사단법인 적정기술학회
Academic Society For Appropriate Technology

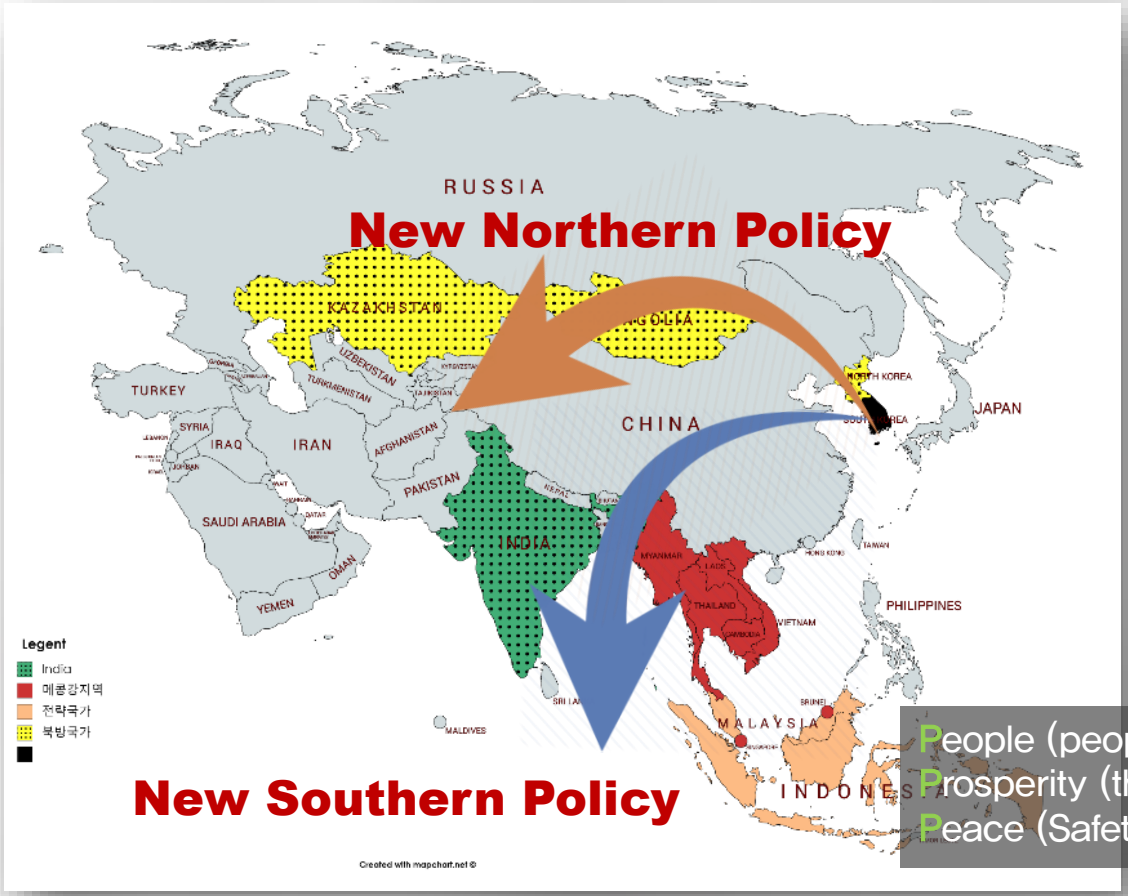
2019 the 13th World Ocean Forum

Strategy of Science & Technology ODA for implementation of New Southern Policy

Appropriate technology in water resources

| Kwanwoo Shin
President, Academic Society of Appropriate Technology
Professor, Sogang University

| New Southern Policy (NSP) : New Economic Territory via Diversification of diplomacy



- **Big 4 centered cooperation is now shifting to**

NNP (Mongolia + CIS)
NSP (ASEAN + India)

- tech, culture and human exchange
- Peaceful resolution of NK nuclear issue
- a Win–Win Prosperity Community

People (people's participation and human exchange)
Prosperity (through a sustainable economic growth)
Peace (Safety through political security cooperation)

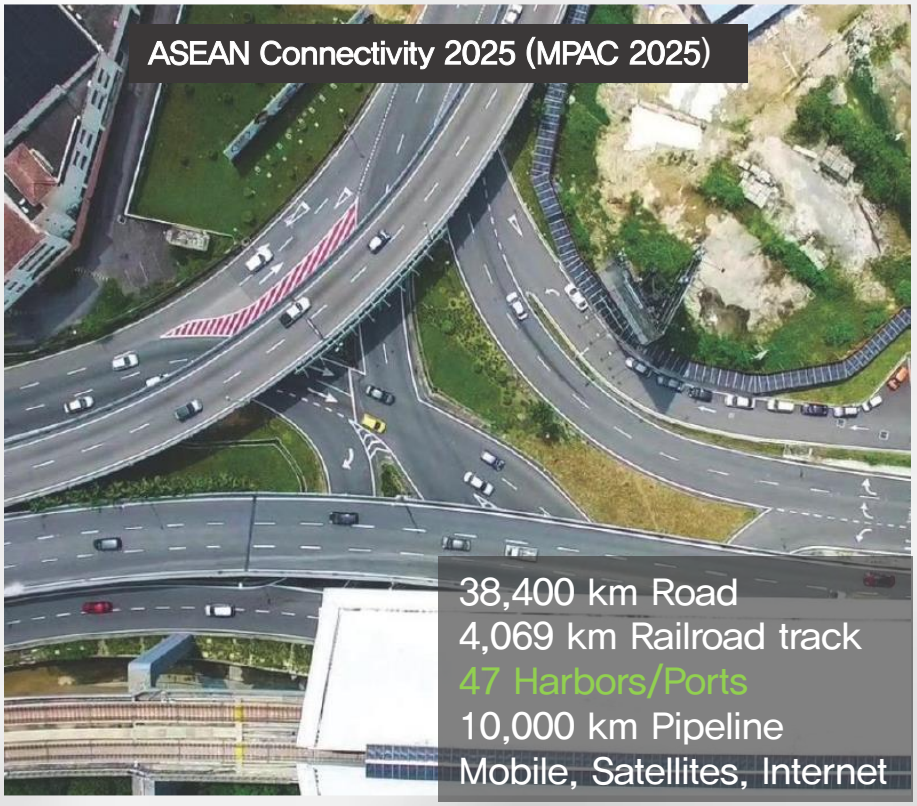
| Assessing **Korean Global Policy Initiative**, against China (*One Belt One Road*), US pivot and rebalance toward Asia–Pacific, and Japan's Indo–Pacific Policy.

| **After the inter–Korean Summit, NNP and NSP became a key project for peaceful coexistence and co–prosperity on the Korean Peninsula**

| New Southern Policy : Why ASEAN ?

ASSOCIATION OF SOUTHEAST ASIAN NATIONS

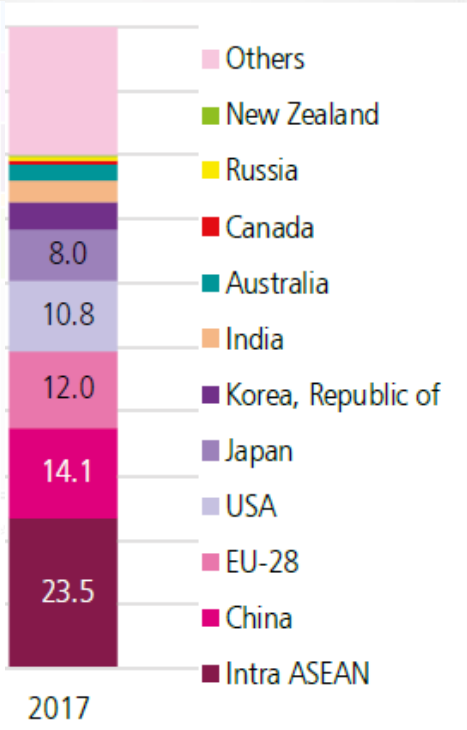
Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam



GDP (2018) billion$

Brunei	14.7
Cambodia	24.14
Indonesia	1 005.27
Laos	18.23
Malaysia	347.29
Myanmar	71.54
Philippines	331.68
Singapore	346.62
Thailand	490.12
Vietnam	241.43

ASEAN–Trading ranking



- Toward freer movement of goods, services, capital, and labors
- As a single market, $2.6 trillion is ranked in **#3 in Asia** and **#7 in the world.**
- a total of 600 million: the third largest labor force, after China and India.
- An average of 7% annual growth is expected by 2025.
- The ASEAN Infra Fund, is investing **$1 trillion in transportation and electricity.**

| China OBOR vs. Japan ASEAN 2025 (*KOICA, 2018, 43, Devel. and Issue)

Massive infrastructure investments, in the construction of transportation networks

Belt and Road Initiative (One Belt, One Road)

Connectivity Initiative : Mekong Tsubasa Bridge

- Formation of economy–based order with East Asian countries
- Expansion of regional *political hegemony* based on investment and aid

–As of 2022, rising to the world #1 investment nation
–Asymmetric interdependence relation
–Focus on maritime infrastructure construction
–Limits due to marine disputes with neighboring countries

- The 5 largest donor nations in the world through more than 60 years of international cooperation
- Leveraging ODA as a means of *economic hegemony*

–As of 2017, ranked 4th in the world, with 37.9% of total investment to Asia Region
–Connectivity Imitative: Supporting to ASEAN MPAC2025
–Focus on basic infra (water, energy, and transportation)
–Expansion of regional partnership, such as Japan–Mekong River Connectivity

Need for *a Strategic ASEAN Approach*, against China (*Political* Hegemony) and Japan (*Economic* Hegemony) Strategies

| Necessities of cooperation with ASEAN through S&T ODA

- ASEAN is Korea 2nd largest trade partner after China (higher than US and Japan)
- $ 158.9b in trade and $ 40b surplus ($ 120b in exports, and $ 59.6b in import, as of 2018)
- About 25% of the total budget of Korean ODA is invested in Southeast Asia
- Human exchange between Korea and ASEAN is approx. 11 million, and became the epicenter of the Hallyu (8.9 million outgoing, and 2.5 million incoming as of 2018)

- Korea is the only country, changed from an ODA beneficiary to an ODA donor

Approx. $12b in ODA benefits (1945–1995)

Approx. $ 2.7b in ODA budget in 2018 only. 15th largest among OECD–DAC countries

- ASEAN seeks to learn from Korea as a development model, through **education, ICT, S & T.**
- – About **37.4% of S&T ODA budget is concentrated in Asia.**

| Korea S&T ODA Vision and Goals

1) Development and capacity building of recipient countries' S&T and ICT sectors
2) Transferring appropriate technology and strengthening cooperation foundation for shared growth
3) Globalization of S & T and ICT and expansion of international leadership

S&T	ICT	Appropriate Technology

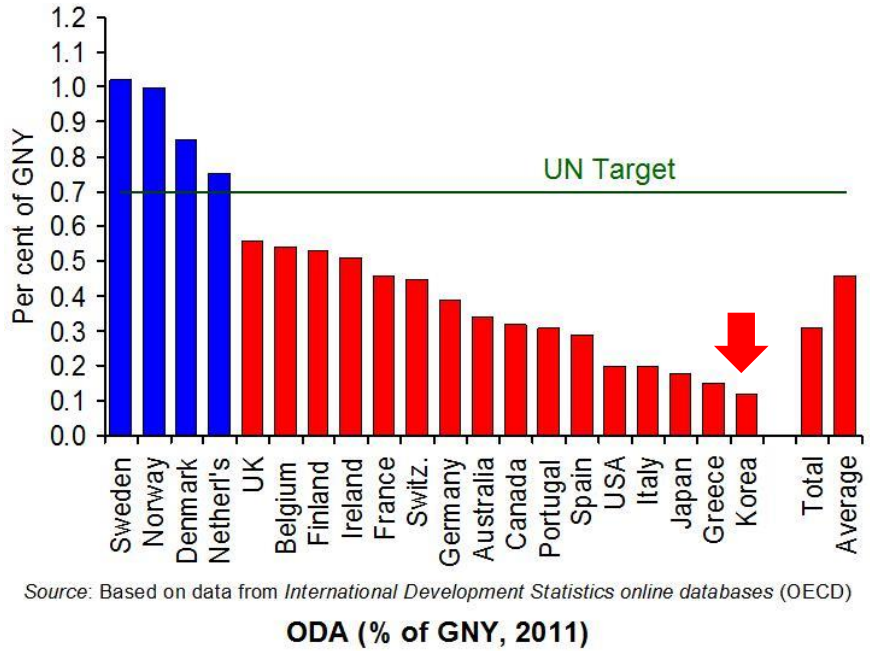
* Kwon (2015), Ministry of Science and ICT (2019)

Official Development Aid/Assistance ODA)

- Developed countries' official development assistance for developing countries to address underdevelopment, the gap between rich and poor, the environment and poverty includes grants, loans, reimbursements and technical assistance. Comprehensive funding and technical cooperation

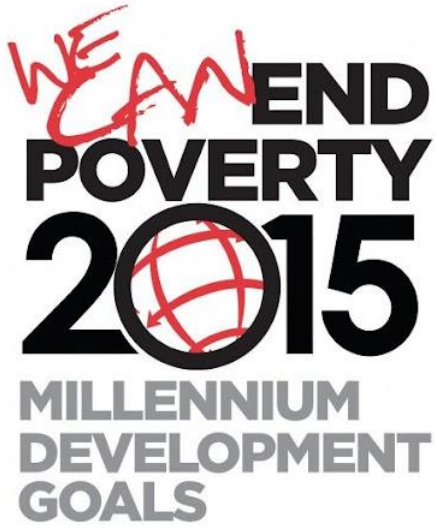
ECONOMIC DEVELOPMENT AND WELFARE AS THE MAIN OBJECTIVE

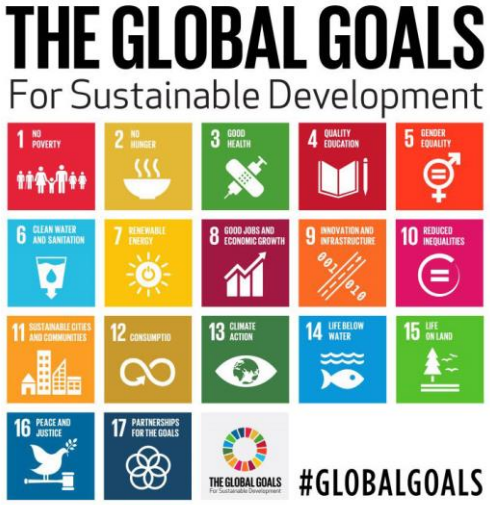
UN asking for more than 5 times of our current budgets



Source: Based on data from *International Development Statistics online databases* (OECD)

ODA (% of GNY, 2011)





ODA, at a same time…….

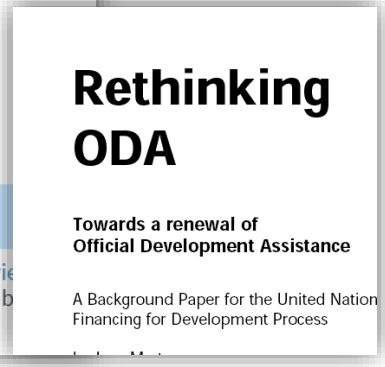
COA confirms problems with ODA projects; billions of pesos wasted

February 21, 2008 10:49pm
Tags: officialdevelopmentassistance
By KAREN TIONGSON-MAYRINA, GMA News Research

Foreign loans or official development assistance (ODA) have been touted as manna from heaven, with their lower interest rates and longer payment terms.

Related Link:
ODA Audit Report
2006 ODA Portfolio Revie

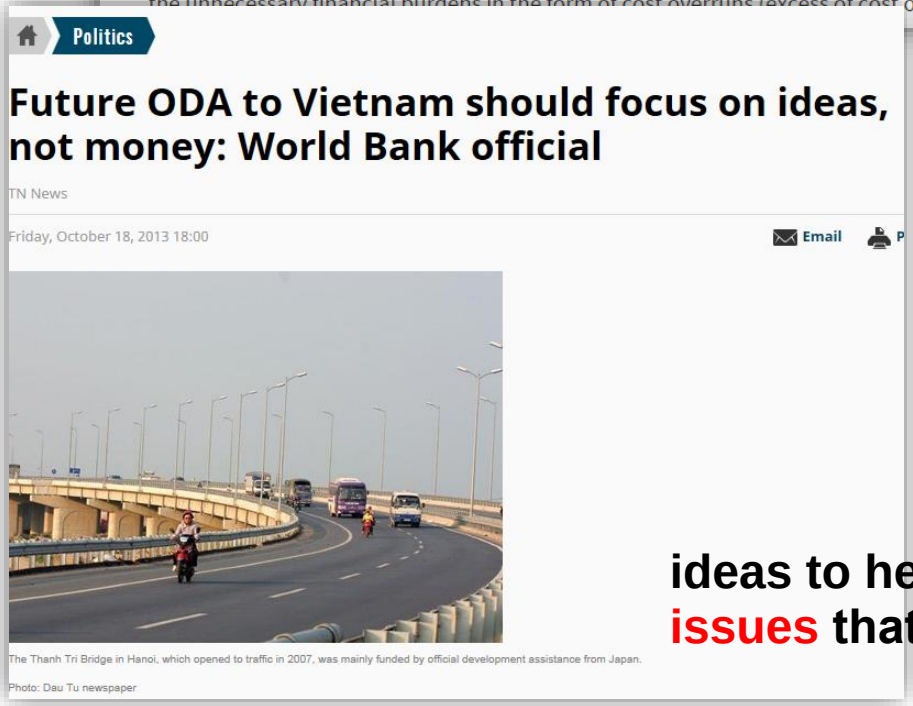
Although these foreign-assisted loans could yield development projects, the other side of the coin may b
the unnecessary financial burdens in the form of cost overruns (excess of cost over budget) and



Rethinking ODA

Towards a renewal of Official Development Assistance

A Background Paper for the United Nation Financing for Development Process



Politics

Future ODA to Vietnam should focus on ideas, not money: World Bank official

TN News

Friday, October 18, 2013 18:00

Email

The Thanh Tri Bridge in Hanoi, which opened to traffic in 2007, was mainly funded by official development assistance from Japan.

Photo: Dau Tu newspaper

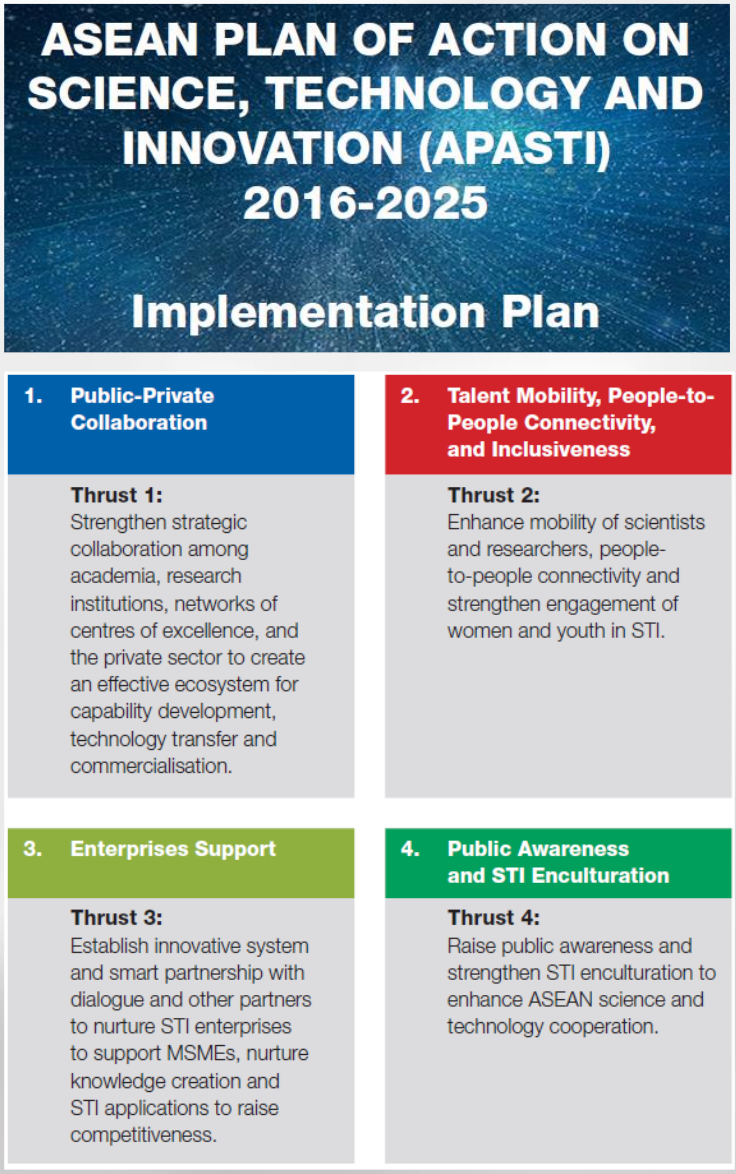
- Our or their perspectives
- Too much dependable
- Excessive and waist support
- Lacking in management
- Money drains

……

It is not always making a solution

ideas to help solve specific complex issues that countries face……

| ASEAN S & T Policy (2016–2025) (*APASTI Plan)



▪ VISION

ASEAN will be, through science, technology and innovation, **Innovative, competitive, vibrant, sustainable** & **economically integrated.**

▪ GOALS

1) **STI is ASEAN greatest challenge and goal.**
2) As an economic community, strengthens public–private cooperation
3) STI is the most effective way to overcome the poverty.
4) The sustainable STI can be only achievable through ICT, youth, women and the private sector.
5) Activating R&D cooperation, technology industrialization, entrepreneurship, and international network
6) STI bridges the gaps between ASEAN countries and between ASEAN and developed countries.

▪ ACTION PLAN

1. Strengthen technical cooperation among universities, institutes and the private sector.
2. Improving the exchange of scientists and the education of STI for young people.
3. Discovering technology based companies and industries, and strengthening knowledge–based industries
4. Strengthening the cooperation with S&T in the region, and public awareness.

- **ASEAN calls for S&T and Innovation and needs S&T ODA from Korea !**

| Current Status of S & T ODA in Korea

국무조정실 2018년도 ODA 예산 계획(안)

□ 총괄

(단위: 억원)

ODA 시행부처(기관)	2017			2018		
	양자 무상	다자	합계	양자 무상	다자	합계
국무조정실	64.4	-	64.4	96.2	-	96.2

과학기술정보통신부 2018년도 ODA 예산 계획(안)

□ 총괄

(단위: 억원)

ODA 시행부처(기관)	2017			2018		
	양자 무상	다자	합계	양자 무상	다자	합계
과학기술정보통신부	112.4	12.4	124.9	131.9	12.3	144.1

※ 다자성양자는 양자에 포함

○ '18년도 ODA 시행목표

- 과학기술 및 ICT 사업을 통해 개도국의 지속가능한 발전 및 협력대상국과의 경제협력 관계 증진

< 단계별 운영내용 >

1단계(2014~2015) 센터설치·운영 기반구축	2단계(2016~2018) 적정기술보급 시행·지원	3단계(2019~2023) 적정기술 선도·확산
• 지구촌기술나눔센터 설치 • 정보시스템 구축 • 현지 거점센터 지원 • 국내외 네트워크 구축	• 적정기술 개발 및 지원 • 적정기술 네트워크 활성화 • 현지거점센터 비즈니스 지원 • 적정기술 교육과정 운영	• 적정기술개발 선도 • 적정기술 네트워크 확산 • 인접국적정기술사업 확산

10

Network building → Appropriate Technology → Network spreading

- Among 491b won in all S&T ODA, about 14.1b won is for Ministry of Science and ICT : Project (47%), Consulting (9%), Training (13%), Technical Cooperation (5%), Private Cooperation (5.6%) and Multilateral (8.5%)
- Notably,
  - Focus on bilateral projects
  - The recipient country's requests are required.
  - Link with SDG goals.
  - 37.4% for Asia, 31.8% for Africa
- Major Projects

  Through National Research Foundation (NRF)
  - Inter-institutional projects (50 – 100m won)
  - Center for Appropriate Technology (500m won per year for 4years)
  - Leading International Cooperation University (Min. of Education) ; 400m won per year for 4 years
  - others : ICT information and broadcasting (7b won in 2015)

- Critics (KOFST report, 2018)

1) ODA for STI growth
2) Monitoring and follow-up management
3) Cooperation with international organizations
4) Evaluation of the previous projects
5) Needs for the Integrated management agency
6) ODA projects sharing Korea development model

Successful ODA models are urgently needed !

| ODA Strategies from the Ministry of Science and ICT (*2019 March)

과학기술외교 강화를 위한

과학기술ODA 활성화 방안

2019.3.28

- 과기정통부 업무계획 (2019. 3)

5. 과학기술 · ICT기반 포용사회 구현

(3) 함께 잘사는 따뜻한 사회 구현

⑤ 공동번영을 위한 과학기술 · ICT 외교확대

○ (ODA) 과학기술·ICT ODA 확산을 통한 글로벌 동반성장 기여 및 개도국과 파트너십 강화

- 과학기술 ODA 10대 선도 프로젝트*의 순차적 추진 등 과학기술 ODA 활성화 방안('18.11월)의 차질 없는 이행

* ①연구기관(V-KIST)·과기특성화대(케냐 KAIST), ②과학기술 클러스터, ③ICT 기반구축, ④글로벌 문제해결의 4대 유형 10대 과학기술 선도 프로젝트

- 개도국 ICT 통합 지원 및 성과 확산 체계 구축을 통해 개도국 ICT 발전 및 우리기업 신시장 진출 지원

VKIST

한-베 과학기술연구원 (Vietnam-Korea Institute of Science and Technology)

KIST 모델을 전수하여 산업기술 R&D 수행이 가능한 종합연구기관 설립

한국 최대의 과학기술ODA 프로젝트 (3,500만 불)

KAIST

케냐 과학기술원 (Kenya Advanced Institute of Science and Technology)

KAIST 모델을 기반으로 케냐 고등과학기술인력 양성을 위한 과학기술특성화대학 설립 지원

과학기술ODA 내실화 및 효과성·전략성 제고를 위한 과제

1. 범정부 과학기술ODA 전략적 추진체계 마련·운영
2. 국내 R&D와 과학기술ODA 연계 강화
3. 국제기구 및 NGO와의 협력에 기반한 다자간협력, 국제공조 확대

수혜국 과학기술 역량 제고	과학기술ODA 전문성·책임성 강화	전략적 추진체계 운영
[현재] 단기·소규모 개별 프로젝트 개별 도시·마을 문제 해결	[현재] 유형별·분야별 전담기관 부재, 인센티브 확대	[현재] 기관별 개별 시행 연계 미흡
[변화] 중장기·패키지형 연계 프로그램 국가 차원의 과학기술 자립 지원	[변화] 전담기관 지정 과학기술ODA 거점화	[변화] 과학기술 ODA 연계·협업 강화

Middle-long term | Dedicated Agency | Regional Organization | inter-institutional collaboration

전 략	추 진 과 제
수혜국 과학기술 자립 역량 제고	유형별 과학기술ODA 모델 마련 및 전주기 지원 강화 수혜국 공동문제 해결 지원 강화 국내 R&D와 과학기술ODA 연계 강화
과학기술ODA 전문성·책임성 강화	과학기술ODA 사업 주관 연구기관 운영 수혜국 과학기술 인력교육 강화 과학기술ODA 전문인력 육성
과학기술ODA 전략적 추진체계 운영	타부문 ODA에 과학기술 요소 강화 과학기술ODA 추진체계 정비 국제기구·NGO 등과의 파트너십 강화

| What is the S & T infrastructure in a nation? (*KISTEP, 2018, IMD2018)

과학 인프라 지표	SCIENCE
총 연구개발투자	R&D investment
GDP대비 총 연구개발투자비 비중	
국민 1인당 연구개발투자	
기업 연구개발비 지출	
GDP대비 기업의 연구개발비 비중	R&D personnel
총 연구개발인력	
인구 천 명당 연구개발인력	
기업 총 연구개발인력	
인구 천 명당 기업 연구개발인력	S&T education
인구 천 명당 R&D 연구자	
과학기술분야 학사학위비율	
과학분야 논문 수	Research achievement
노벨상 수상	
인구 백만 명당 노벨상 수상	
출원인 국적별 특허 출원 수	Patents Acquisition
인구 10만 명당 출원인 국적별 특허 출원 수	
출원인 국적별 특허 등록 수	
인구 10만 명당 출원인 국적별 권리유효 특허건수	
GDP대비 지식 및 기술집약산업의 부가가치 비중	S&T awareness
과학연구 수준이 국제적 기준보다 높은 정도*	
연구자/과학자가 국가에 매력을 느끼는 정도*	
과학연구 관련 법률의 혁신 지원정도*	
지적재산권의 보호정도*	Industrial innovation
산·학 간의 지식 전달정도*	
기업의 혁신역량*	

기술 인프라 지표	TECH.
GDP대비 통신분야 투자 비중	ICT investment
모바일 브로드밴드 가입자 비중	
1인당 월평균 이동전화 요금	
기업의 요구에 대한 통신기술의 충족도*	Mobile infrastructure
전 세계 사용 컴퓨터 수 대비 점유율	
인구 천 명당 컴퓨터 수	
인구 천 명당 인터넷 사용자 수	Internet infrastructure
인구 천 명당 브로드밴드 가입자 수	
평균 인터넷 대역폭 속도	
디지털 기술의 사용 용이성*	Manpower
수준급 엔지니어 공급정도*	
기업 간 기술협력정도*	
공공 및 민간부문의 벤처가 기술개발을 지원하는 정도*	Venture capital
법적환경이 기술개발 및 응용을 지원하는 정도*	
기술개발자금의 충분성*	
첨단기술제품의 수출액	Cutting-edge technology
제조업 수출액 중 첨단기술제품 비중	
서비스 수출액 중 ICT 서비스 비중	
사이버보안이 기업에서 적절히 다루어지는 정도*	IMD 2018

- There is no difference in S&T infrastructure between us and ASEAN!

| S&T ODA, How to approach?

TRADITIONAL Approach

Science ODA

Technology ODA

Human Development

- Secondary schools for basic science education
- Colleges for Science Education
- Nurturing talented students
- Supporting lab and facilities

Science Teacher Training, STEAM education
Science Lecture support, hands on education
Academic degree program, and Joint research labs

- **Spread across the sustainable development goals**

Anti-Poverty, food, health, education, gender equality water-toilet and hygiene, energy, labor, industrialization, innovation, inequality, sustainable cities, climate change marine and forest resource protection, peace and justice, human prosperity (SDGs)

economy labors	water environment energy	health food & poverty	SUSTAINABLE DEVELOPMENT GOALS

ICT Infrastructure

- Wireless communication, internet infra structures
- Broadcasting communication
- IT human resources for SW & AI
- Strengthen tech-industry

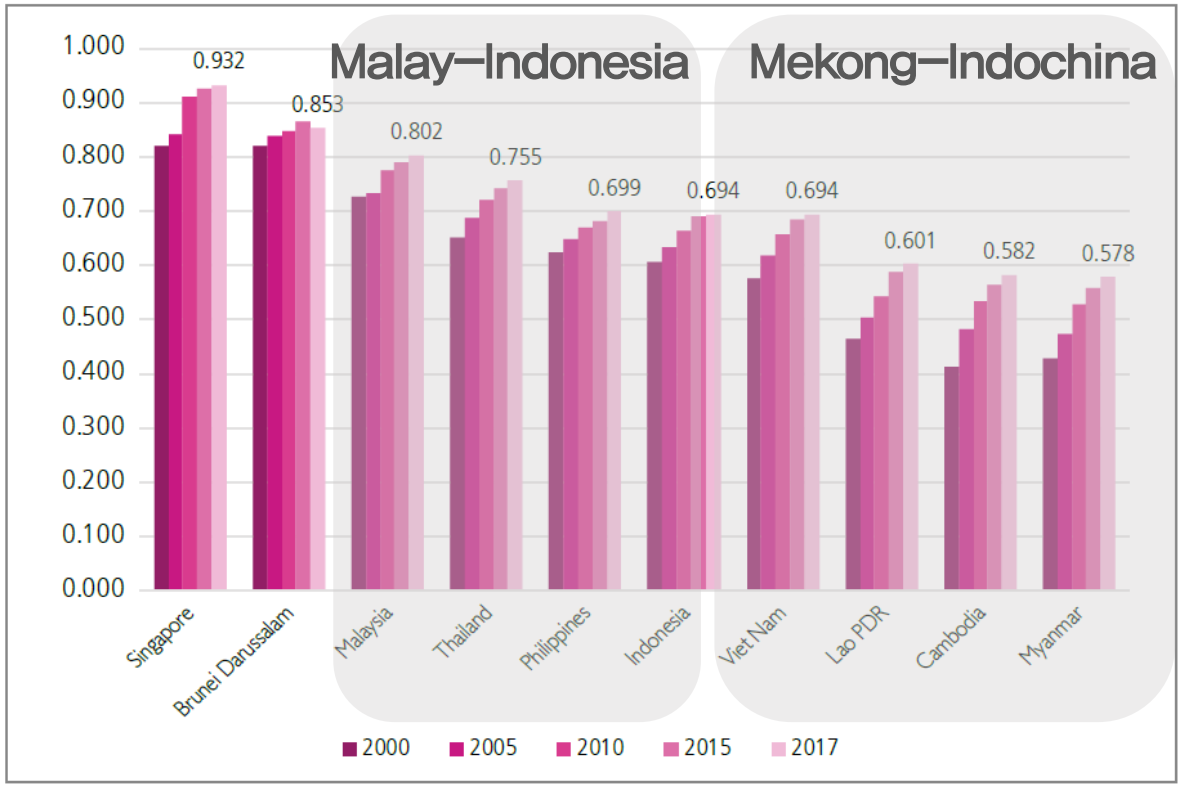
5G service, 4th industrial revolution, digital broadcasting, IT education and software curriculum, start-up wireless payment, and industrialization policies

- S&T and Education
- ICT infrastructure

| Strategic approach to S&T ODA (*2018 UNDP/ASEAN statistics)

Need for regional and multilateral access

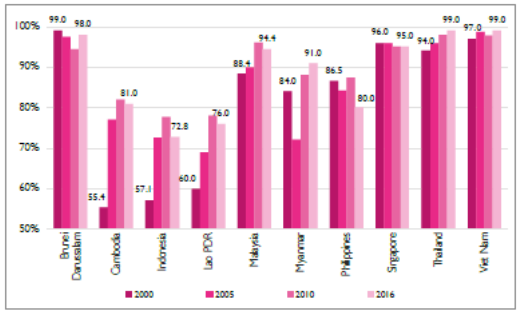
Figure 4.4. Human Development Index, ASEAN Member States, 2000-2017



Source: UNDP, Human Development Reports series.

Vulnerable counties in healthcare
– Cambodia, Indonesia, Laos, Myanmar and Philippines

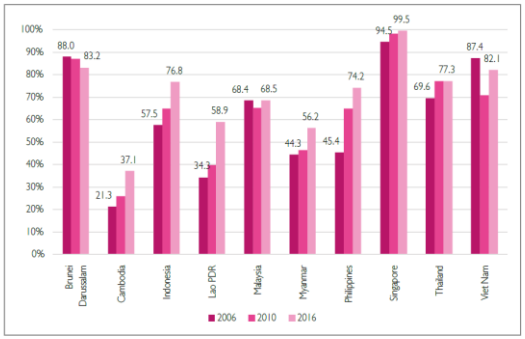
Figure 3.1. Coverage of immunisation against measles among one-year old children (%), ASEAN Member States, 2000-2016



Source: ASEAN Secretariat, ASEANstats database.

Venerable countries in secondary education
– Cambodia, Myanmar and Philippines

Figure 2.5. Net enrollment rate in secondary education (%) by ASEAN Member States, 2006-2016



Source: ASEAN Secretariat, ASEANstats database.

Mekong area | Indonesia–Malaysia, different approaches are required!

* ASEAN KEY FIGURES (2018)

| Current Status of NSP (* KIEP, Kwon)

- NSP : Four key areas in cooperation : **transportation, energy (climate), water resources, and ICT**
  ; Linkage with ASEAN Connectivity Master Plan
- Analysis of promising projects in four key areas
  - Transportation : High speed rails, GIS logistics, Mekong development, highway, MPAC infra
  - Energy : Power plant, renewable energy, smart grid, hydrogen/e-vehicles
  - **Water resources: Climate change, water resource management, and waste management**
  - ICT: Semicon, Smart Factory, healthcare, smart finance, e-Gov, and 5G, digital Innovation

Korea-ASEAN NSP

- Korea-ASEAN Future Community (17.11 ASEAN Corporate Investment Summit)
- Korea-Vietnam, -Philippines, -Indonesia Summit (2018)
- 20th ASEAN-Korea Summit (2018.11)
- Korea-Brunei, Korea-Malay, Korea-Cambodia Summit

The 3rd SEAN-Korea Summit, Korea-Mekong Summit, being held in 2019. 11.

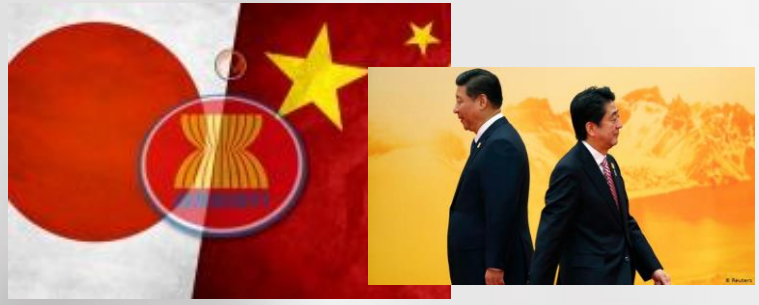
Japan, China battle for ODA influence in the Philippines *20 November 2018*

필리핀 (교통망) 중국 13조, 일본 8조

China and Japan rivalry in ASEAN *23 February 2018*

Can Japan compete with China over ODA?

Japan is rethinking, for "free and open Indo-Pacific strategy.".



Uniquely designed, Korean ODA policy is needed, distinguished from Japan and China

Direction of Korean S&T ODA, in line with NSP

Perspective transition from unilateral aid to partnership for innovation growth

Strengths of Korea S&T and ICT

Sharing the political, historical backgrounds (+ Hallyu)

1) Experience of economic development via STI
2) In the short term, established the STI infrastructure
3) the World best ICT infrastructure
4) Excellent S&T human resources and educational institutions
5) Equipped the bilateral, human network (12years)
6) Economic growth model through S&T education

New S&T cooperation with ASEAN is needed

1) Unique, and cost-effective projects
2) Regional, and multilateral programs
3) Projects, **maximizing Korea S&T strengths**
4) Projects, **contributing peace and coexistence**
5) Projects, **contributing to Korea's economy**
6) Projects, linking S & T to **education**

- Inclusive S&T ODA (common problem solving R&D)

KEYWORDS,
particulate matter, MERS, earthquake, water resource pollution, micro-plastics etc.

Contributing to common interest issues

- S&T Education development

KEYWORDS,
STEAM Education, teacher retraining, research facility, curriculum building, field study

Creating jobs for retired scientists

- Fostering R&D manpower

KEYWORDS,
Human resources, scholarship program, international exchange, Joint research program

Contributing to domestic S&T research

R&D for global issues

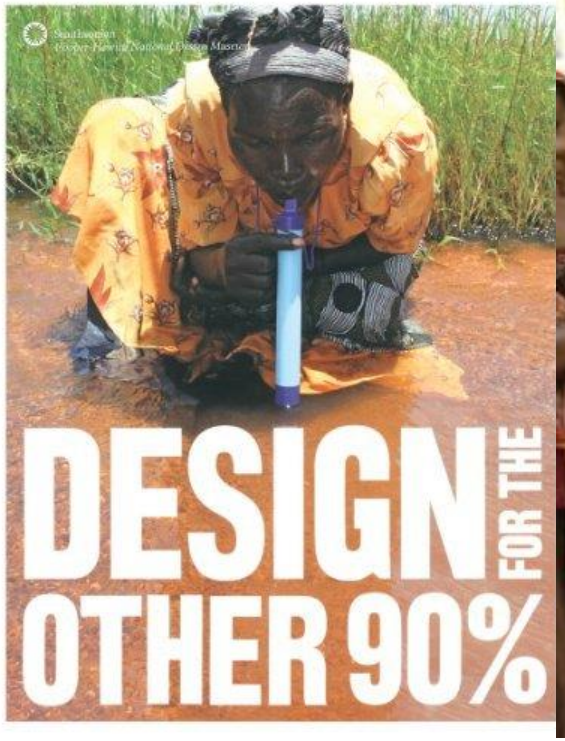
Contributing to domestic S&T

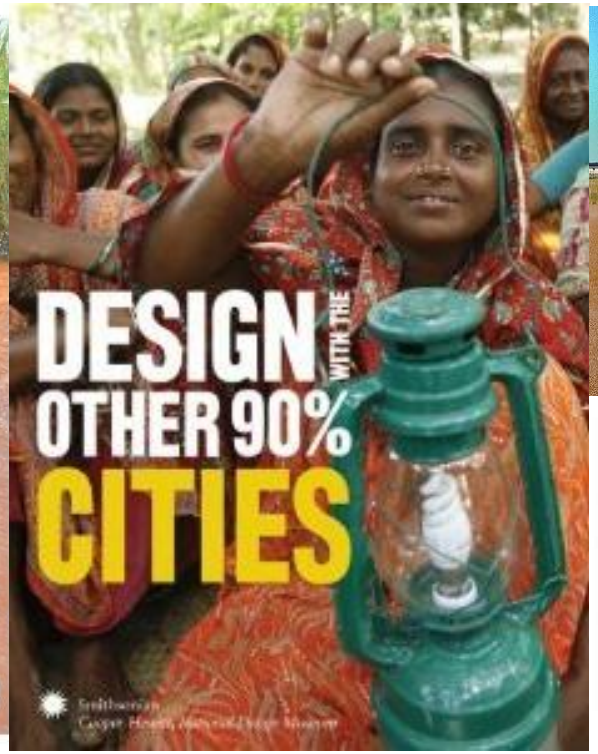
Fostering manpower

S&T, Innovation via Appropriate Tech.

- Presenting "Small Economy", "Local Problem Solving," "Sustainable Technology" as an alternative to capital-based assistance that large-scale aid and development projects have led to poverty in the Third World

LOCALLY SUSTAINABLE APPROPRIATE TECHNOLOGY





| Appropriate technology in marine-water resources

Cambodia

Pop. 15,762,370

GDP $20.9 Billion

Vietnam

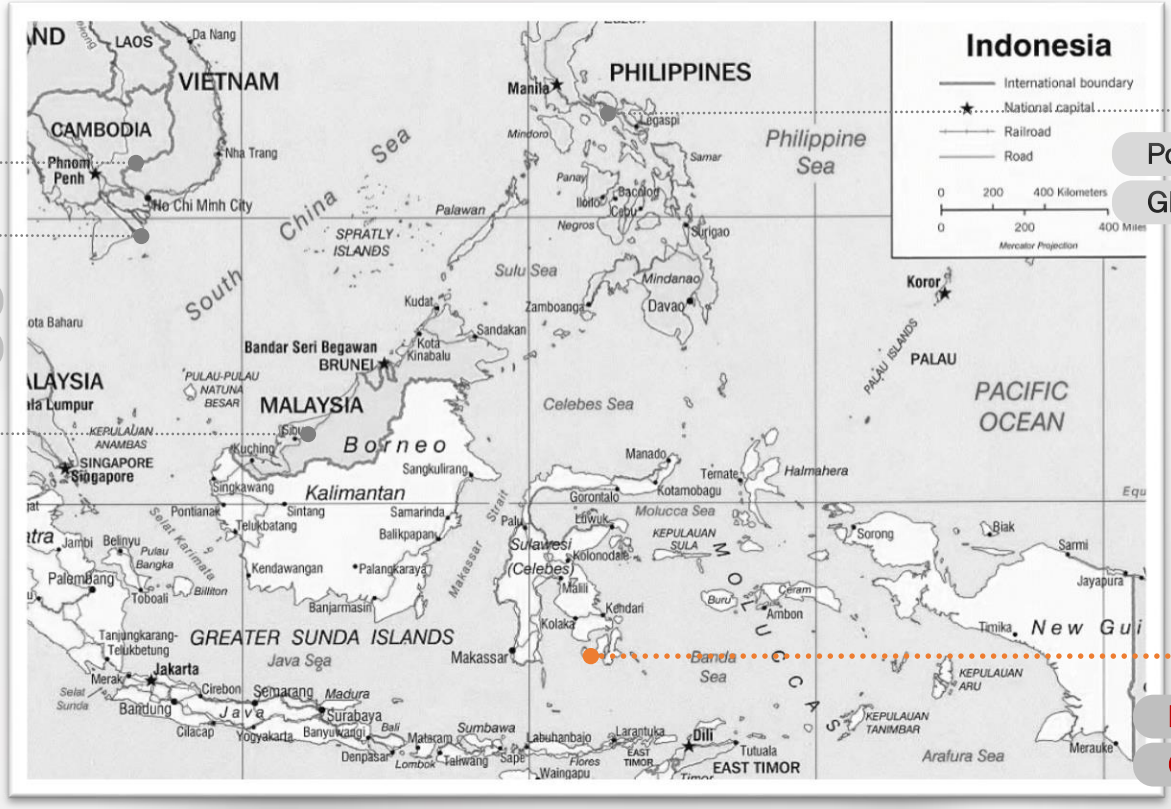
Pop. 91,519,289

GDP $299.6 Billion

Malaysia

Pop. 28,334,135

GDP $442.0 Billion



Philippines

Pop. 100,981,437

GDP $389.5 Billion

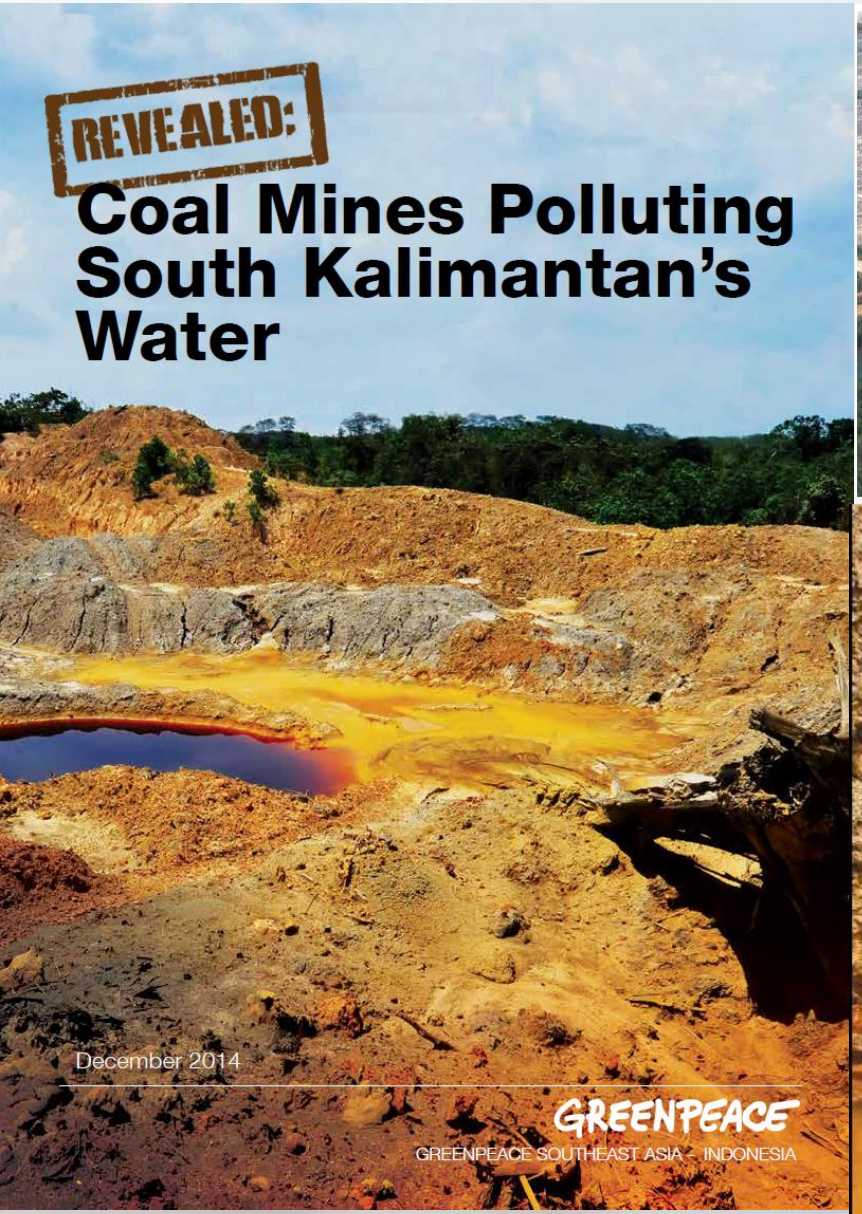
Indonesia

Pop. 260,000,000

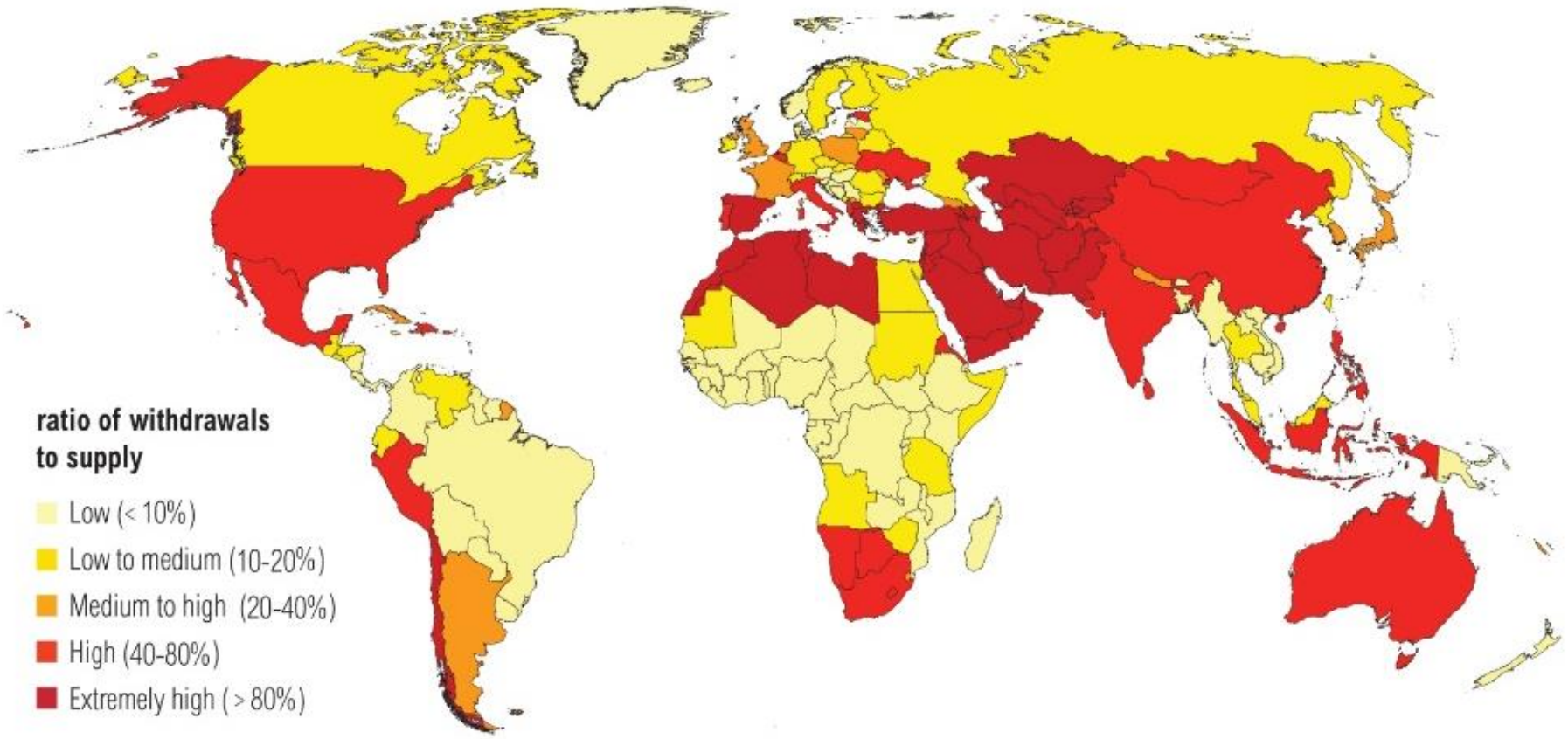
GDP $1,092 Billion

- 17,509 islands (World largest island country, by area AND number)
- Southeast Asia largest population, economy and resources
- Quadrupled GDP growth from $857 in 2000 to $3346 in 2017

| Numerous water–related local problems



| Water Stress (2040) : Severe water shortage

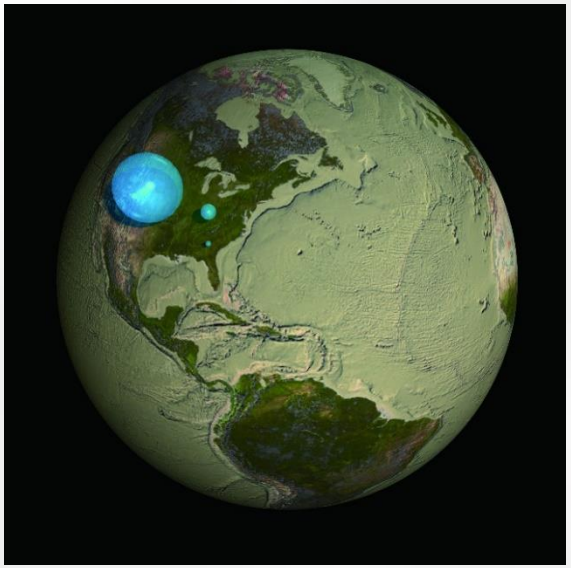


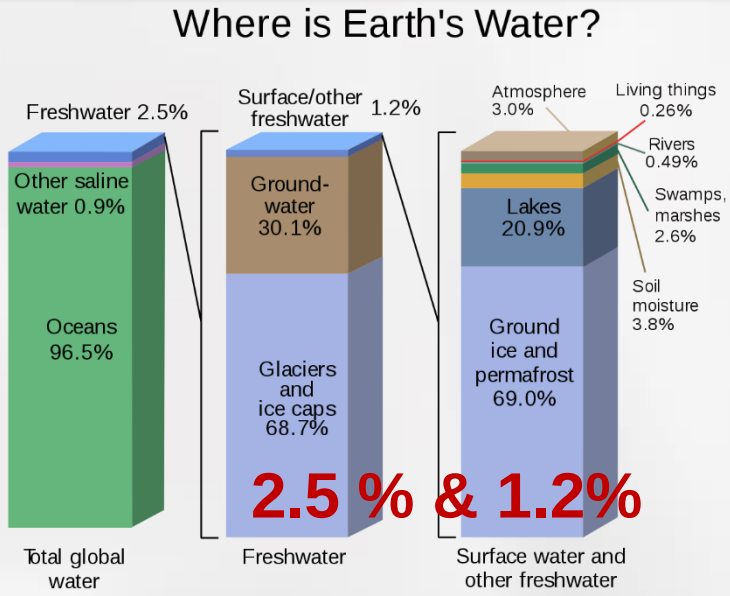
NOTE: Projections are based on a business-as-usual scenario using SSP2 and RCP8.5.

For more: ow.ly/RiWop

WORLD RESOURCES INSTITUTE

| Water Stress (2040) : Water is the most precious resource.





Lack of water resources, pollution, and water–related diseases are on–going environmental problems in Southeast Asia, including Indonesia

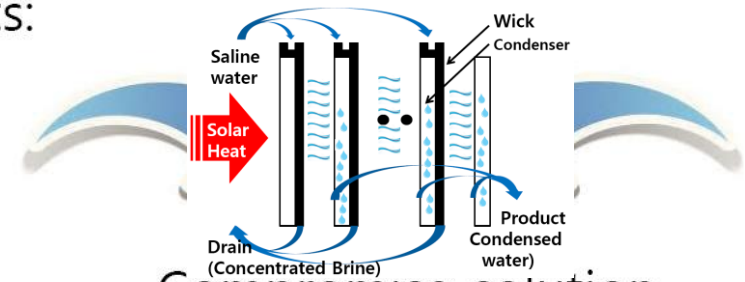
| Need for maritime-based economic development

1) how to develop marine-based economy and 2) regional water resource protection.

| Examples, appropriate technology for water-resource

Huge water plants:

→ too massive

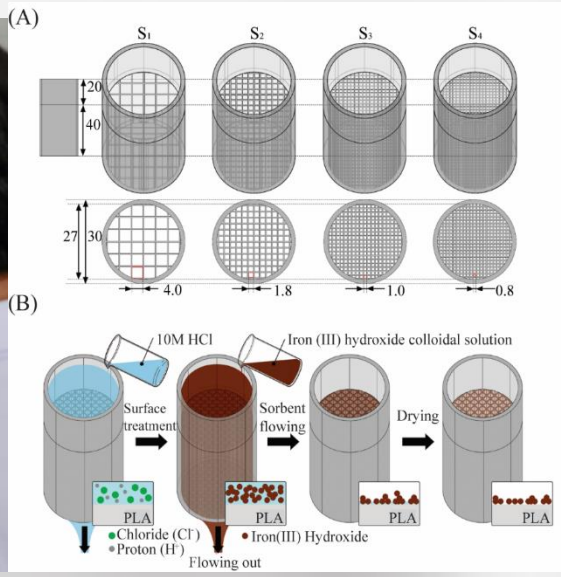


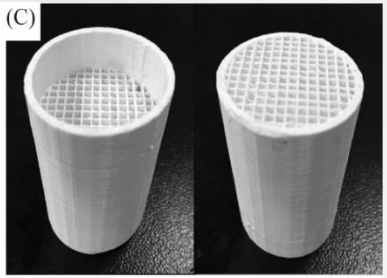
Compromise solution

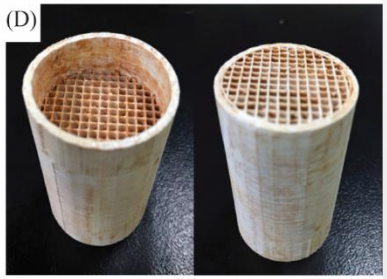
Multi Effect Solar Still

Common Solar Stills:

→ too low productivity







Solar-based small desalination device (Dr. Park), 3D printed arsenic removal filtration devices (Sogang University)

| Appropriate technology examples, continued...

Small scale hydropower, twin–treadle pumps, human powered pumps
Q drum, hippo–drum, river decontamination boat (England) are representative examples.

Marine and water issues, in line with Indonesian development strategy

Korea–Indonesia Special Strategic Partnership(2017)

- Industrial development
- Supporting start–ups

구분	보건	환경 보호	교육	운송/ 저장	통신	농림수 산업	에너지	식수공급 및 위생	기타
금액	50.88	17.01	16.05	15.63	14.69	10.62	9.612	9.32	27.66
비율(%)	29	10	9	9	8	6	6	5	16

- 2017 Korea–Indonesia Agreement

Agreement to expand ODA in the area of transportation, public administration, environmental protection and water management

- Reduction of environmental change
- Marine–based economic development
- Protection of national resources, environmental management
- Biodiversity conservation and sustainable usage

So, where we will begin the ASEAN–Korea ODA

- Identify the ASEAN Science and Technology demands

Task–force is needed to derive the ASEAN S&T, ICT agenda.

. Dispatch of visiting teams in the filed of S&D
. Hosting ASEAN–Korea Conferences
. Call for demands from Academic organization, and networks

- Planning regional and multilateral projects

Expands bilateral cooperation projects in coordination with multilateral interests

. Korea–Mekong projects focusing on basic education (secondary and university S&T infra development)
. Korea–Indonesia/Malaysia projects focusing on R&D joint research for regional issues
. Korea–Singapore/Thailand collaborative projects, for advanced scientific projects in global issues, spreadable to ASEAN region

- Discovery of technology based innovative industrialization projects

Promote private cooperation projects, in coordination with various Ministries

. Startup linked job creation (KOICA CTS, TIPS)
. Smart factory and creative workshop (4th Industrial revolution, LINC, Manufacturing innovation)
. Sharing economy and app–based software projects and living labs
. Private sectors–centered projects

제10회 적정기술국제컨퍼런스 2019

과학기술ODA 국제컨퍼런스

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on Appropriate Techonology 2019

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Korea Institute of Science and Technology (KIST)

기조강연

Irina Bokoca
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Dr. Marc Dusseiller
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안성훈 교수
서울대학교

Mariela Machado
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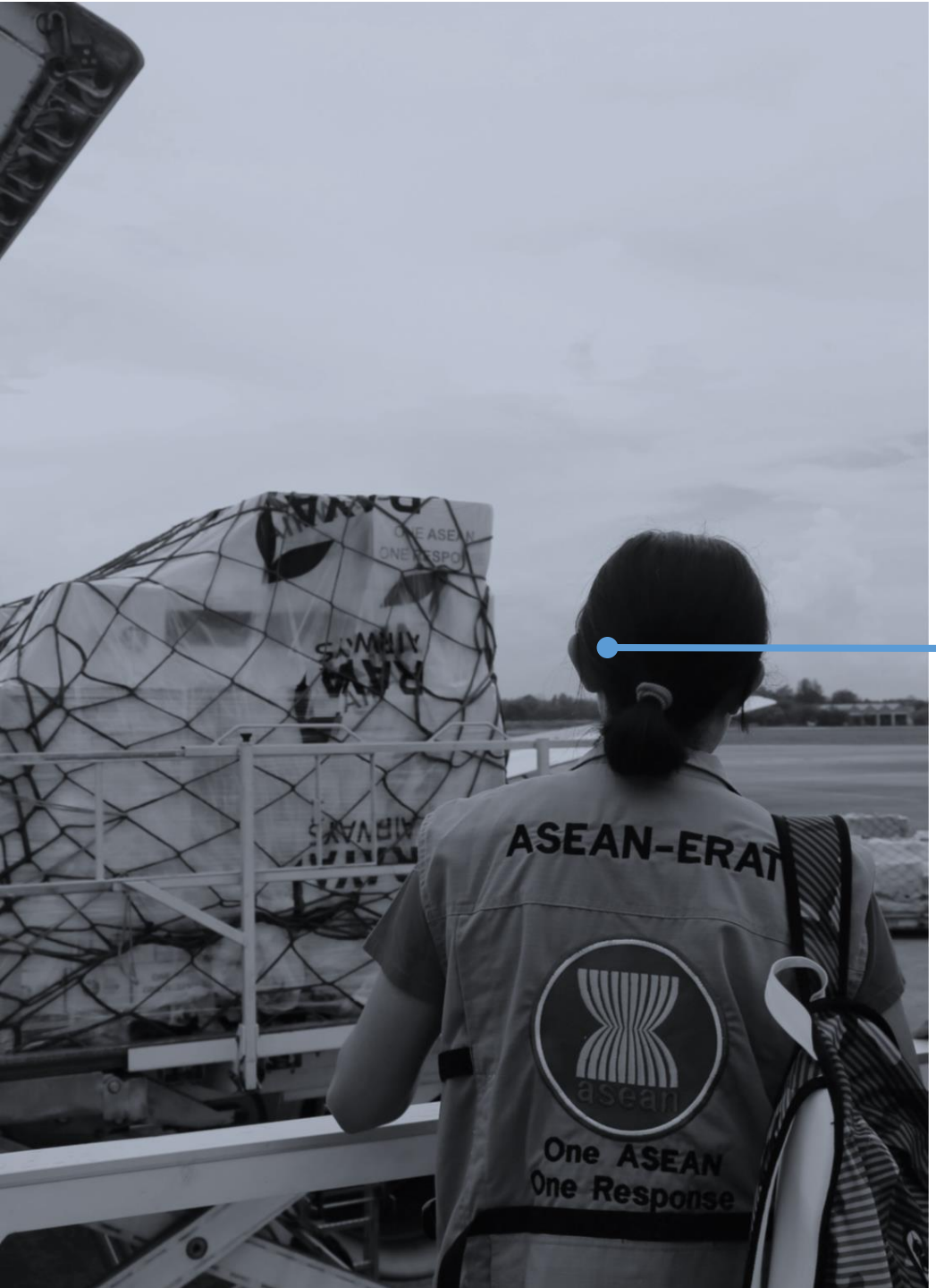
Operations
@Engineering for change



New Southern Policy via S&T ODA

Thank you

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