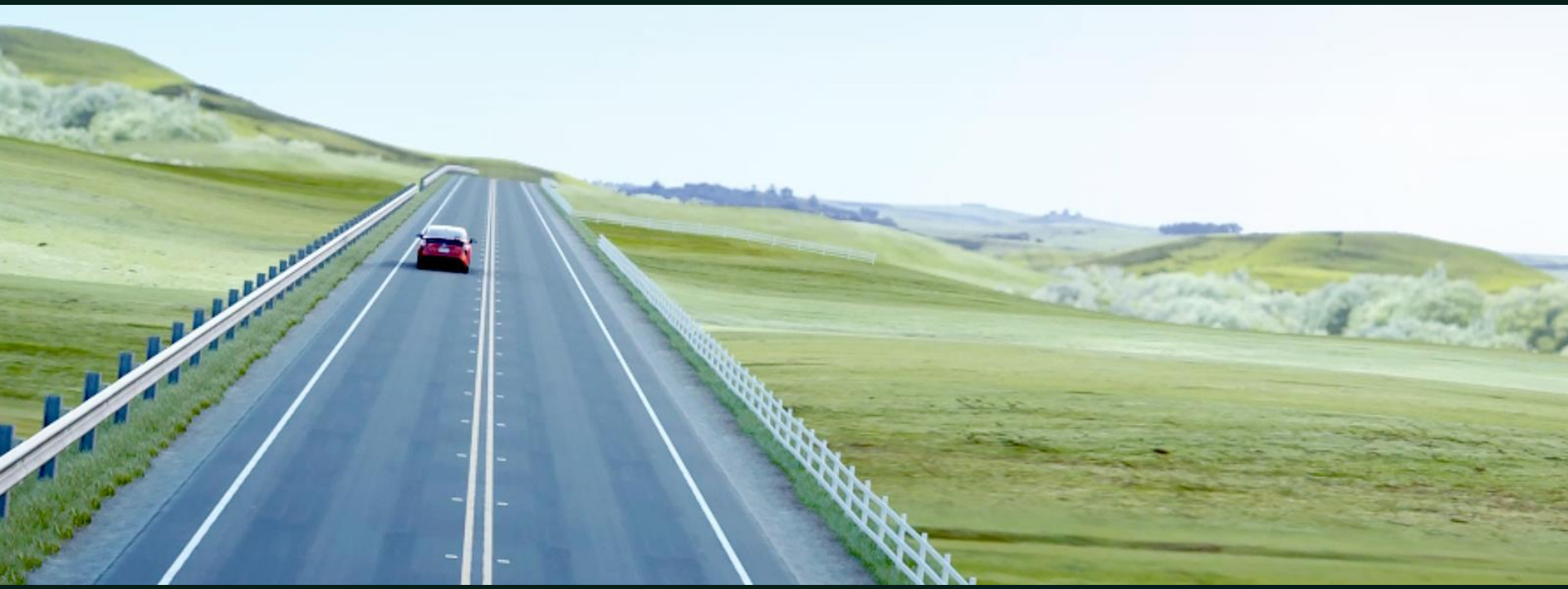
University Engagement and Environmental Sustainability:

“Toyota Environmental Strategies”

Ninnart Chaithirapinyo

Chairman of The Board of Toyota Motor Thailand



The 4th Engagement Thailand Annual Conference: University Social Commitment in a Challenging Century

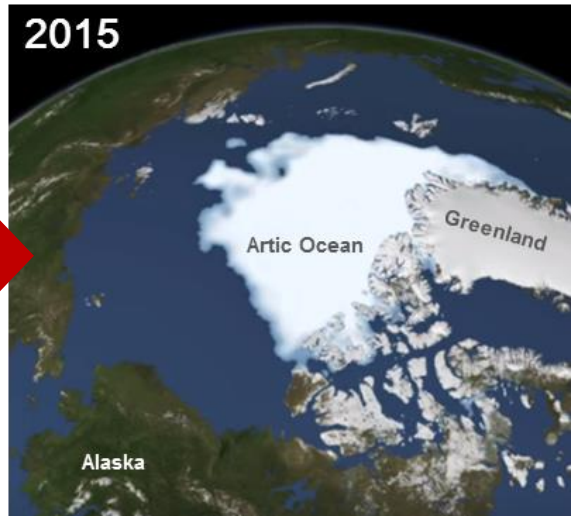
5 – 7 July 2017 at Chulalongkorn University

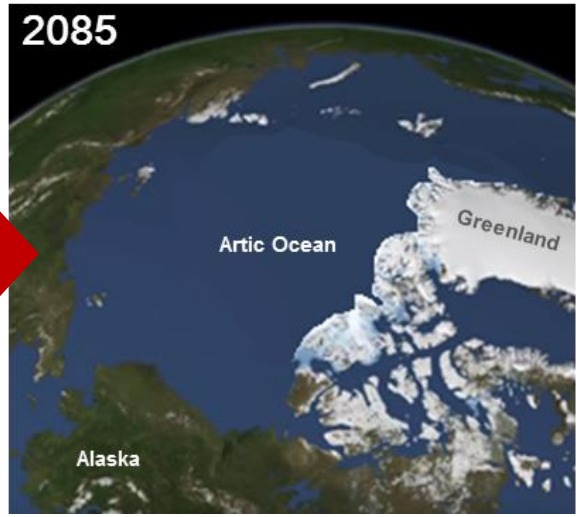
TODAY'S AGENDA:

1. Major Global Challenges
2. Toyota's Vision and Challenges
3. Towards Environmental Awareness

Major Global Challenges

CLIMATE CHANGE is no longer a far-off problem;
it is happening here, it is happening now!





#Paris Agreement

To keep the global rise in temperatures below 2 °C by 2100.

Thailand aims to reduce CO_2 by 20% of BAU, est. 115 million tons by 2030.

Source: NASA and National Wildlife Federation

Automotive Technology Trends

Shared Mobility – shared use of car; offering mobility as a service

Better accessibility, travel flexibility, and easier trips for all (aging society)

Ridesharing

More passengers per trip e.g. **car pooling**

Ridesourcing

Connect drivers with passengers e.g. **Uber**

Carsharing

Membership to Access vehicle for short-term

**Public driving license and insurance*

Source: University of California - Berkeley, 2016 & US Department of Transport

Automotive Technology Trends

Automated Driving

The evolution for Safety, Efficiency, and Freedom

0

No Automation

Driver performs all tasks

1

Driver Assistance

A system assisting (ABS, cruise control)

In production

2

Partial Automation

More systems (steering, acceleration)

R & D

3

Conditional Automation

Systems perform all but still need driver

4

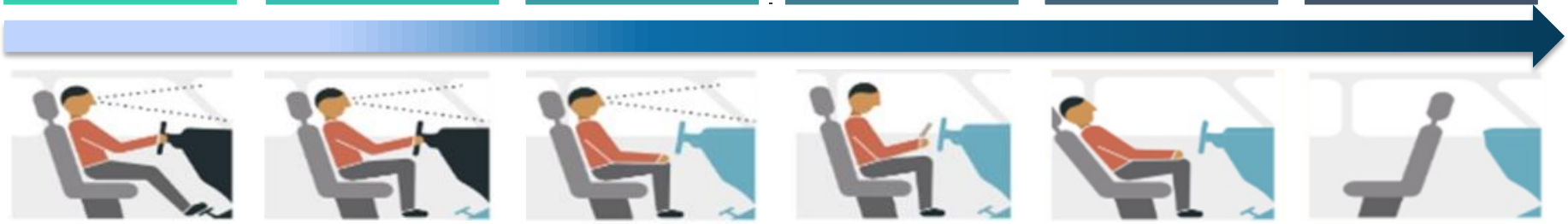
High Automation

All functions are automated even with no human response

5

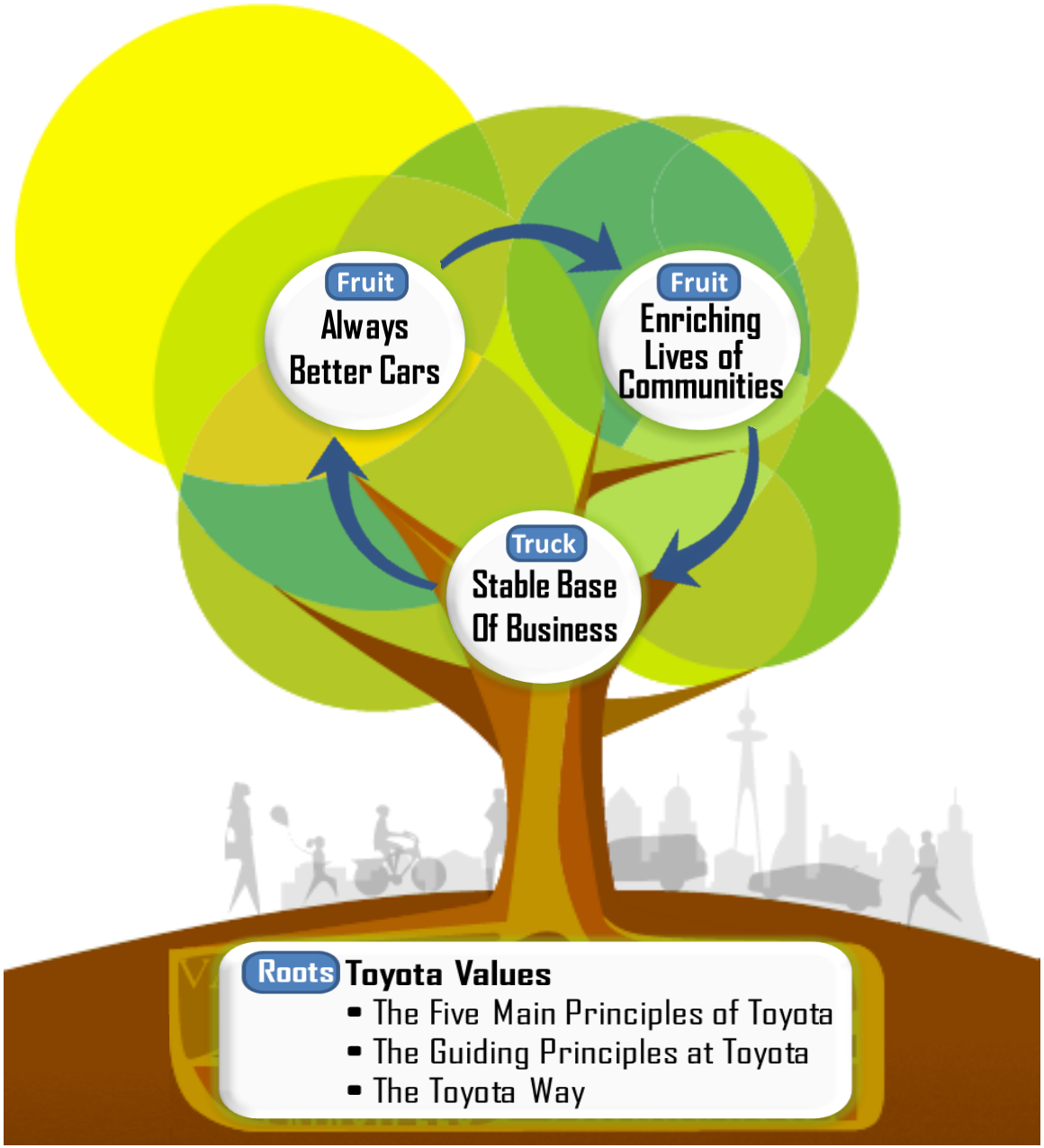
Full Automation

Fully automated in every circumstances without driver



Source: Society of Automotive Engineers (SAE)

Toyota Global Vision 2030



Source: TMC

Toyota Environmental Challenge 2050

Source: TMC

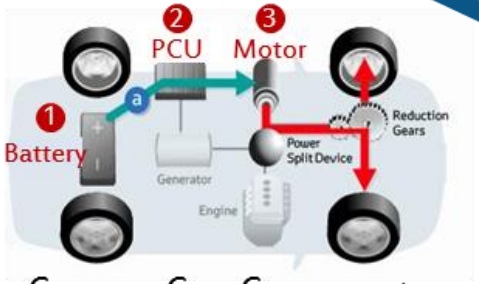
Automotive Technology Trends

Adapting hybrid technology to next-generation eco-cars

Hybrid technology underpins Toyota's PHVs, EVs and FCVs

Hybrid Vehicle - HV

***(1.4 million units** sold in 2015)*



Common Core Components

who is the winner?

EV

- Short distance ~150 Km
- Over 20K parts will disappear
- ***0.3 million units** sold in 2015*

PHV

- EV mode for 20-30 Km
- No excise tax of electricity
- ***0.1 million units** sold in 2015*

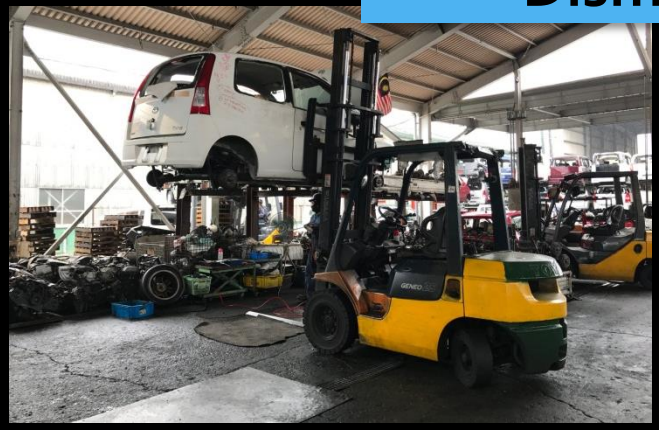
FCV

- FCV has high potential to expand in the future
- ***700 units** sold in 2015*

The world is driving towards sustainability so that alternative energy vehicles are required.

Source: TMC

Dismantlers; Recycling Society









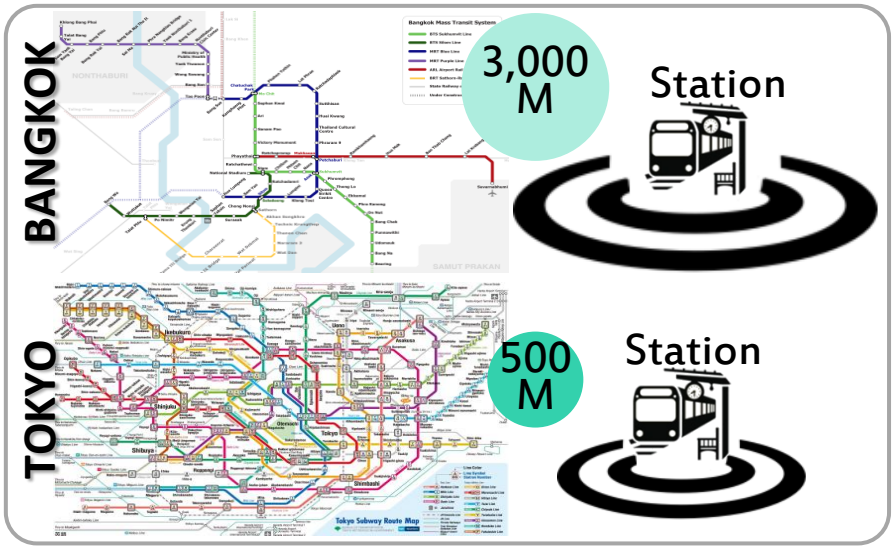
Automotive Technology Trends

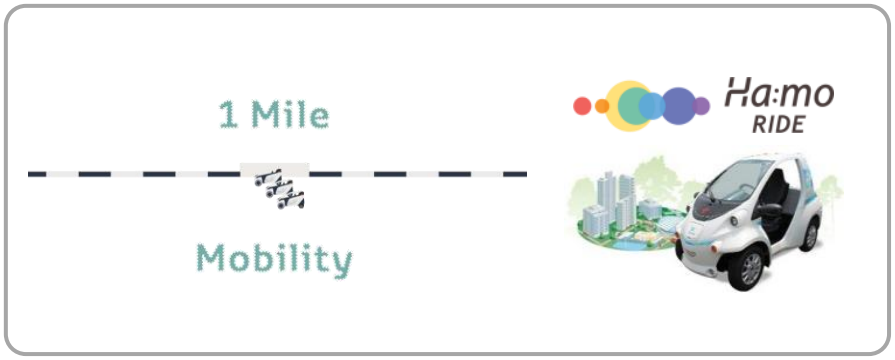
CU Toyota Ha:mo

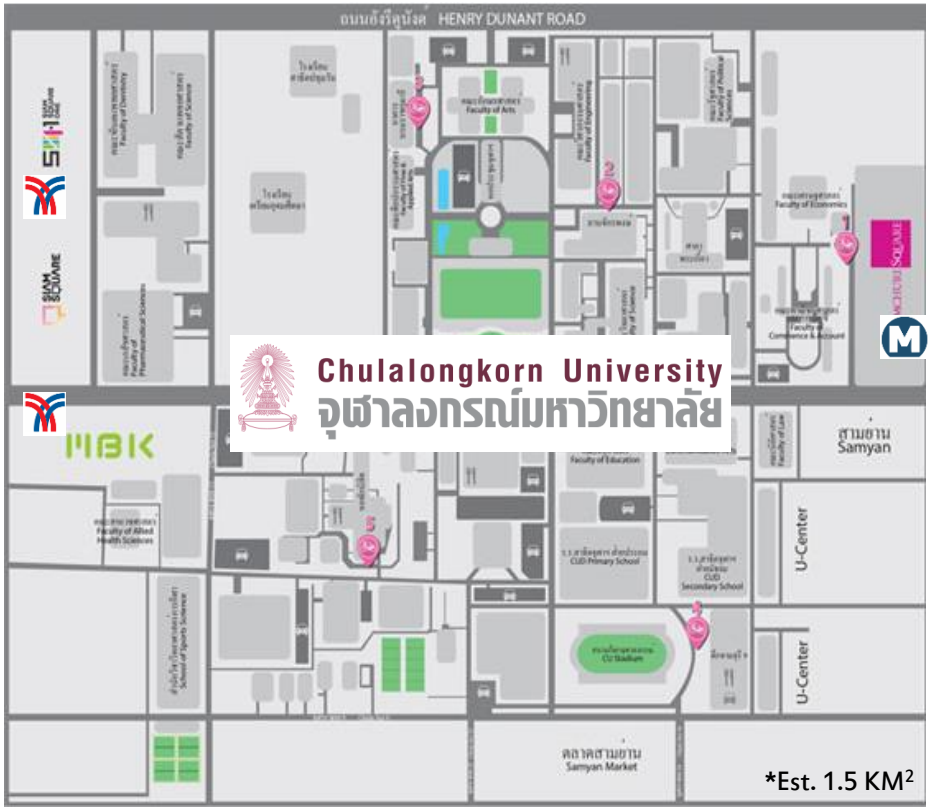
Create new mobility option to support sustainable society and life style change.

Automotive Technology Trends

R&D of EV Sharing for the last-one-mile mobility







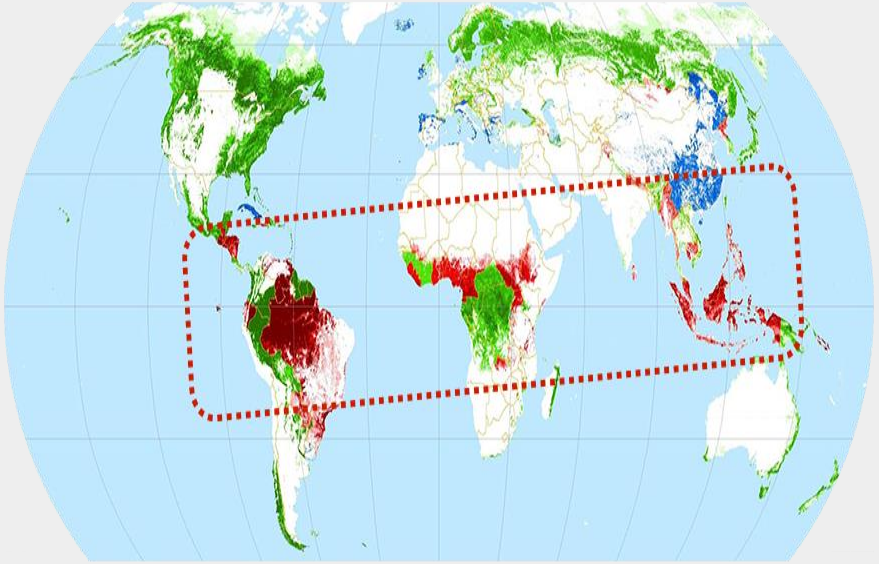
<<R&D project to promote EV car-sharing>>

- Served as mobility of happiness.
- Demonstrate EV as city commuter / personal mobility as EV sharing .
- Memory of Anniversary: TMT 55th and Chulalongkorn University 100th.

The Red List of Threatened Species

Habitats are still segregated due to economic development, and biodiversity losses have not stopped

Forests equivalent of 14% of the land area of Japan are lost annually



■Regions with decrease in forest ■Regions with increase in forest
■Regions with slight decrease or increase in forest

『Ministry of the Environment Global forest resources assessment』

In surrounding forests, grasslands, waterfronts, swamps, development is causing habitats to shrink and segregate

It is important to restore the fragmented habitats quickly !!!

Source: TMC

The Red List of Threatened Species

By guiding with organizations, Toyota will lead entire society by preceding collaboration and "connection with the world"

Toyota Today for Tomorrow Project

KPI and Standardization development to become a global base

Hot Spot

Review sharing of Toyota's know-how

TOYOTA

Hot Spot

Hot Spot

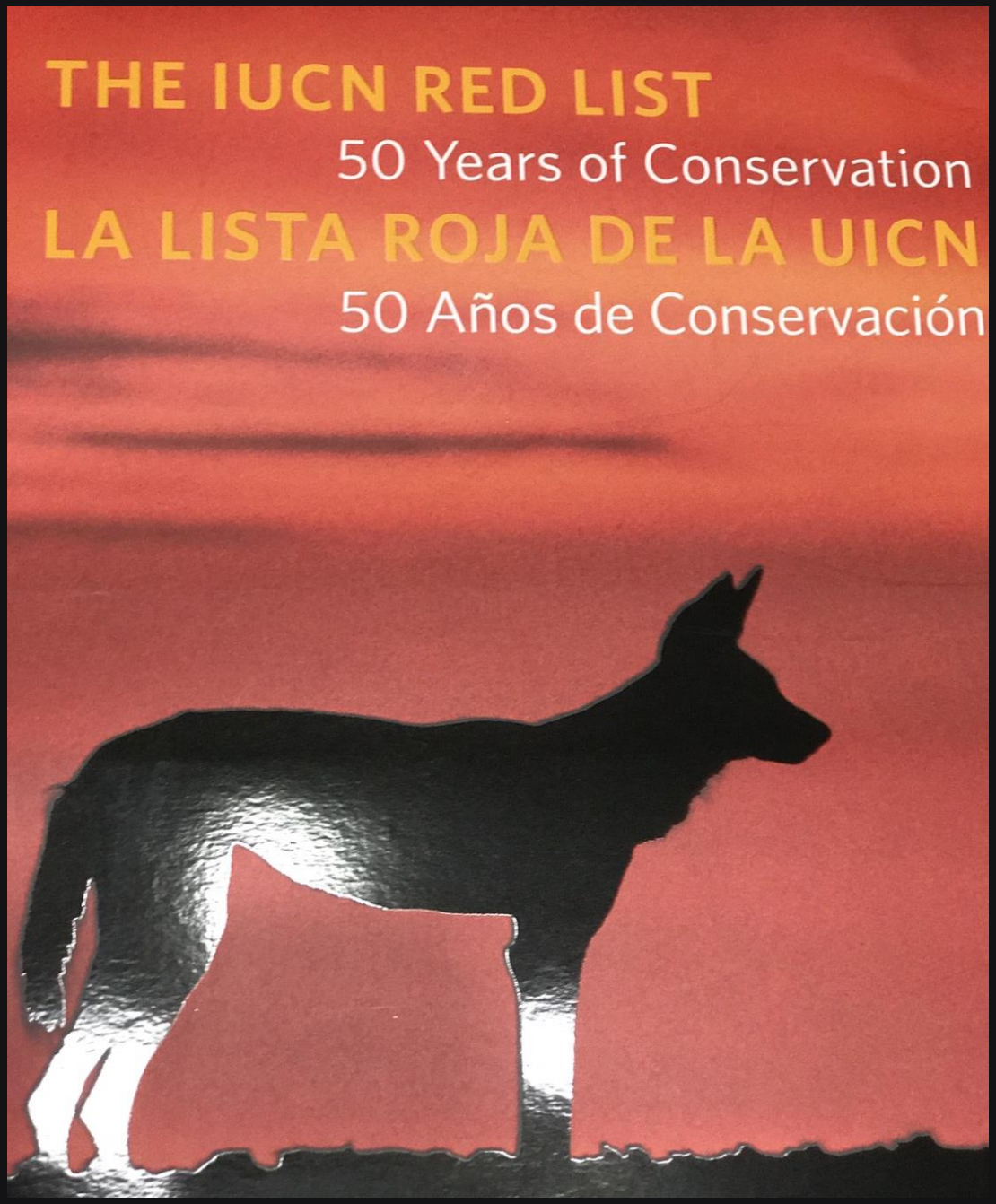
Open data to the public,, and promotion activities

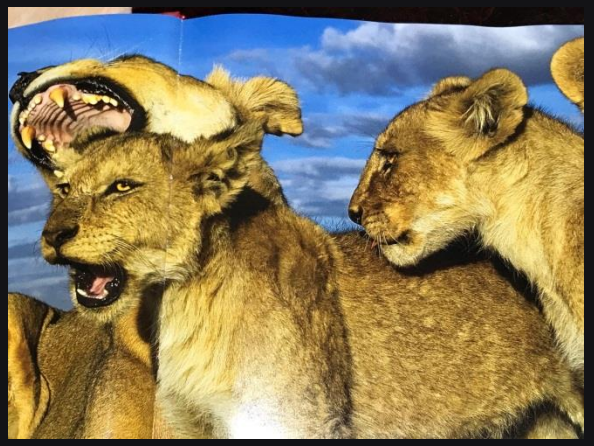
Hot Spot

Support for scientifi findings and data accumulation

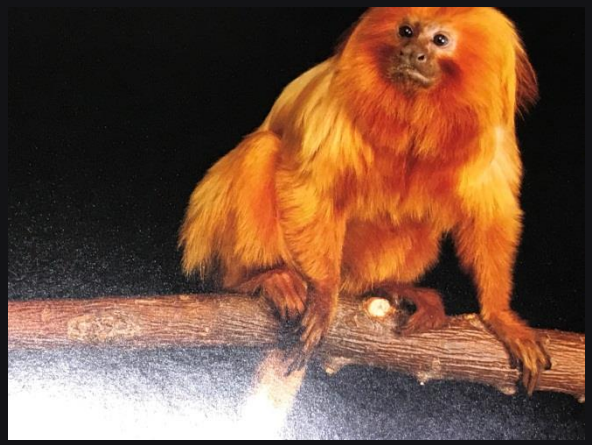
Hot Spot

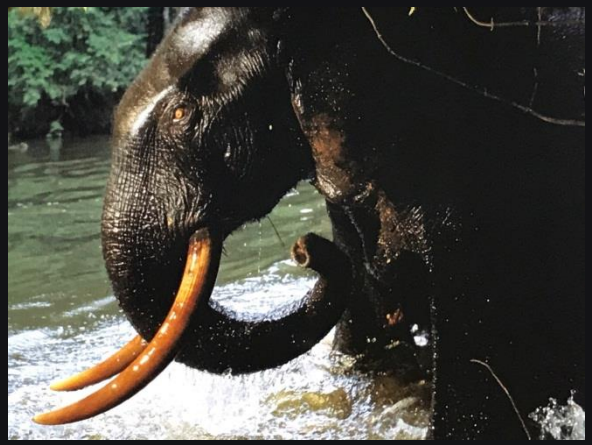
Source: TMC


THE IUCN RED LIST
50 Years of Conservation
LA LISTA ROJA DE LA UICN
50 Años de Conservación



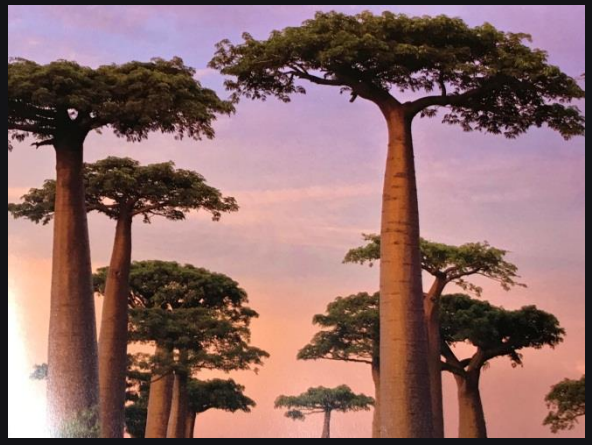




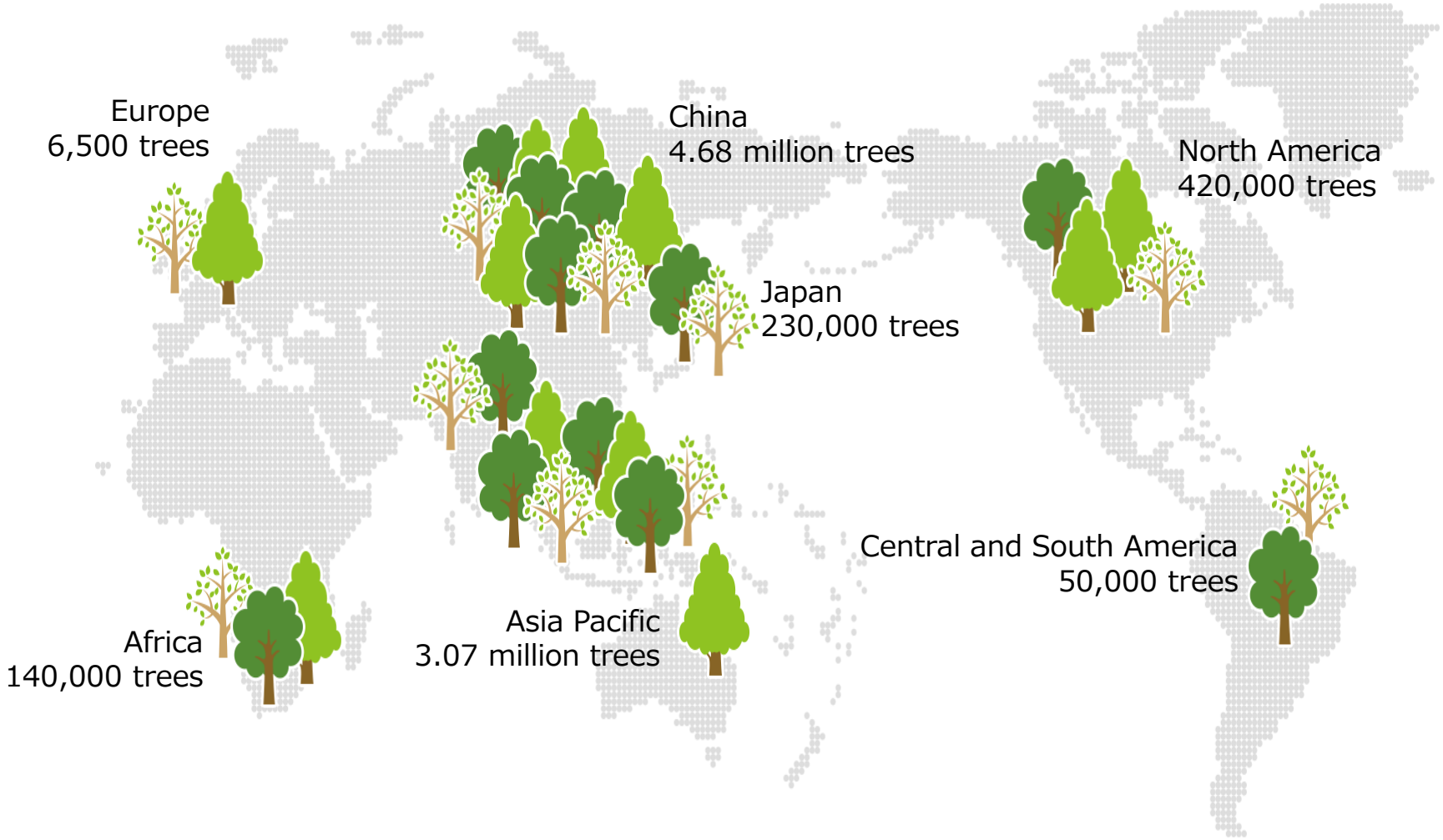






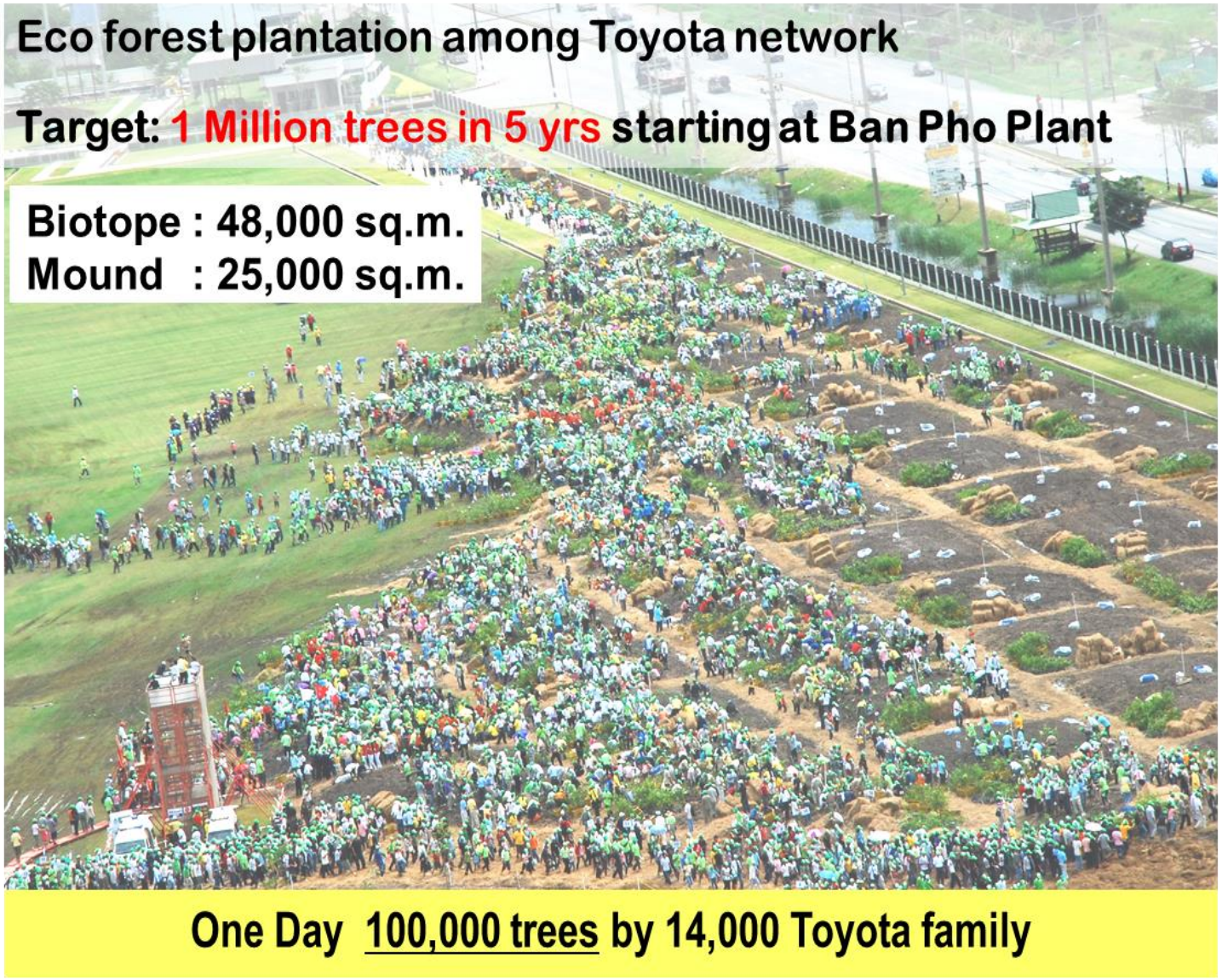
Global Eco Forest Plantation

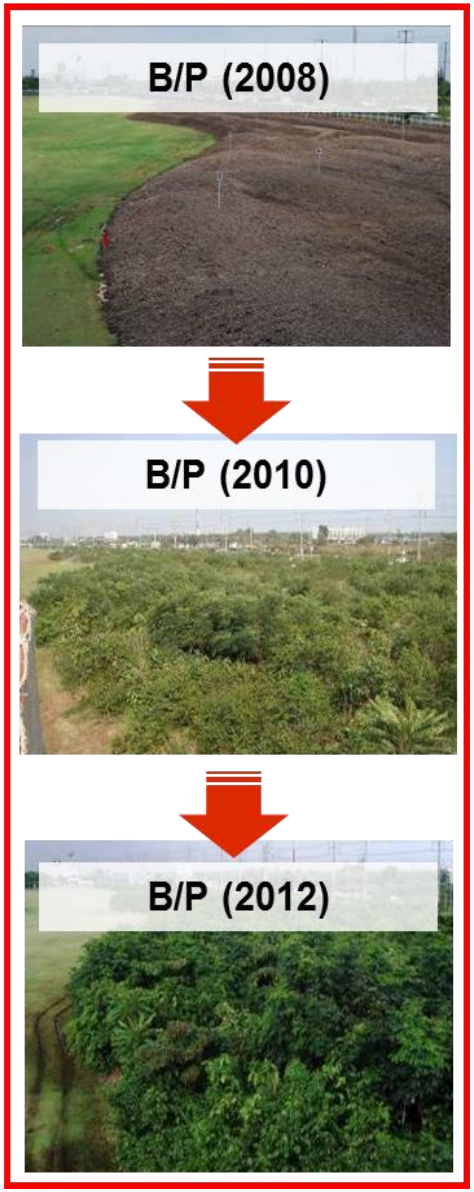
Collaborative activities with employees of Toyota's affiliates, communities, and various organizations



Source: TMC

Eco Forest & Eco System Conservation





Source: TMC

Eco Forest & Eco System Conservation

Prof.Dr.Akira Miyawaki's Phytosociological system

1. Find native species
2. Prepare native Seedling
3. Soil & Mound
4. Soak seedling with water before planting
5. Density & Diversity planting

Source: TMC

Eco Forest & Eco System Conservation

Promoting Forest Conservation with Local Economy






Source: TMC

Eco Forest & Eco System Conservation

Toyota Biodiversity and Sustainability Learning Center "Cheewa Panavet"

Cheewa	=	Life	(Biodiversity)
Pana	=	Forest	(Tree)
Vet	=	Home	(Habitat)
Cheewa Panavet	=	Forest which is a home of the living things	

1) Exhibition Building

- Royal commemoration exhibition on biodiversity conservation
- Auditorium

Building space: 425 m²

Banpho Factory

2) Biotope

- Construction of habitat for living creature
- Demonstrate Plant society

Area : 48,000 m²

3) Eco Forest

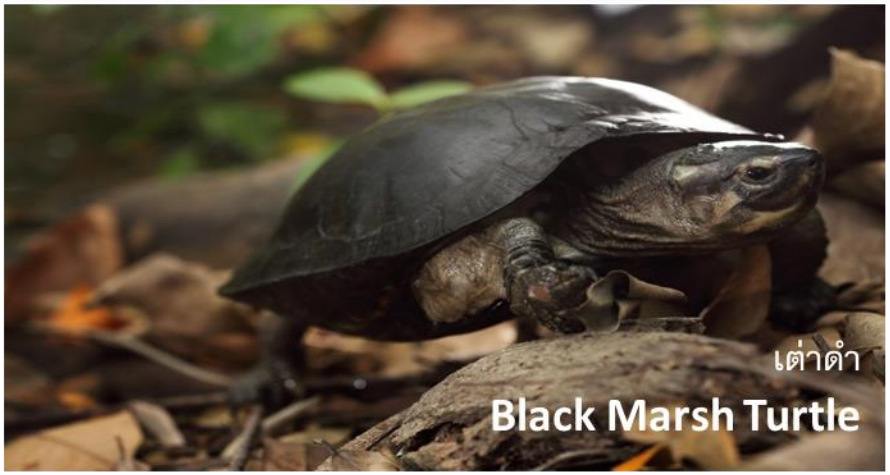
- Tree planting by Prof.Dr. Miyawaki 's Method

Area : 48,000 m²

Total Area of Cheewa Panavet = 96,000 m²

Eco Forest & Eco System Conservation

1) Biodiversity: **Plant 43 species**
Animal 218 species (Bird, Reptile, Insect, Fish, etc.)



Eco Forest & Eco System Conservation

2) Visitors

** July 2016– 24 Apr '2017*

Type	No. of Visitor (Person)
1) General Visitors	10,162
2) Student (½ day , 1 day -training)	3,582
Total	13,744

Eco Forest Plantation with Chulalongkorn

2012
(38,400)

To celebrate King Bhumibol's 84th birthday

2013
(28,600)

To celebrate King Bhumibol's 86th birthday

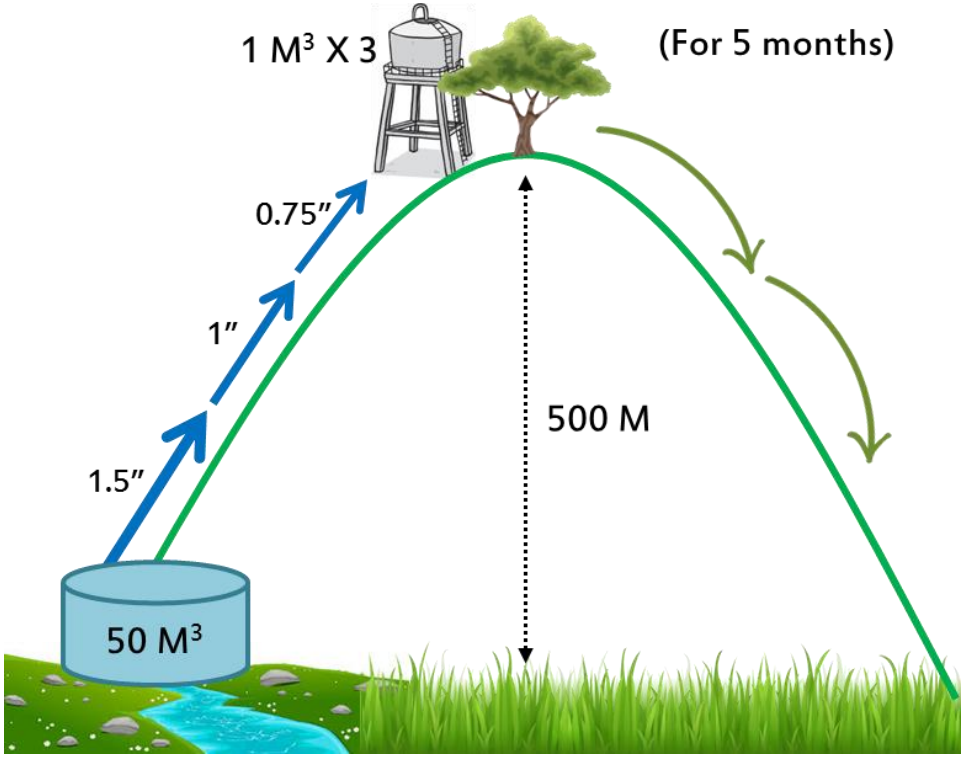
2014
(60,000)

To celebrate Princess Sirindhorn's 60th birthday

2017
(30,000)

Reforestation Model under Princess's initiative

Eco Forest Plantation with Chulalongkorn



Mangrove Plantation Day

2004

2006

2007

2008

2009

2010

2011

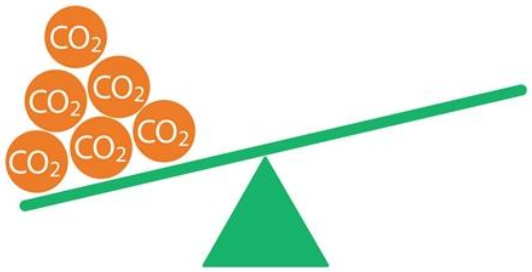
2012

2013

2014

2015

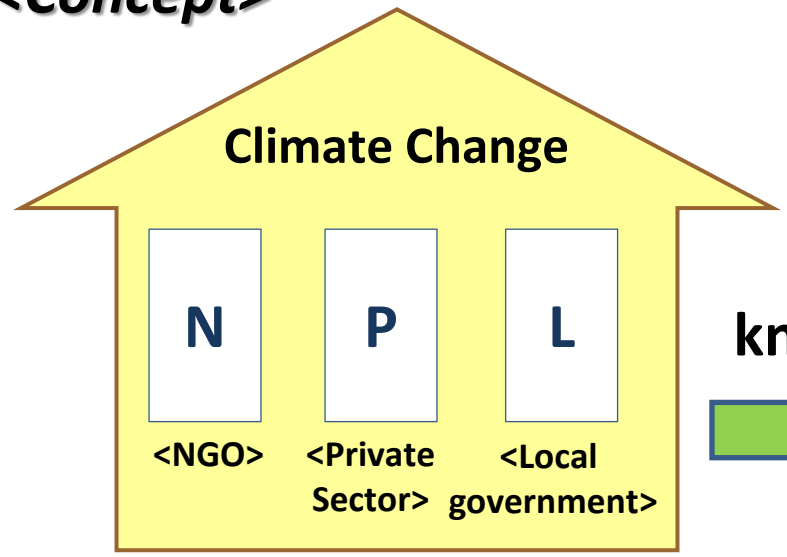
Mangrove Plantation Day



Carbon Dioxide (CO_2) Reduction = 7,000 tons

Stop Global Warming 12th Year

<Concept>



knowledge

Env. Problem

Community & School

Knowledge + Local wisdom

Mitigation

1. Energy Reduction
2. Waste Reduction and Recycle
3. Sustainable Transportation
4. Green Area Increasing

Adaptation

5. Water Conservation

NGO	=	TEI THAILAND ENVIRONMENT INSTITUTE
Private sector	=	TOYOTA เมืองสีเขียว
Local Government	=	Municipality/ Local administration

Performance Evaluation via Contest and GENBA

Result of Stop Global Warming Project













U-mong, Lamphun Province

Klaeng, Rayong Province

Tung-song, Nakhorn Sri Thammarat Province

- 225 Local Administration nationwide
- 140 Communities nationwide participated
- 286 Schools nationwide participated
- 3 Global Warming Learning Centers
- Reduce CO_2 20,000 Tons
- Budget 227 MB (6.4 Million USD)

Future Plan for Stop Global Warming

○ To comply with Toyota Environmental Challenge 2050

Challenge # 6 : Challenge to Establishing a Future Society Harmony with Nature

Integrate 3 project with SGW

What we need for our cities?

Driving Innovation through government funding and contest

"Smart Cities – Clean Energy"

DEC'16: **36** Applicants

JAN'17: **16** Candidates (0.5 MB)

APR'17: **7** Winners (10 MB)

OCT'17: **ITS-WC in Canada**

1.Energy
(smart grid, solar, wind, biomass)

2.Mobility
(digital infra, HV, PHV, EV)

3.Community
(welfare, health, education,)

4.Environment
(agricultural, natural area)

5.Economy
(sustainable economy & business)

6.Building
(district heat/cool, TREES; Eco Showroom)

7.Governance
(performance measurement)

8.Innovation
(driving R&D)

What we need for our cities?

What we need for our cities?

THANK YOU

The 4th Engagement Thailand Annual Conference: University Social Commitment in a Challenging Century

5 – 7 July 2017 at Chulalongkorn University