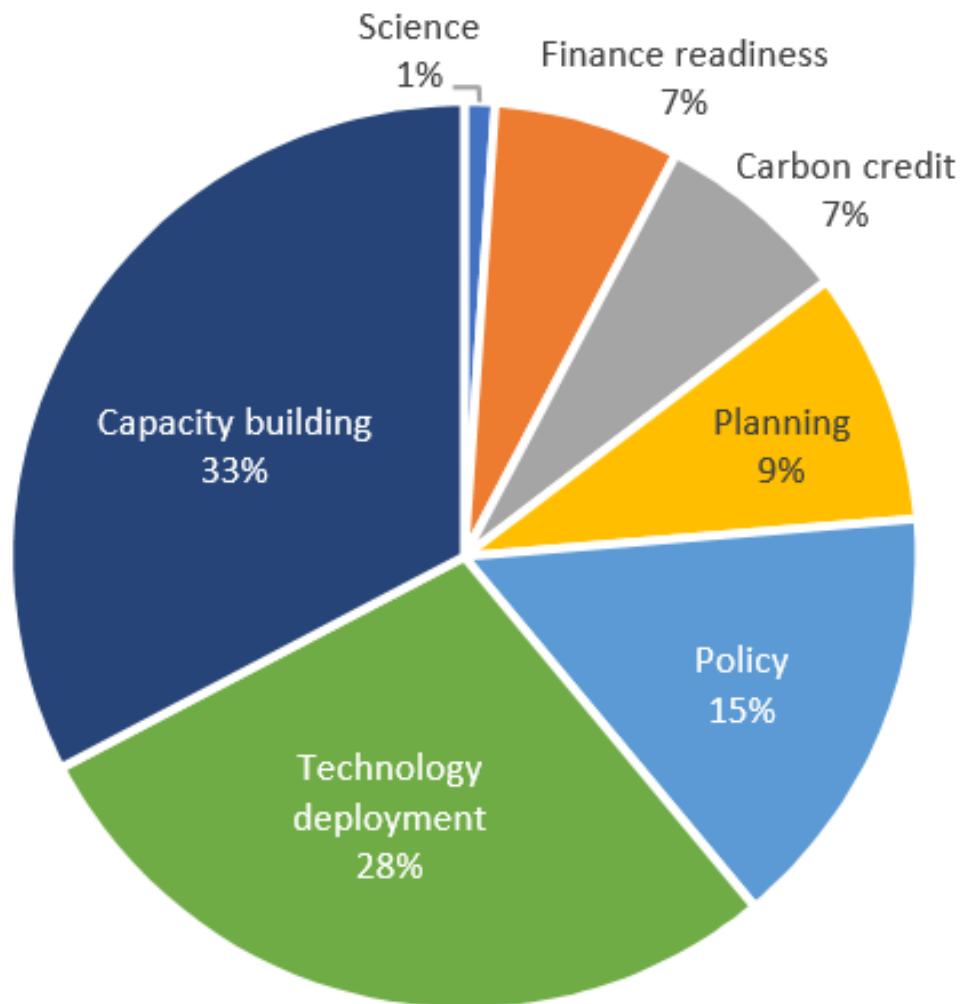
# Projects by Sector all Countries



N= 535



# Types of Service in all Projects



N= 921

## Adaptation

Plant Genetic/Breeding

Rice to upland grain

Triple cropping to double cropping + shrimp/fish/poultry crop

Plant Science/ Genetics in forestry

Agro-forestry

Sea - dyke

Coastal wetland Rehabilitation

Rooftop rainfall harvesting for households

Harvesting runoff water

Integrated River Basin Management

## Mitigation

Wind power

Energy-saving compact fluorescent lamps

Large-Scale Heat and Power (Cogeneration)

Bus rapid transit

Biogas

Nutrition improvement through controlled fodder supplements for livestock

Wet and dry irrigation in rice growth stages

Sustainable forest management

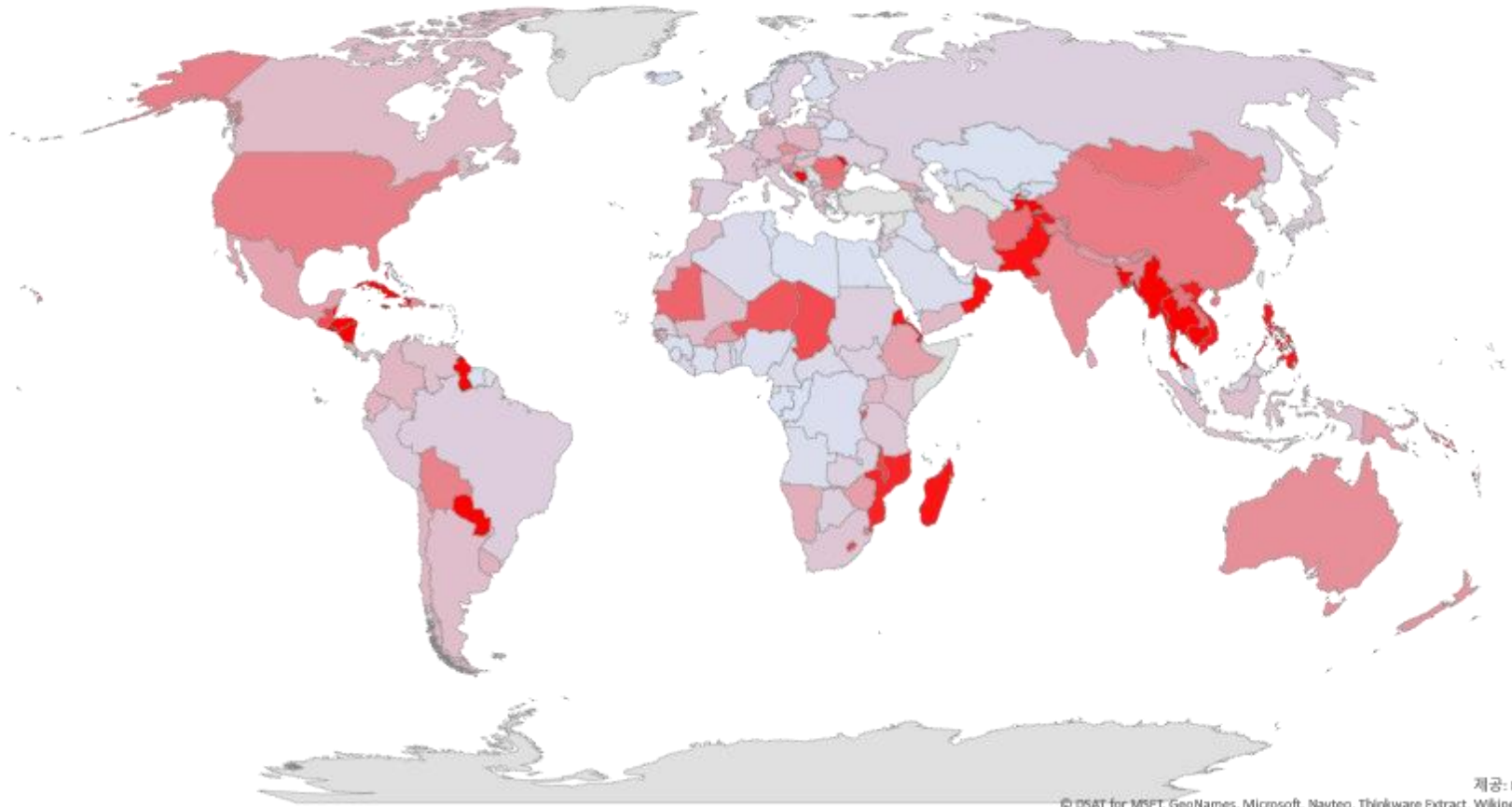
Afforestation and reforestation

Rehabilitation of mangrove

| Technology                                     | Benefits                                                                                         | Barriers                                                                                          | Recommendations                                                                                                                                                                                    |
|------------------------------------------------|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Forest &amp; Mangrove Restoration (M+A)</b> | GHG sink, forest products, bio-diversity, landslide, flood, inundation protection, fish breeding | Land use, usufruct, ownership, and zonation                                                       | Strong land use zonation and legal enforcement combined with adequate funds for fair compensation and feasible livelihood alternatives. Carbon credit schemes, PES, and central climate trust fund |
| <b>Plant Genetics/<br/>Plant Breeding (A)</b>  | Increased resilience and more efficient resource use                                             | Public opinion, smallholder risk and private sector contract management, long implementation time | Public research and extension support, agri-business involvement, crop insurance and input subsidies, legal support to farmer in contract management                                               |

# Losses Per unit GDP in % Mapping

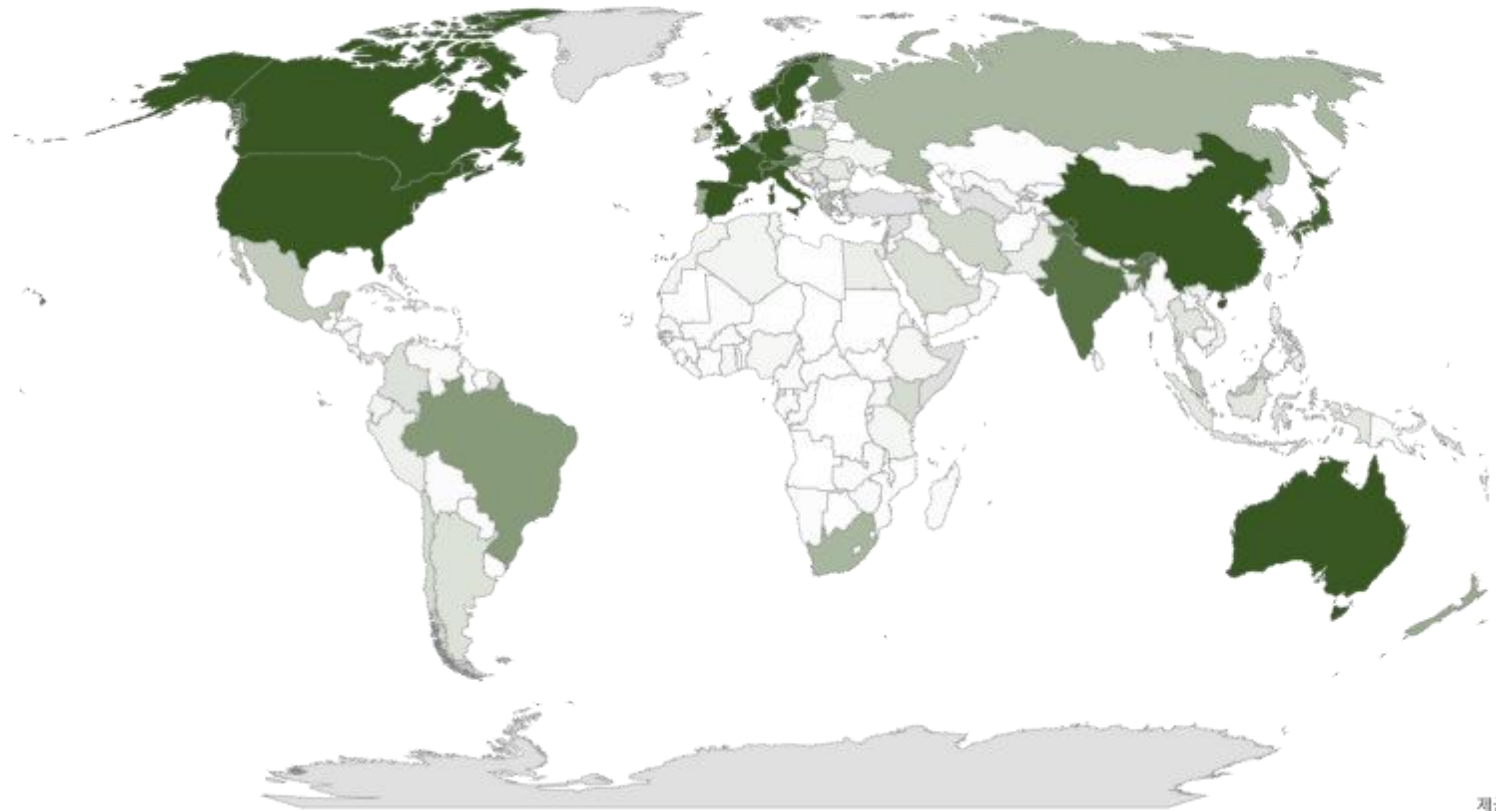
Losses per unit GDP in %  
Avg. 0.0000 0.6947



제공: Bing  
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# Climate Technology Gap Mapping

Climate Publication\*Field-Weighted Citation Impact

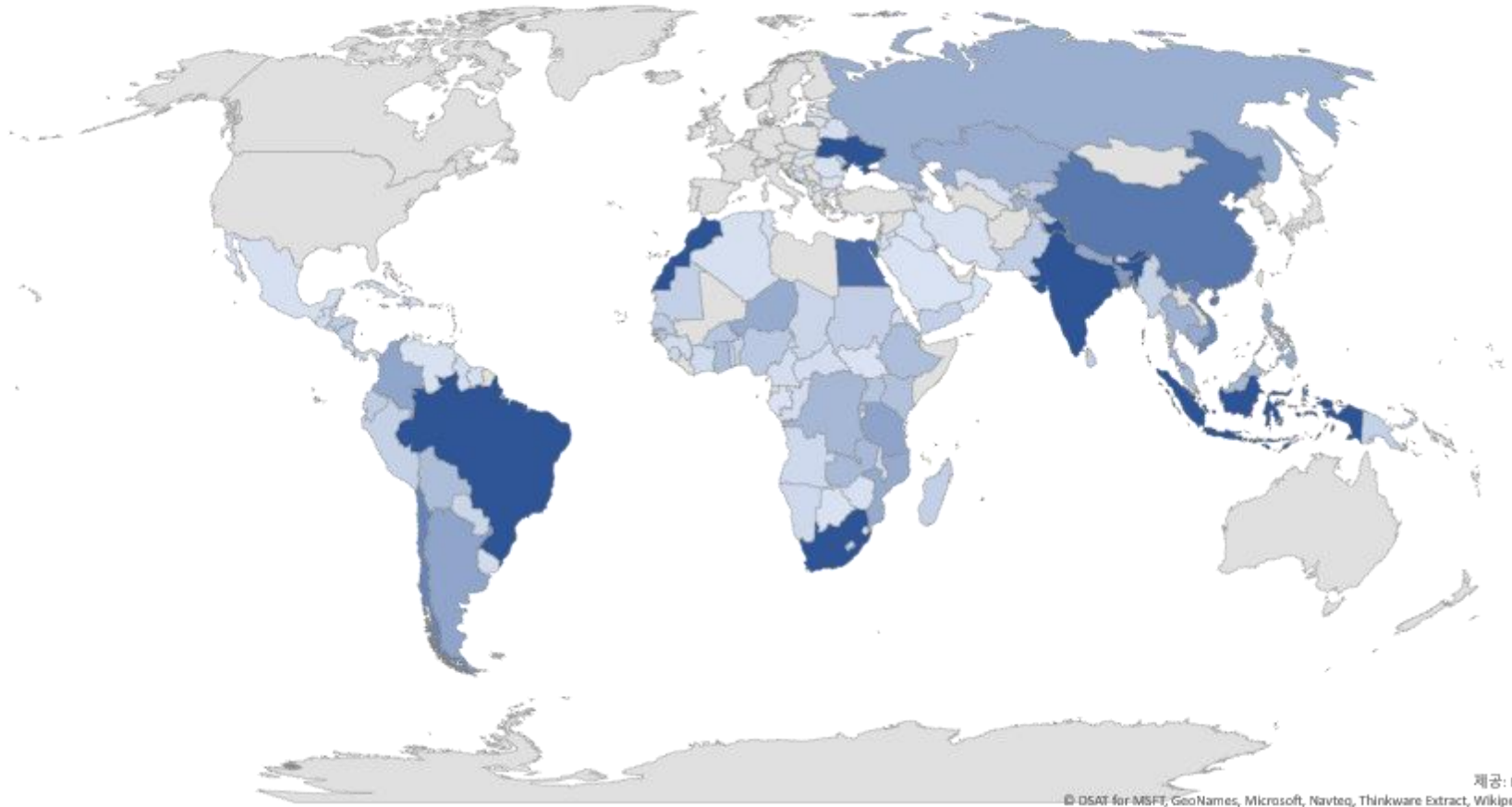


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# Amount of Funding Approved Mapping

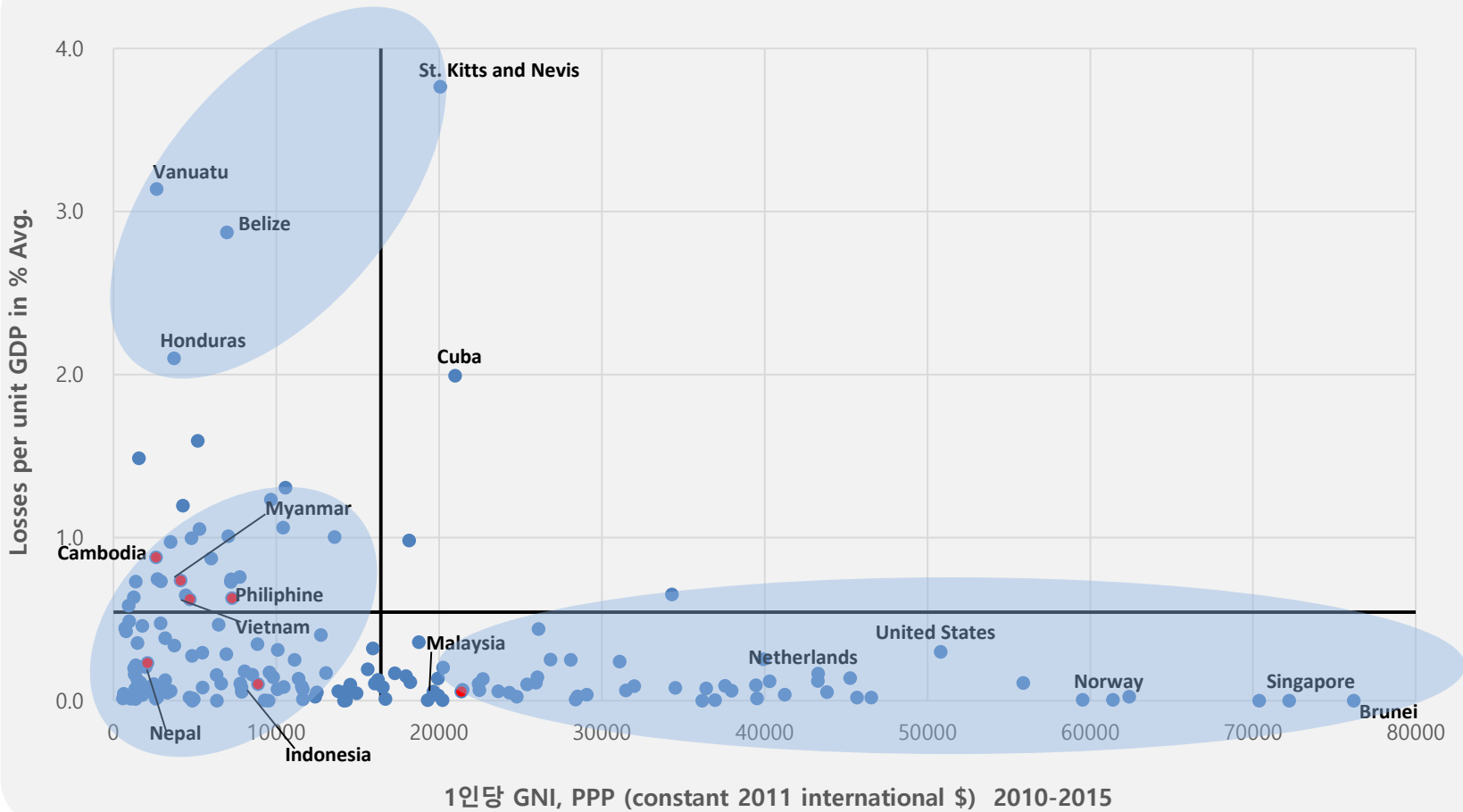
Amount of Funding Approved (USD millions)

0.352 430.7409048



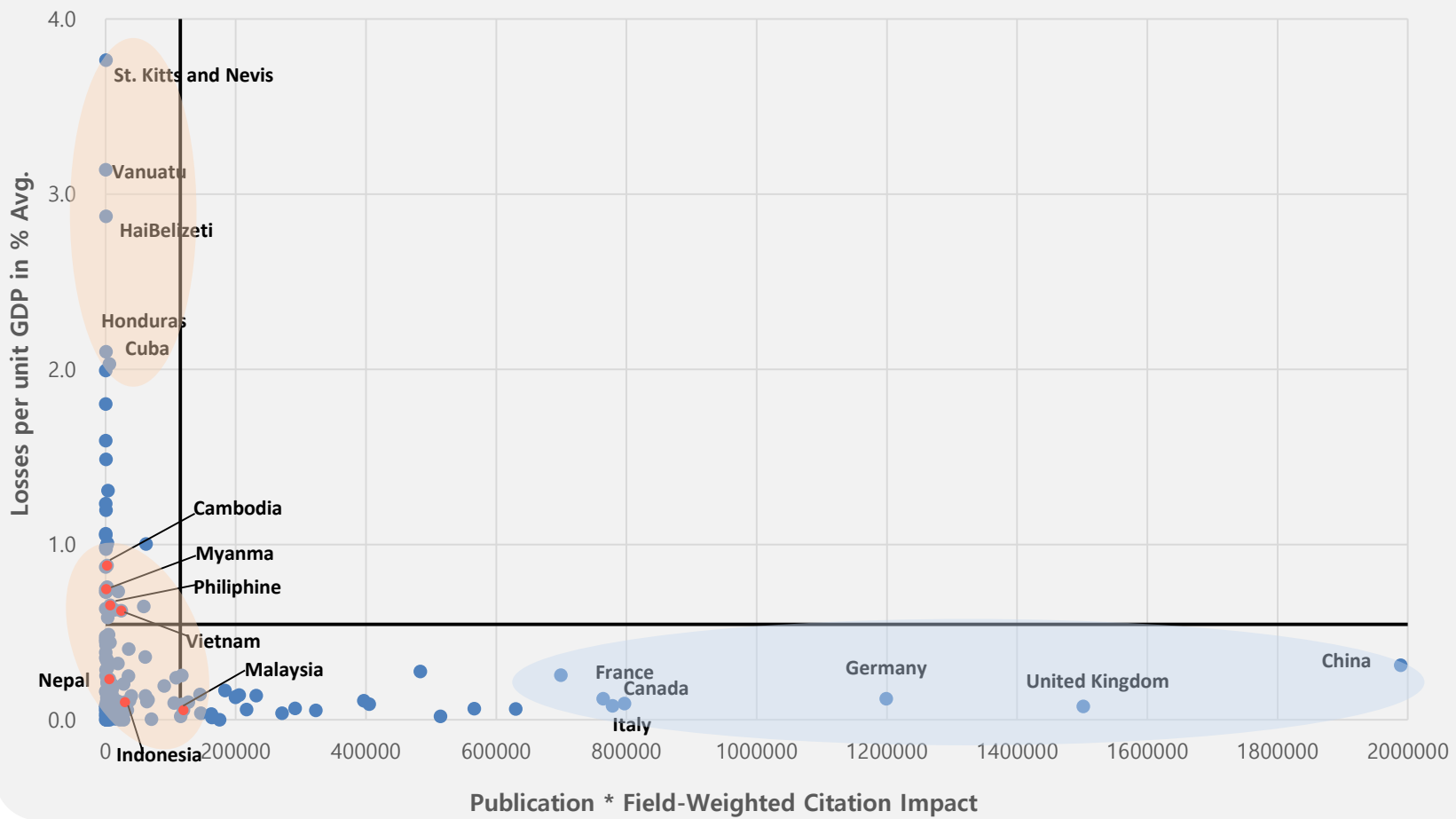
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# GNI per capita vs. Losses per unit GDP in % Avg.

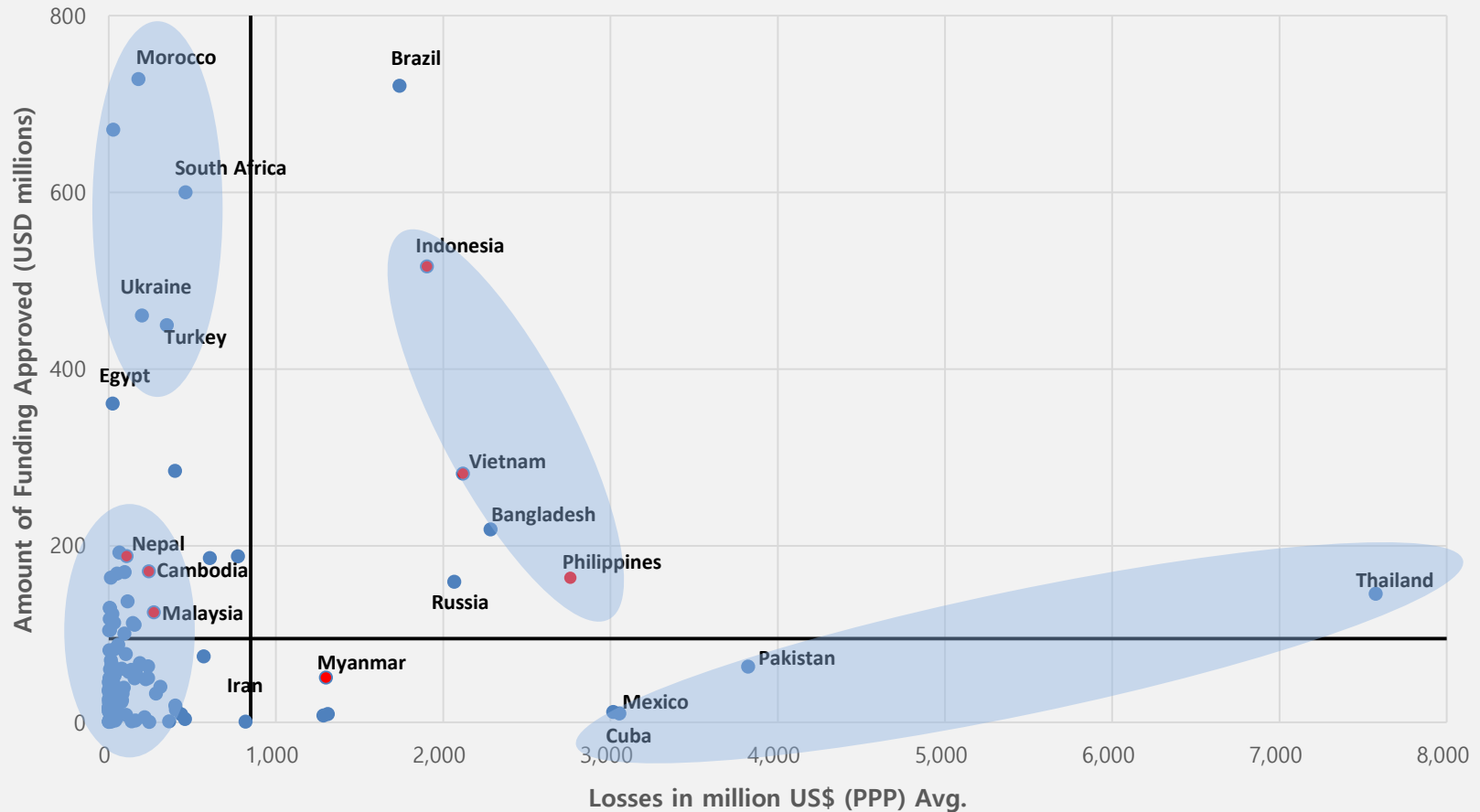




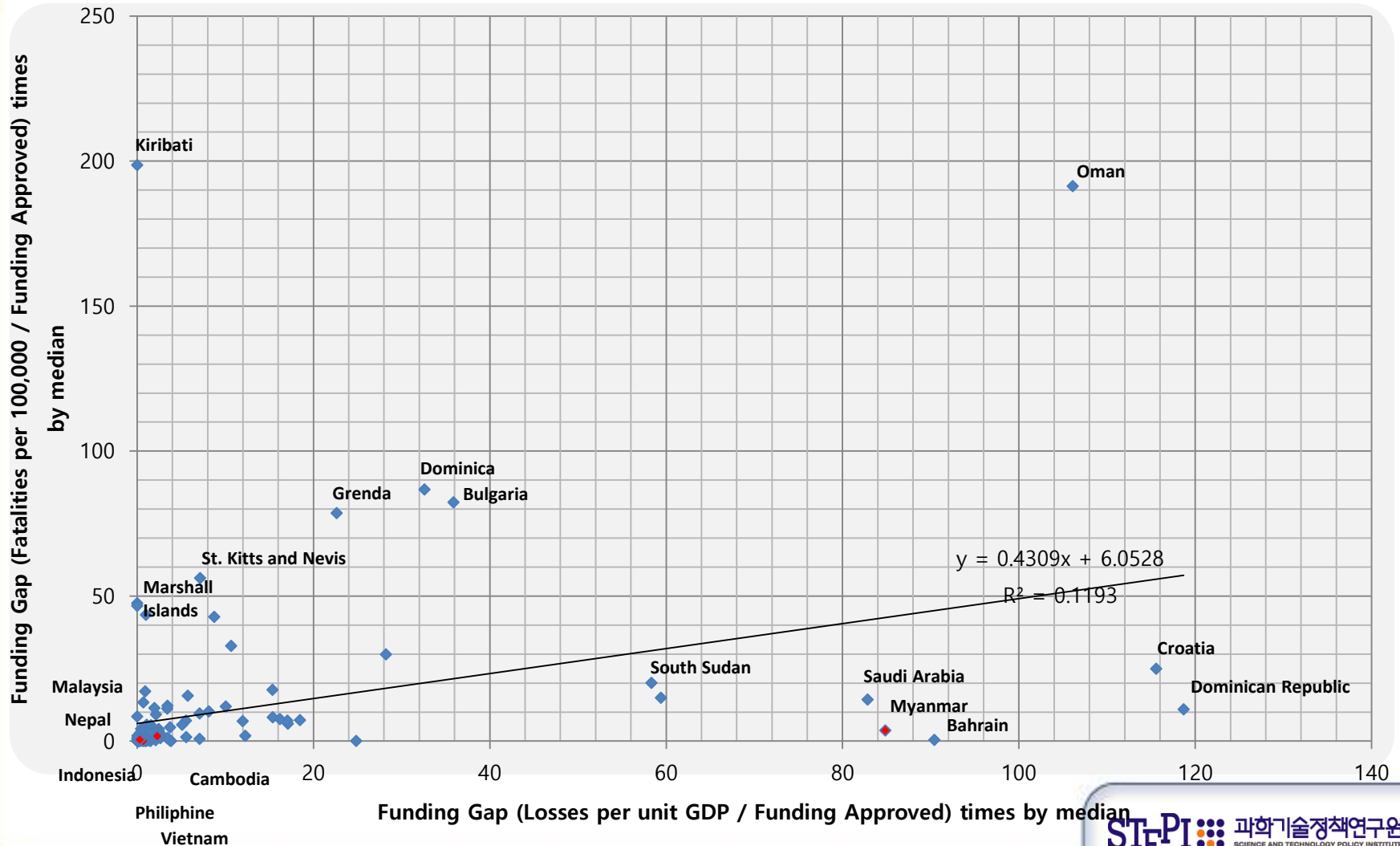
# Publication\* Field-Weighted Citation Impact vs. Losses per unit GDP in %Avg



# Losses in million US\$ (PPP) Avg vs. Amount of Funding Approved (USD millions)



# Funding Gap



- | **SDGs and Climate Change**
- || **Cases of Climate Technology Gaps in ASEAN**
- ||| **Korean Collaboration and Implications**

# Korean S&T Innovation Centers

## S&T Innovation Centers

2013. 07  
Phnom Penh,  
Cambodia

2014. 07  
Luang Prabang, Laos

2015. 07  
Pokhara, Nepal

Nepal

Laos

Cambodia

**Asia** (currently, 3 centers in operation)

Target countries : **Cambodia, Laos, Nepal,**  
Mongolia, Myanmar, Bangladesh,  
Vietnam, Indonesia, Philippines

**Africa** (No centers in operation)

Target countries : Nigeria, Ethiopia,  
Uganda, Cameroon, Kenya, Tanzania, DR Congo



# Project outcomes – (2) S&T Innovation Centers

## Cambodia

### Innovative Water Center

- **Research area**
  - De-watering the polluted drinking water (arsenic and metals, organic matter)
  - Cost-efficient pumps and de-watering facilities by using new renewable energy
- **Implementing Organization**
  - Scientists Without Borders

## Laos

### Sustainable Energy and Agriculture Center

- **Research area**
  - Self-generating energy through indigenous plants & agricultural byproducts
  - Producing agricultural processed goods by establishing small enterprises based on villages
- **Implementing Organization**
  - Sharing and Technologies Incorporated

## Nepal

### Innovation Technology & Entrepreneurship Center

- **Research area**
  - Developing New renewable energy
  - Developing agricultural appropriate technology
  - Organizing appropriate technology training for young entrepreneurs based on technology
- **Implementing Organization**
  - Handong University



# Project outcomes – (3) Raising public awareness

## 01 7<sup>th</sup> Creative Design Contest

- **Purpose** : To develop and disseminate appropriate technology to marginalized people (The other 90%)
- **Date / Venue** : May 22, 2015(Fri), Seoul National University
- **Activities** : 340 undergraduate/graduate students (75 teams) attended, 20 teams awarded through evaluation  
(1<sup>st</sup>: oral presentation, 2<sup>nd</sup>: exhibition)



### <Awardees>

| Prize           | Provider                       | Universities, team, (name of invention]                            |
|-----------------|--------------------------------|--------------------------------------------------------------------|
| 1 <sup>st</sup> | Minister of MSIP               | Gyeongsang Univ, 'Pharmglory', (Life Heat Source)                  |
| 2 <sup>nd</sup> | President of NRF               | Inha Univ, 'Tapio Clinic', (preventing epidemics: Tapiotizer)      |
|                 | President of Sanhak Foundation | KAIST, 'KAIDEA', (Braille Printer for blind people)                |
| 3 <sup>rd</sup> | President of UNITEF            | Kangwon Univ, 'Wisdom of Columbus', (Band Mouse for hand disabled) |



# Korean CTCN Network Members



*47 Korean network members out of 389 in total*

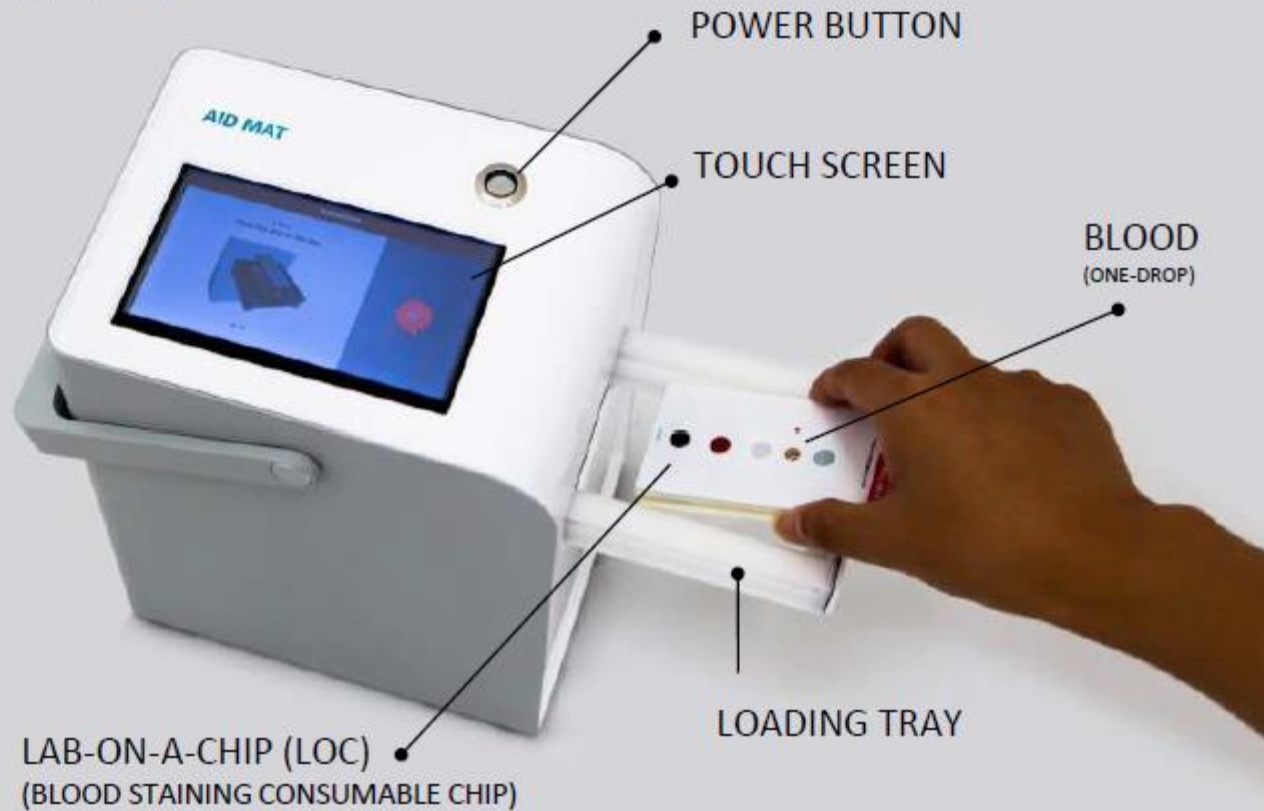


As of November 2017



# Mobile Console + LOC

1 US patent, 6 Korea patents

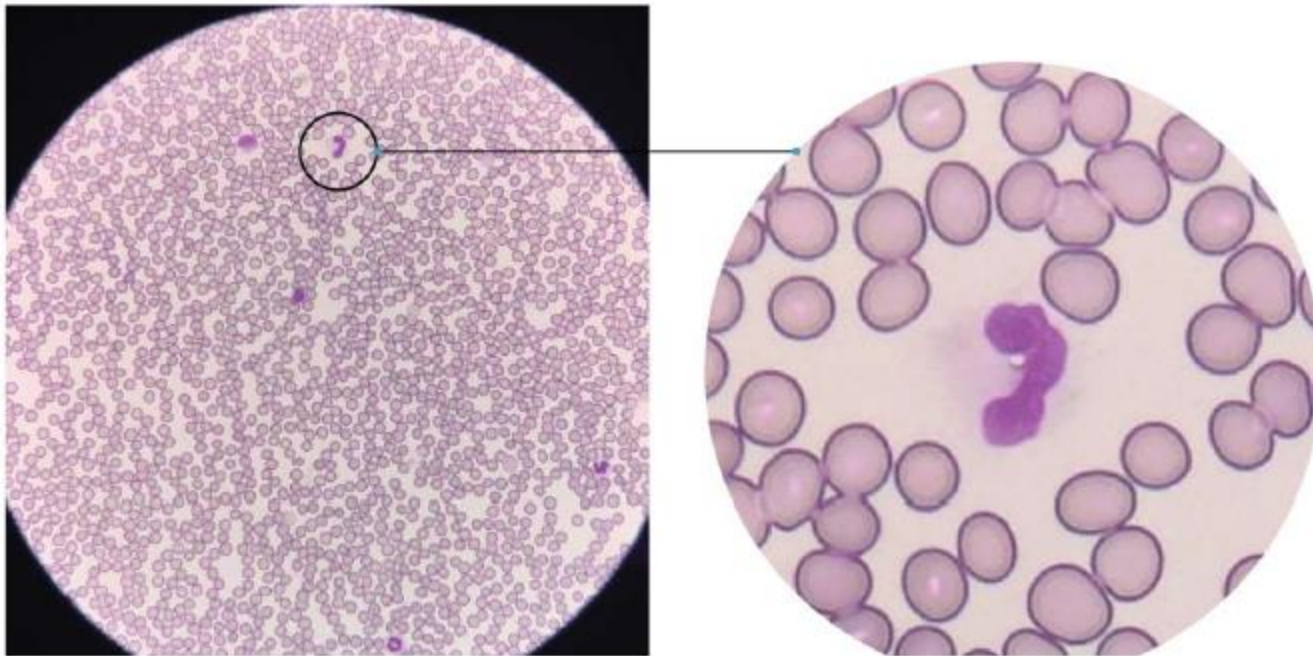


# FOR LAST 100 YEARS, **NOT** IMPROVED



# Blood Cell Classification by Deep Learning

## 99% Accuracy



Captured by

Normal Blood Sample

400x

## 2016 CAMBODIA CLINICAL TRIALS PHASE I





# 감사합니다!

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