



Standardization, industrialization, and the UN Sustainable Development Goals

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Yuko YASUNAGA, Ph.D.

United Nations Industrial Development Organization (UNIDO)





**The world is full of challenges.
We have to look at the realities.**



Innovation to address “societal challenges”

- Today’s innovators are expected to tackle “**societal challenges**”
 - = global warming
 - = environmental pollution
 - = poverty and poor nutrition
 - = secured supply of food/water/energy
 - = peace keeping
 - = prevention of infectious diseases, etc.
- Many of these are caused from “**market failure**”.
(The *invisible hand* does not work.)
- United Nations adopted these societal challenges as **SDGs**
(**Sustainable Development Goals**) in 2015.



What are SDGs?

~17 goals/169 targets~

1 NO POVERTY

2 ZERO HUNGER

3 GOOD HEALTH AND WELL-BEING

4 QUALITY EDUCATION

5 GENDER EQUALITY

6 CLEAN WATER AND SANITATION

7 AFFORDABLE AND CLEAN ENERGY

8 DECENT WORK AND ECONOMIC GROWTH

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10 REDUCED INEQUALITIES

11 SUSTAINABLE CITIES AND COMMUNITIES

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

13 CLIMATE ACTION

14 LIFE BELOW WATER

15 LIFE ON LAND

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

17 PARTNERSHIPS FOR THE GOALS



Drinking water service (2015)

6 安全な水とトイレ
を世界中に



By 2015, 181 countries had achieved over 75% coverage with at least basic services³

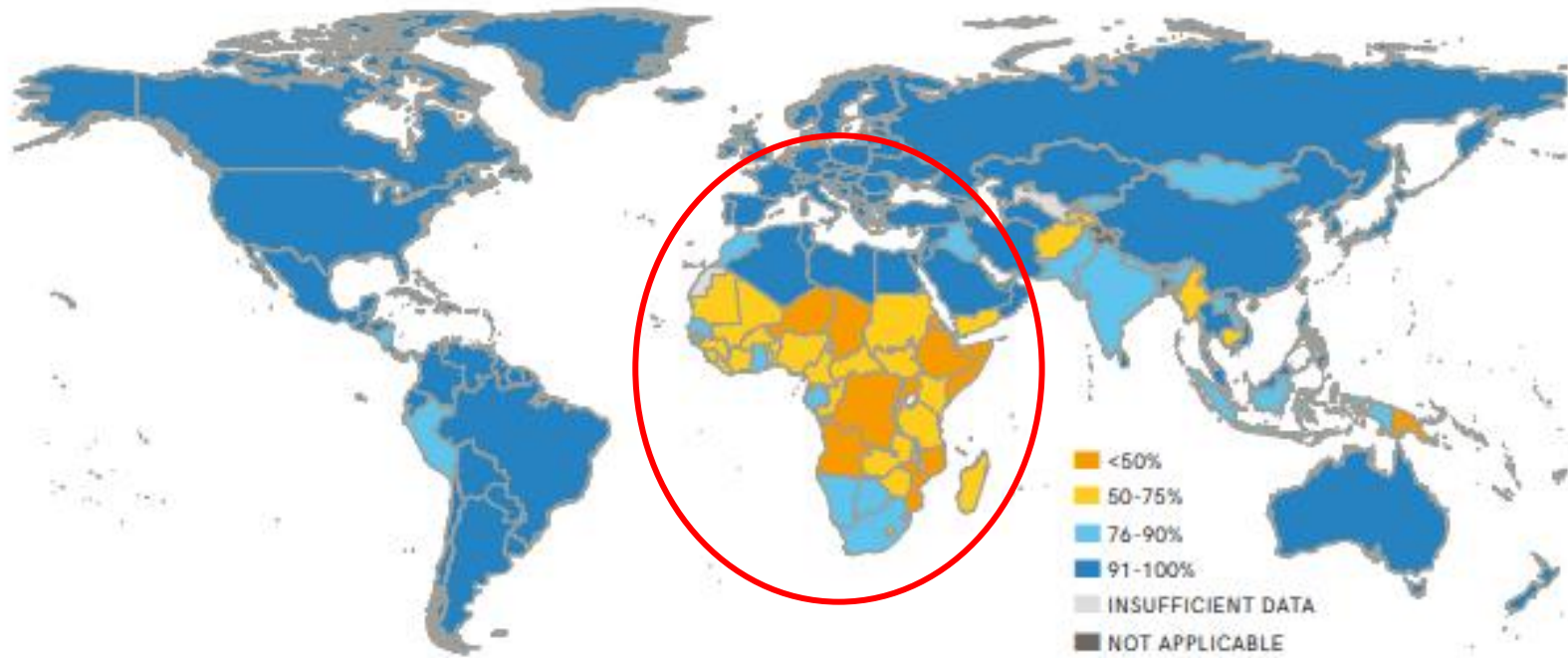


Fig. 4 Proportion of national population using at least basic drinking water services, 2015

Source: ICEF • WHO (2017)

Electricity (2018)

7 エネルギーをみんなに
そしてクリーンに



World bank (2018) Access to electricity (% of population)

Development and Environment

(Upper) Garbage dumped on the roads (Conakry, Republic of Guinea)
【Source】afrique confidentielle.com



(Lower) Garbage mountain collapses, which have led to death of “scavengers” (Delhi, India)
【Source】The New York Times

Development and Environment

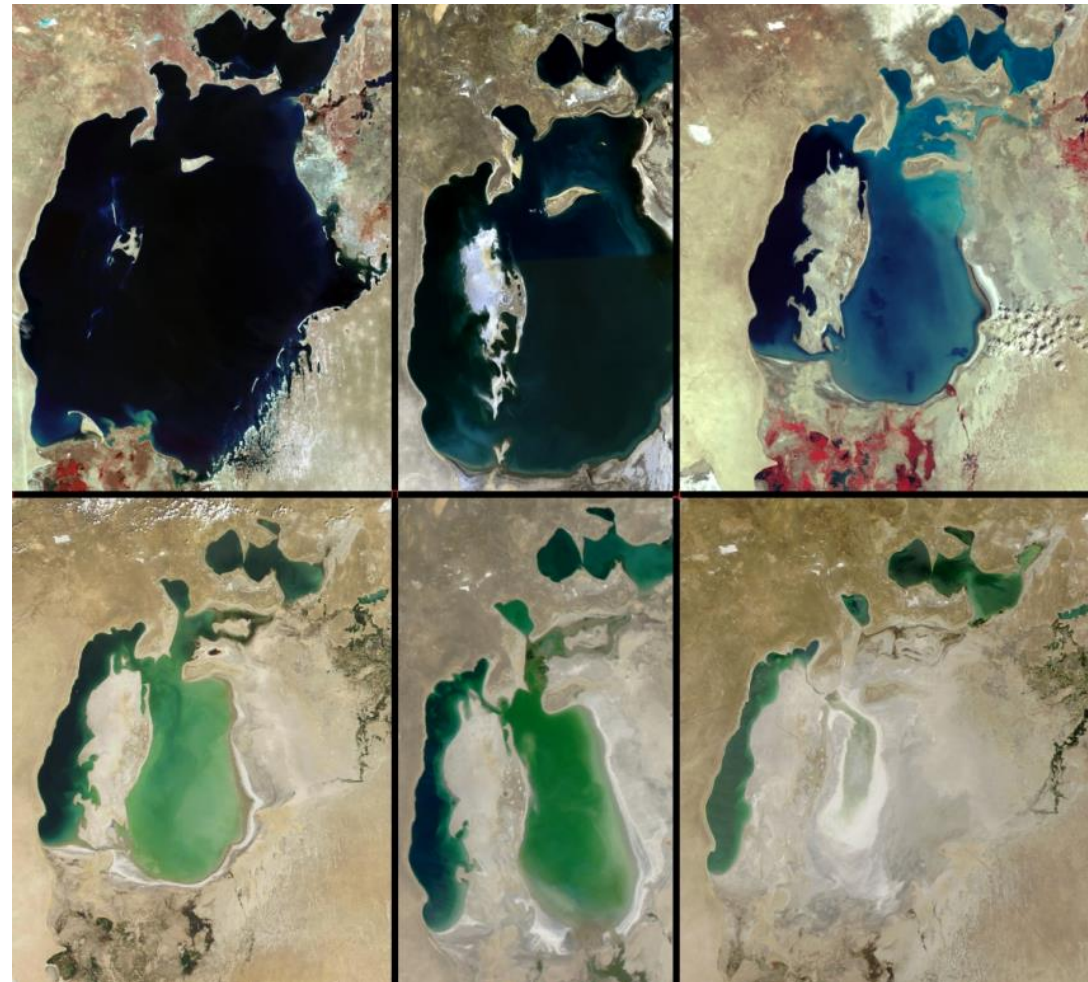


(Upper) The world's most polluted river (The Citarum River, Indonesia)
【Source】 Blue Ocean Network



(Lower) Dharavi, a slum surrounded by high-rise building (Mumbai, India)
【Source】 India Today

Development and Environment ~ Aral Sea ~



From upper left to upper right
1973, 1989, 1999
From lower left to lower right
2001, 2003, 2009
[Source: USGS·NASA]



Image: William C. Tuttle, 1990





Why did UN need to promote “SDGs”?

- Conventional way (**assistance**) **cannot solve** the problems quantitatively and qualitatively.
- If **goals** are defined, they must **attract investors’ attention**.
- If **more investment** are made, solution of those problems must be **propelled**.

We need to think from a different angle!

To contribute to the world within a framework of **CSR**.
(**Corporate Social Responsibility**)



To achieve SDGs are **big business** chances!

It is good for private companies to **make money, by contributing to achieve SDGs.**

In Japan we call the philosophy “Sanpo-yoshi”. (三方良し : 3 ways satisfaction)

1. Good for **seller** (profitable)
 2. Good for **buyer** (convenient)
 3. Good for **society** (society’s welfare)
- We also need to be sustainable.
(Good for the **future**.)

(Ref) "Sanpo-Yoshi" by Ohmi merchants (近江商人)



What are the barriers to the challenges? (in Africa)

1) Solar power generation at non-electrified villages

- Technology challenge = OK with sunshine endowment (hours/intensity)
- Business = micro payment with smartphone made easy billing system.
- Societal challenge = how to build a sustainable system for everyone

2) Drinking water

- Technology challenge = High turbidity
- Cultural challenge = People who gets water from well/river/pond, do not understand why they need to pay for water.

3) Toilet

- Technology challenge = Toilets with less water without sacrificing sanity
- Cultural challenge = Safety, gender equality, and inclusiveness

4) Waste collection and treatment

- Technology challenge = Infrastructure
- Societal challenge = How to operationalize “periodical waste collection system”

= We need to be more **innovative!** Current schemes does not necessarily fit

Africa.
INCLUSIVE AND SUSTAINABLE INDUSTRIAL DEVELOPMENT

Stereo-typed views on “**No innovation from Japan**” (or, everywhere in the world)

- 1) **Universities** are no good.
- 2) **Private companies** are no good.
- 3) **Society** does not allow “risk-taking” behaviors.
- 4) **Government**’s policies are “too late, too small”.
- 5) “Aged male boss (**OSSAN**) ” are doing nothing (or doing bad.).
- 6) **Japanese people** are not innovative.
- 7) **Silo structure** (**Octopus pot: TAKOTSUBO**) works bad everywhere (university, company, government). (= Yasunaga’s hypothesis)

Octopus pot: TAKOTSUBO

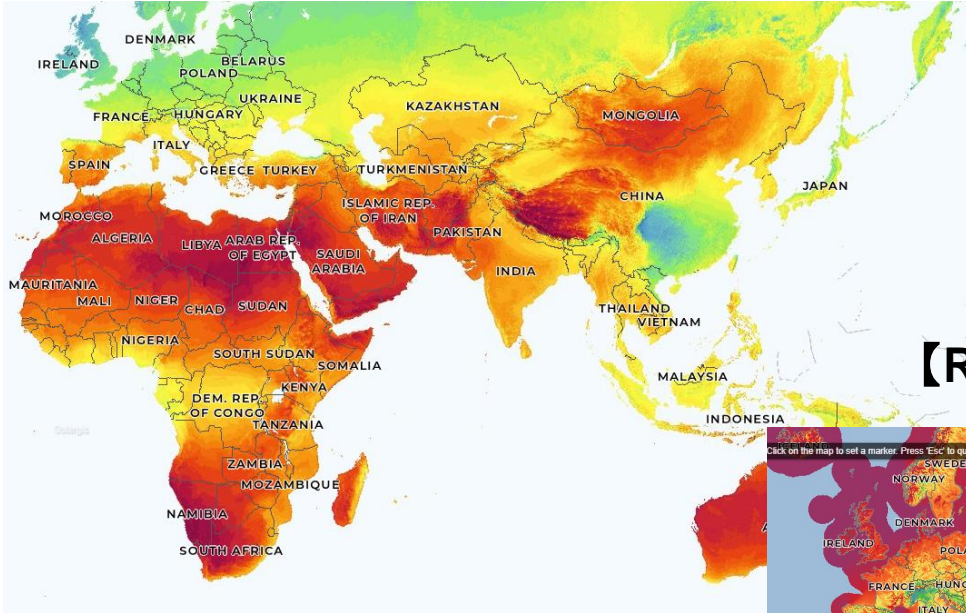


Why metrology is essential for SDGs?

- 1. New measurement methodologies and technologies are essential for developing and maintaining new infrastructure.**
- 2. New measurement methodologies can support development of new industries.**
- 3. Developing new measurement methodologies requires new technologies. Needs for new measurement methodologies drives development of new technologies.**
- 4. New measurement methodologies and technologies can help people to familiarize newly introduced products/services. It is also helpful to solve “last one-mile” problems for the users.**

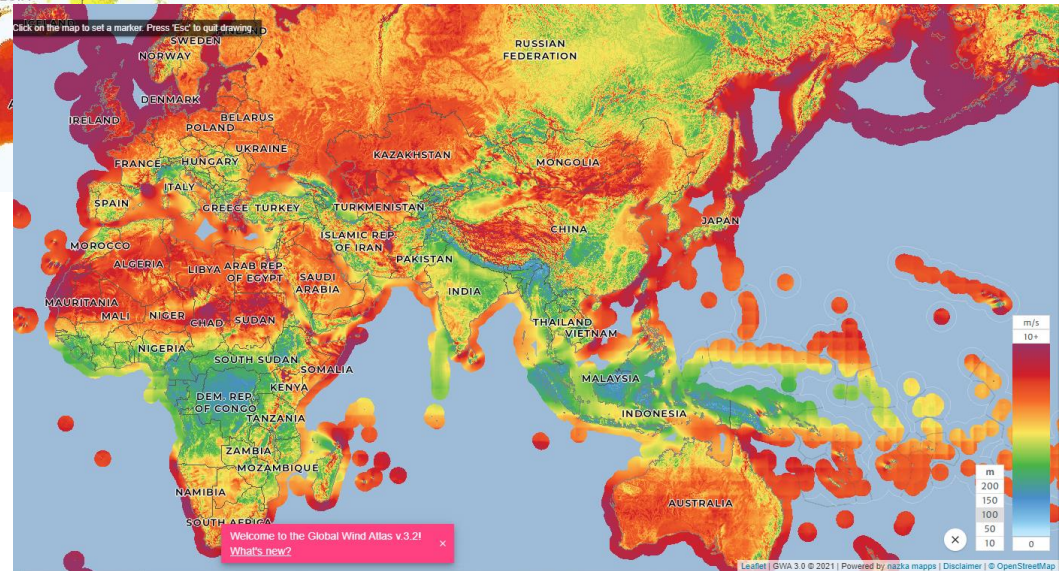
- **New Energy Infrastructures and Metrology**
- In the Hydrogen economy, solar-rich/wind-rich countries can be the “World’s power house”.
- Precise measurement of volume, temperature, weight, pressure, and flow rate, etc. are the keys to stable transaction and safe handling of Hydrogen.
- These technologies are the base for new energy industries with a large youth employment.

[Ref] Africa's potential in solar energy – horizontal irradiation



[Source] Global Solar Atlas

[Ref] Africa's potential in wind energy



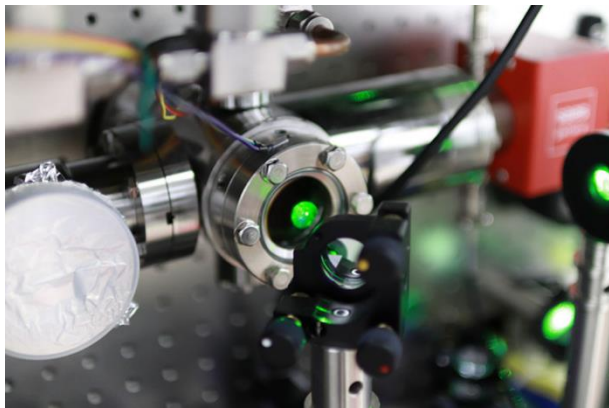
[Source] Global Wind Atlas

- CD (Compact Disc) contains approx. 75 minutes of music. Who decided that? And why? **Standardization** makes a new industry.

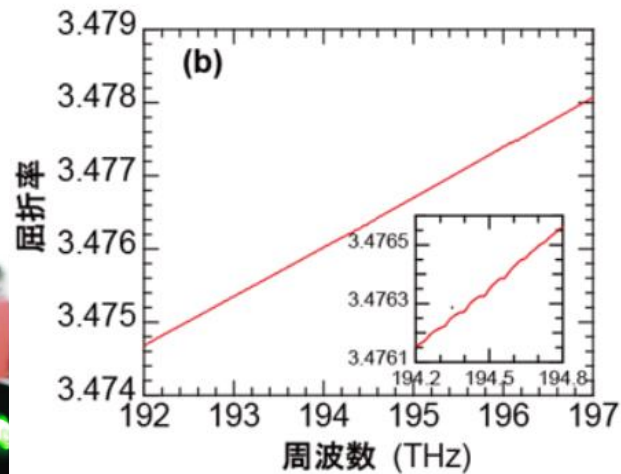


- If we want to solve the “**marine plastic litter**” problem, **biodegradable plastics** shall be alternative solutions.
 - 1) Do we have standardized ways of measuring “biodegradability” in a way which consistent with our objectives to stop marine plastic pollution?
 - 2) Do we have standardized ways of accrediting that the plastic bag is made from biodegradable plastics for consumers’ attention?
 - 3) Do we have standardized ways of promoting the penetration of biodegradable plastics?
- >> For all of these, metrology is essential.

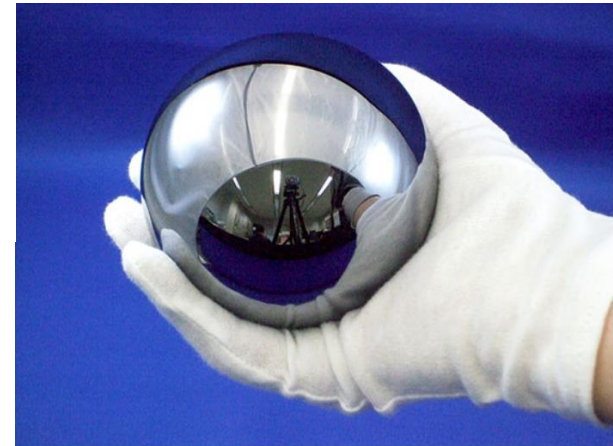
● **Metrology drives new technologies. New technologies enable more precise measurement.**



AIST's Optical Lattice Clock (Yb)



Dual-comb spectroscopy



Si mono-crystal ball used for defining "kg"

[Source] AIST homepage

● UNIDO has been promoting metrology for industrial development in developing/emerging countries.

- 1) UNIDO organized AFRIMETS (Intra-Africa Metrology System) Legal Metrology School in **Tunisia**
- 2) **Malawi**: Development of a robust standardization, quality assurance, accreditation and metrology infrastructure (SQAM) project
- 3) Strategic Partnership with the International Bureau of Weights and Measure (BIPM) and the International Organization of Legal Metrology (OIML)
- 4) On World Metrology Day 2017, UNIDO issued a brochure “**The role of Metrology in the context of the 2030 Sustainable Development Goals**”. Issued “**Certification of Measuring Instruments**” in 2019.
- 5) Supporting an upgrade of **Armenia**’s metrology system
- 6) First metrology school for African countries hosted by **Kenya**
- 7) Metrology: a key enabler for realizing the Sustainable Development Goals
..... And many more



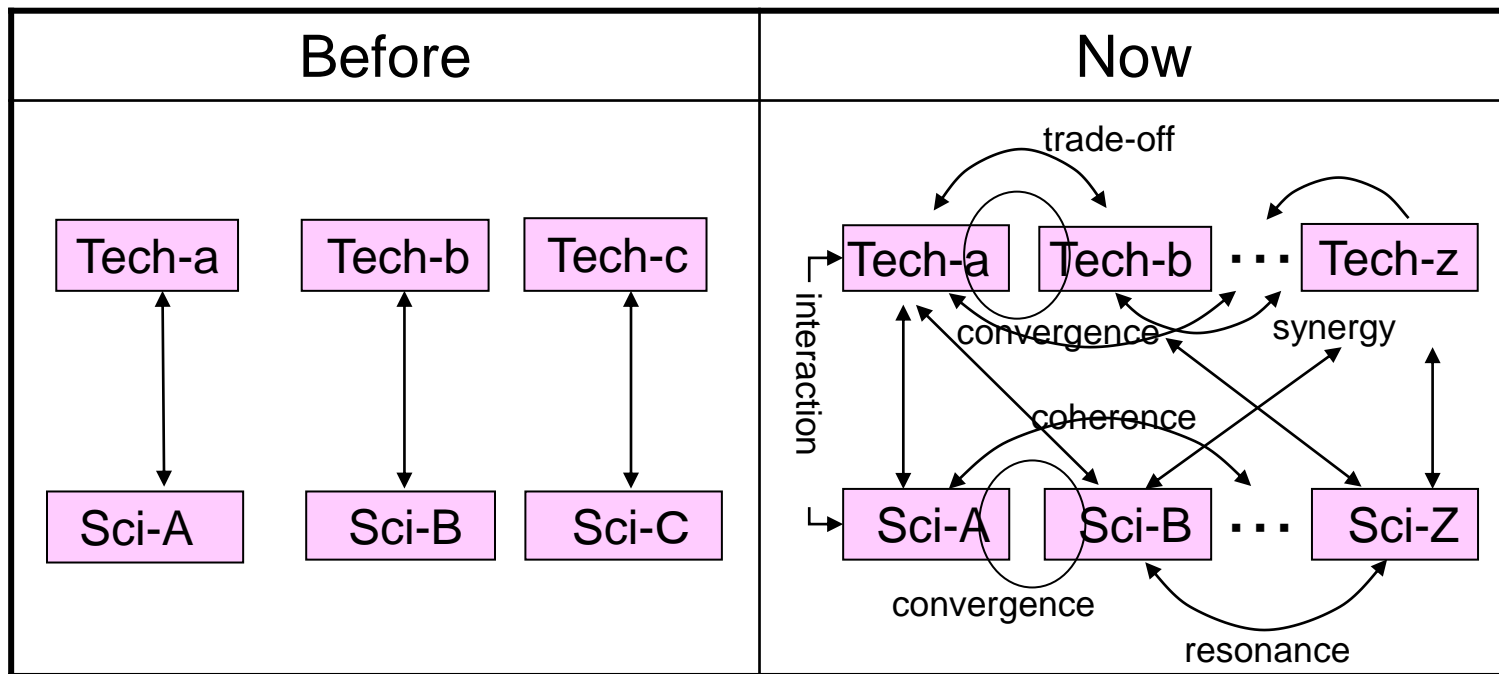
AFRIMETS

Intra-Africa Metrology System
Système Intra-Africain de Métrologie



What becomes different? Why difficult?

- Technologies become complex. But it is true anytime. What is the most eminent change in the recent years? (Yasunaga's model)



Manageable

Not manageable



Thank you very much for your attention!

