



Thailand:

Overview of the Biotechnology Sector and Strategy to Develop Thailand's Bio-Economy



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8 June 2020. Dr. Suvit Maesincee, Minister of Higher Education, Science, Research and Innovation (MHESI) brought a team of eight top executives representing industries, entrepreneurs, academia, government agencies and people sector to meet Prime Minister General Prayut Chan-o-cha to discuss **the use of Bio-Circular-Green Economic (BCG) Model to drive the national agendas** which include food security, public health security, energy security, job security, environmental sustainability, as well as social inclusiveness.

BCG Economy: A key global driver of economic development post COVID-19

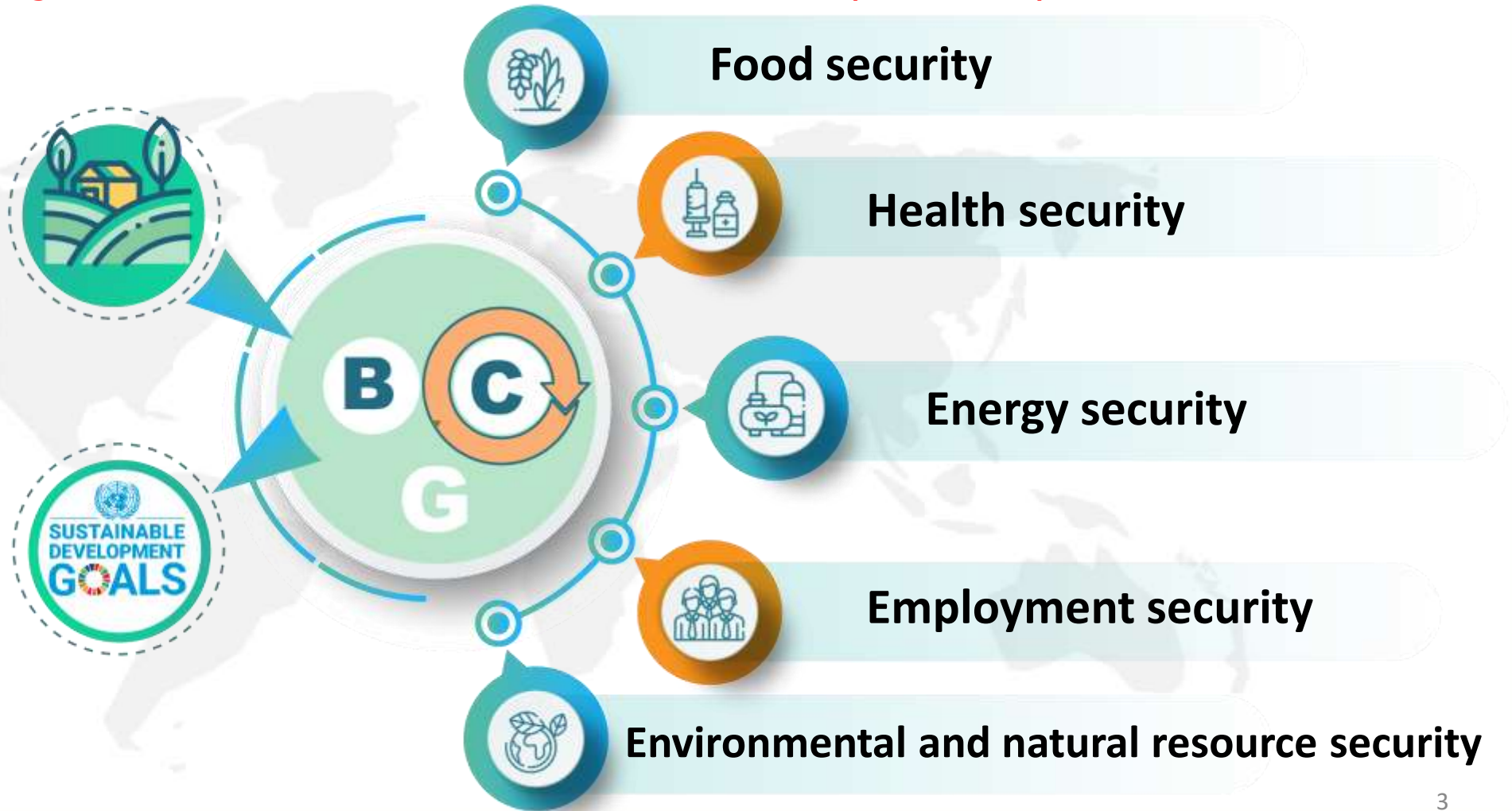
Paradigm Shift: Modernization & Wealth → Sustainability & Security

Concept: SEP

Sufficiency :,
Economy Philosophy

Goal: SDGs

Sustainable
Development Goals



3 Guiding Principles



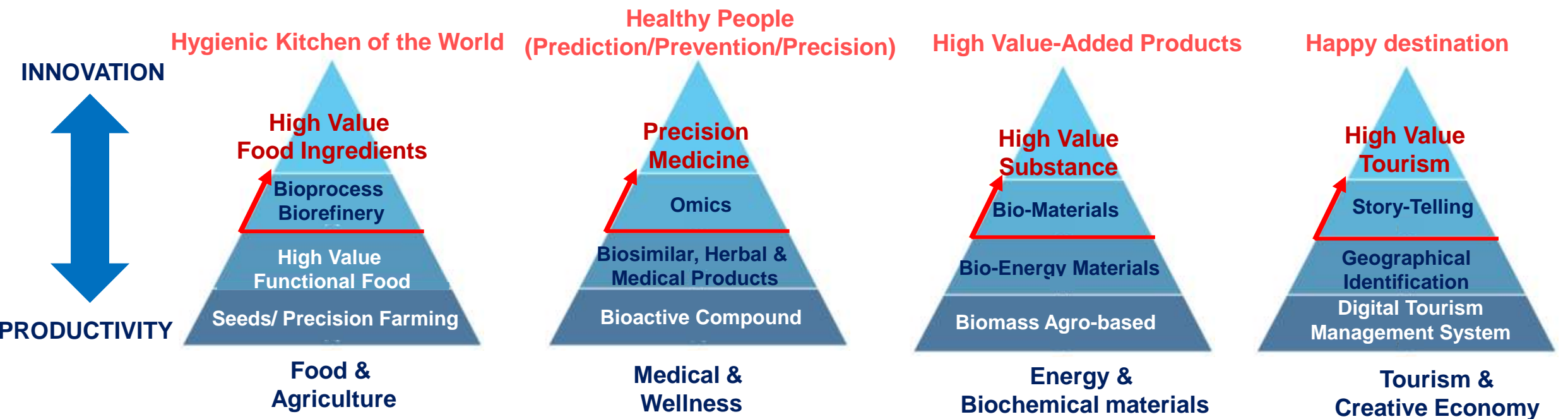
Strengthen from Within, Global Thai Linkage

Going Forward Together, Left No One Behind

Sufficiency Economy Philosophy (SEP) for Sustainable Development Goals (SDGs)

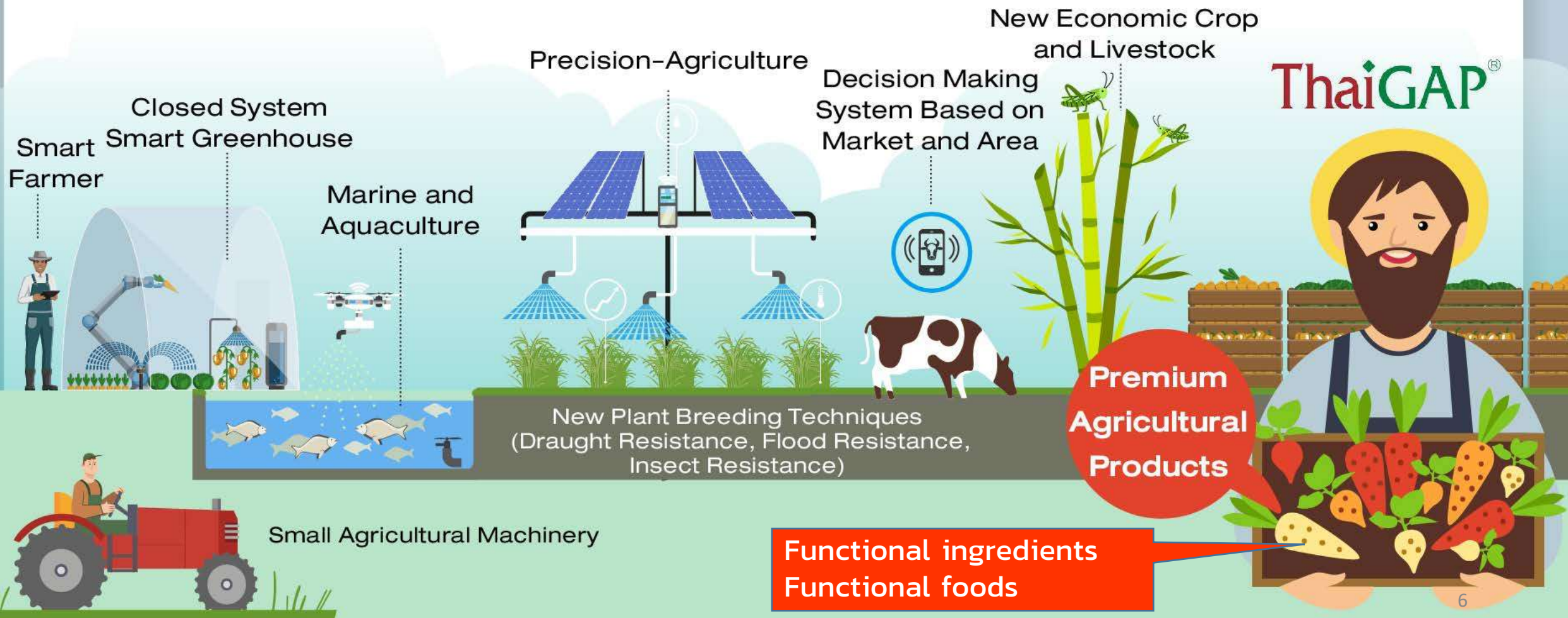
Biodiversity & Biotechnology as drivers for BCG economy

BCG MODEL: Aim for Distributive Economic Prosperity

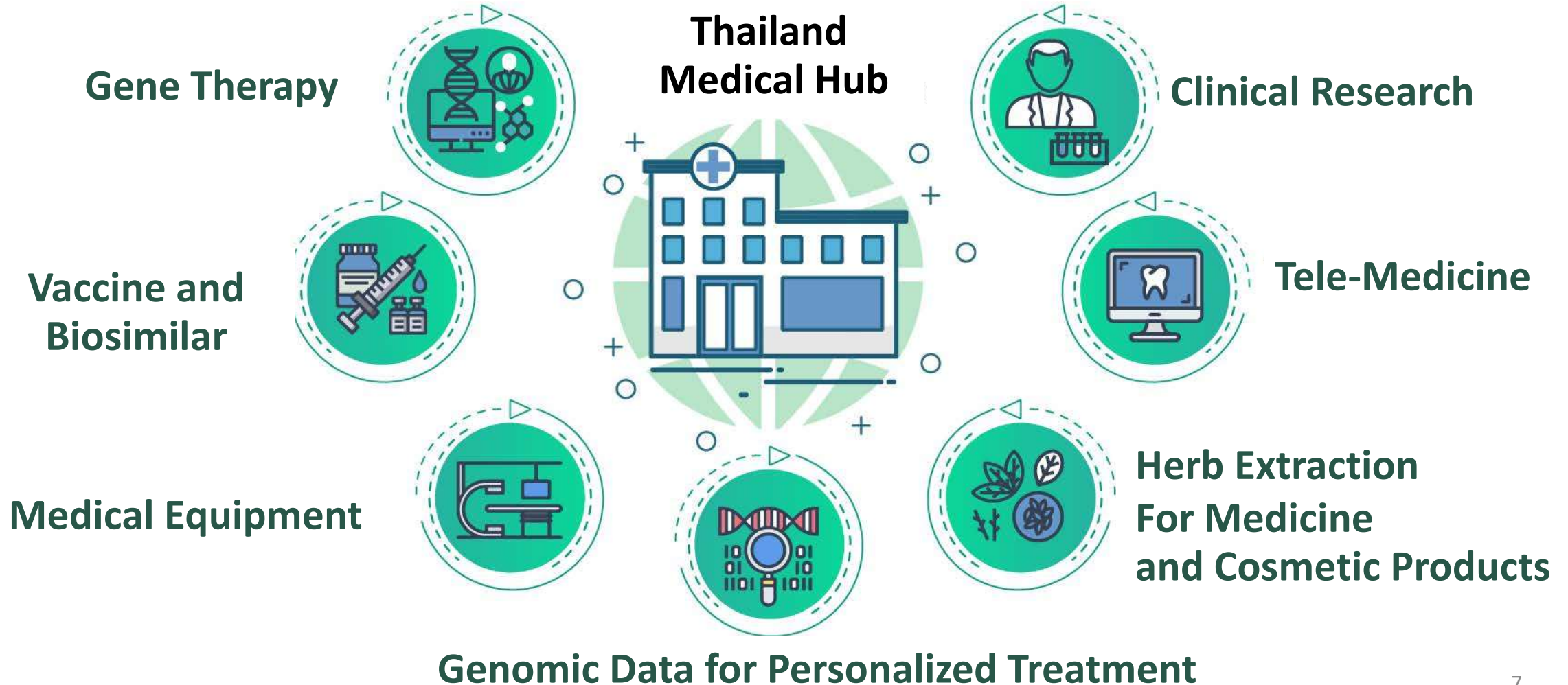


BCG MODEL in Food and Agriculture Sector

Satellite Imaging
to Manage
and Monitor
Agricultural Crop

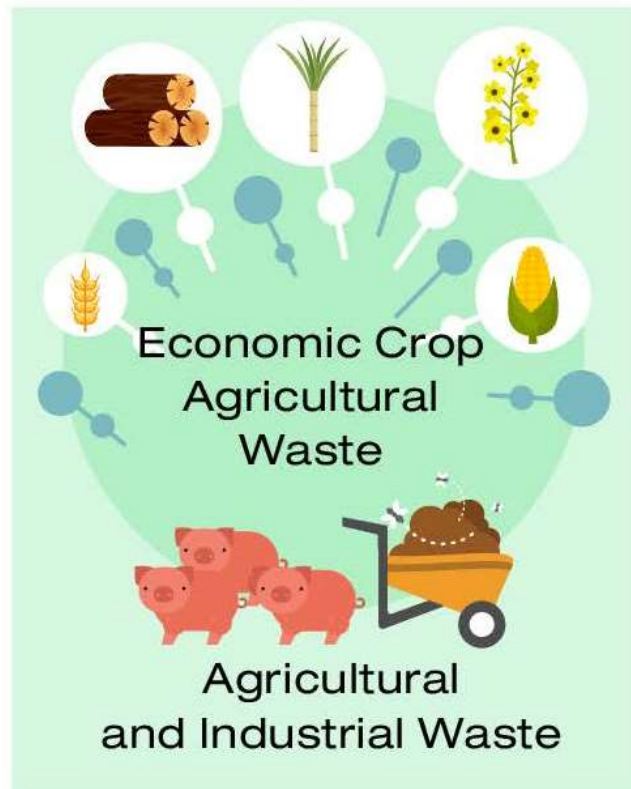


BCG MODEL in Medical and Wellness Sector

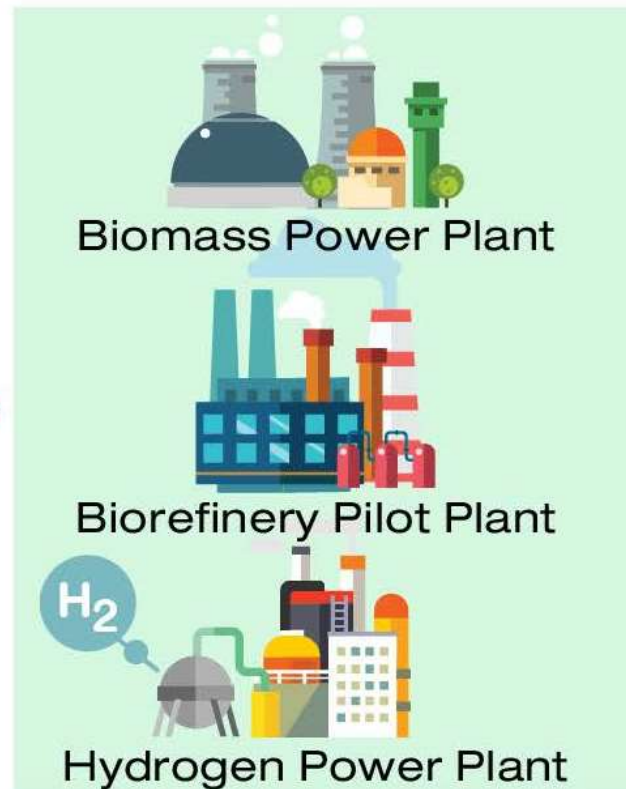


BCG MODEL in Energy, Material and Biochemical Sector

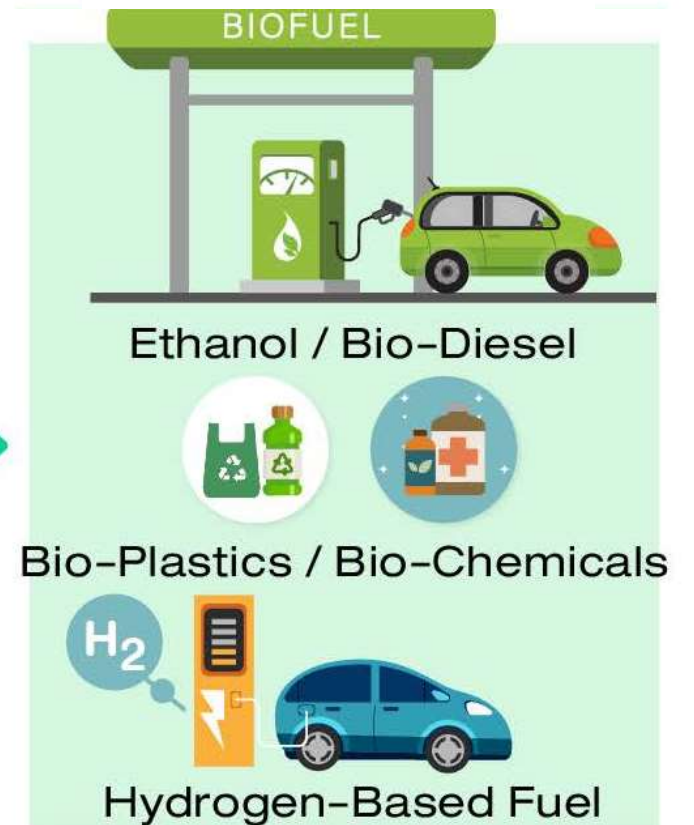
Agricultural Product and Waste



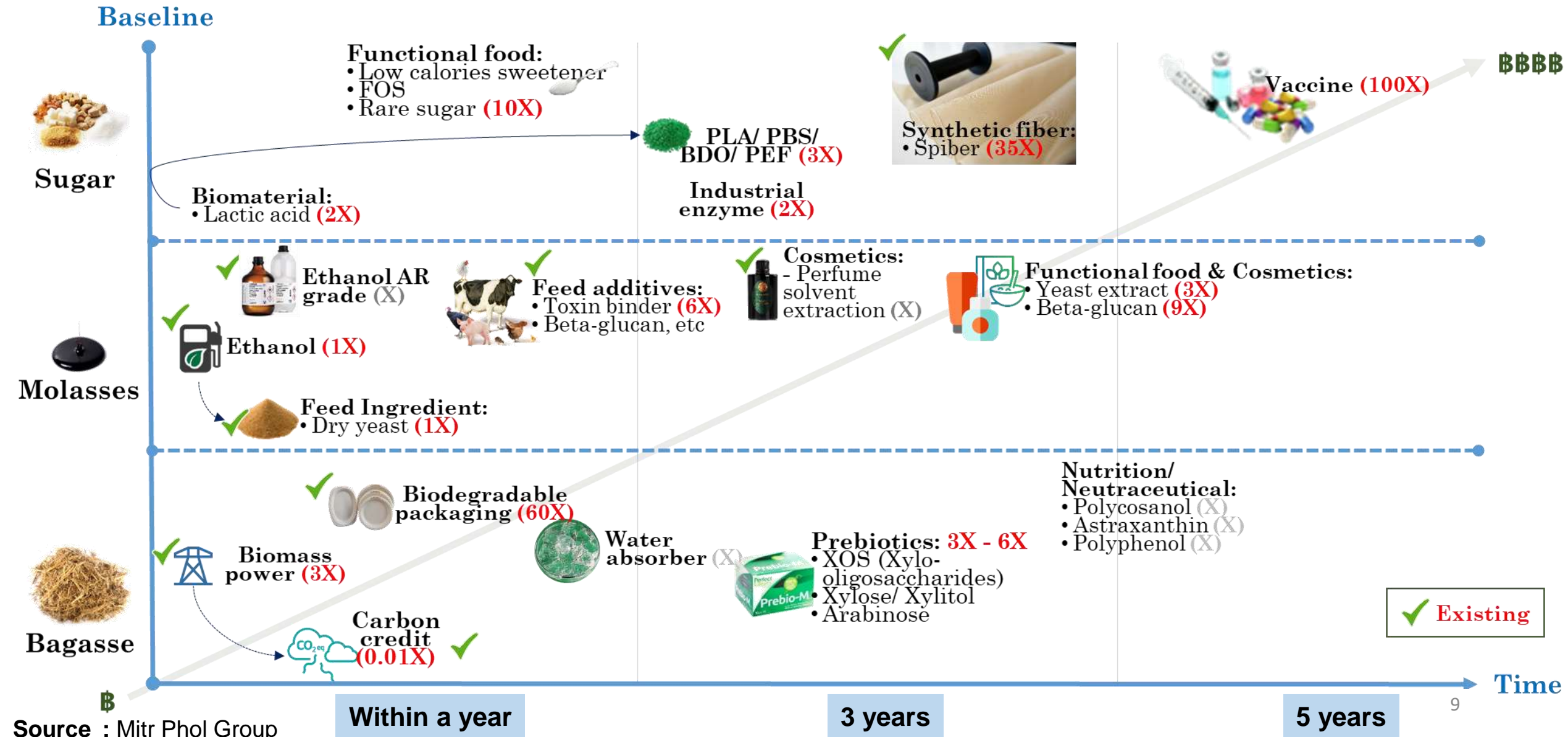
Investment Promotion



Industrial Development



Biotechnology and value creation in biochemical industry



BCG MODEL in Tourism and Creative Economy Sector



Paradigm shift

Then

Publicly-led investment

Cash-aid policy

Annual funding

Individual project-based funding

Economic growth based on traditional industry

External-dependent growth

Individual contribution

Now

Enterprise-led investment with government support

Government investment

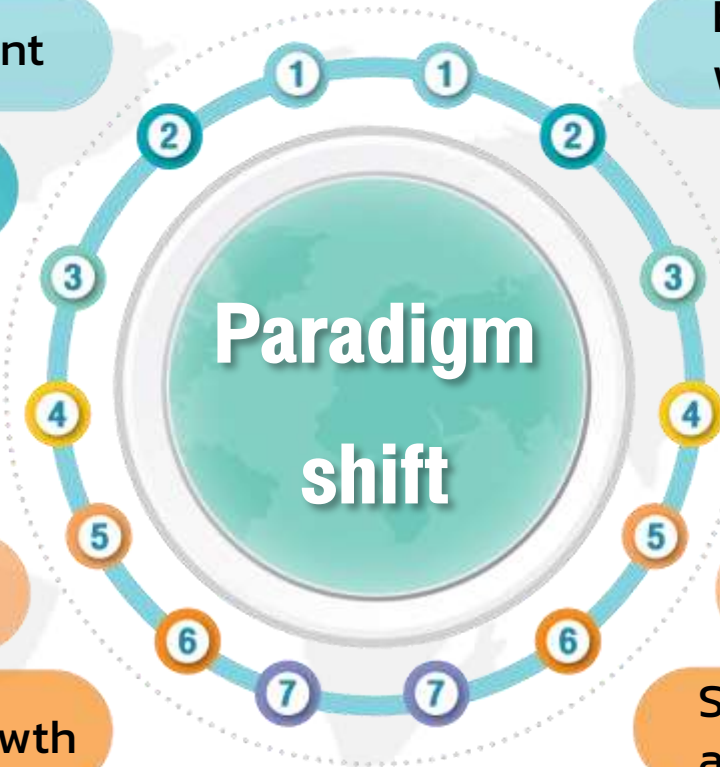
Multi-year funding

Integrated project funding

New S-curve industry

Strengthening local economy and global linkage

Collective action through contribution of 4 sectors



Overview of biotechnology in Thailand



**THAILAND
BIOTECHNOLOGY**
The Gateway to ASEAN

Content

- **Thailand biotechnology development policy**
- **Agriculture and Food** - Plant breeding development – Animal farming- Genetic engineering policy: Transgenic plants - disease diagnosis and services
- **Medicine and Health** Medical devices - Diagnostic kits - Biopharmaceuticals – Stem cell technology - Vaccine
- **Biorefinery Industry** - Bio Energy - Biomass - Biogas - Ethanol-Biodiesel - Bio Industry - Bioplastics
- **Why Thailand**
 - Skilled labor
 - Access to markets
 - Attractive investment incentives
- **Development network of support organizations**
 - National Science and Technology Development Agency (NSTDA)
 - National Center for Genetic Engineering and Biotechnology (BIOTEC)
 - Thailand Science Park (TSP)
 - National Biopharmaceutical Facility (NBF)
 - Research and development Certification Committee Secretariat(RDC)
 - Thailand Center of Excellence for Life Sciences (TCELS)
 - Thailand Institute of Scientific and Technological Research (TISTR)
 - Biodiversity - Based Economy Development Office (BEDO)
 - The Venture Capital (VC) Industry in Thailand

[Link: http://aseanup.com/overview-biotechnology-thailand/](http://aseanup.com/overview-biotechnology-thailand/)

Investment to drive the BCG economy model

National Biobank



Collection, preservation and utilization of bioresources

Genomics Thailand



A collaborative human genome research network to enable precision medicine

Regional Science Park



Foster local economy development

Big Data



Improve agricultural practice through precision agriculture (TP Map/ Agrimap/ Hydro&Geo Map)

Biorefinery Pilot Plant



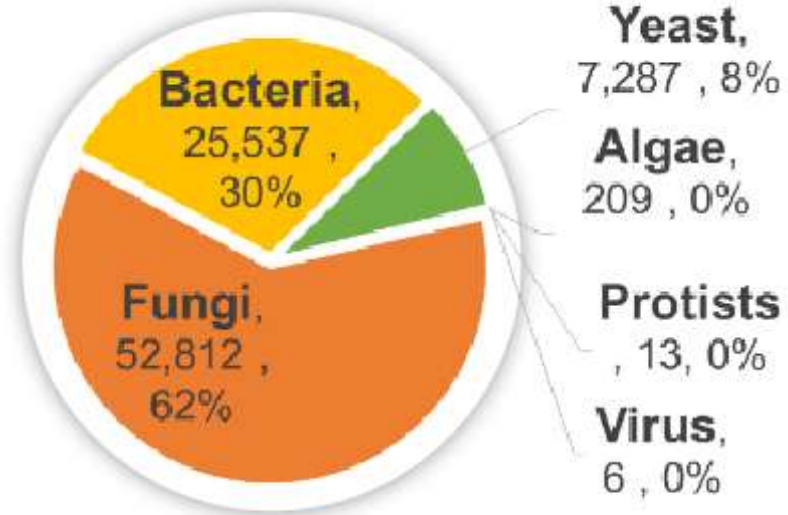
Scaling up technology: Lab-scale to industrial-scale (Waste to Wealth)

collection

85,864

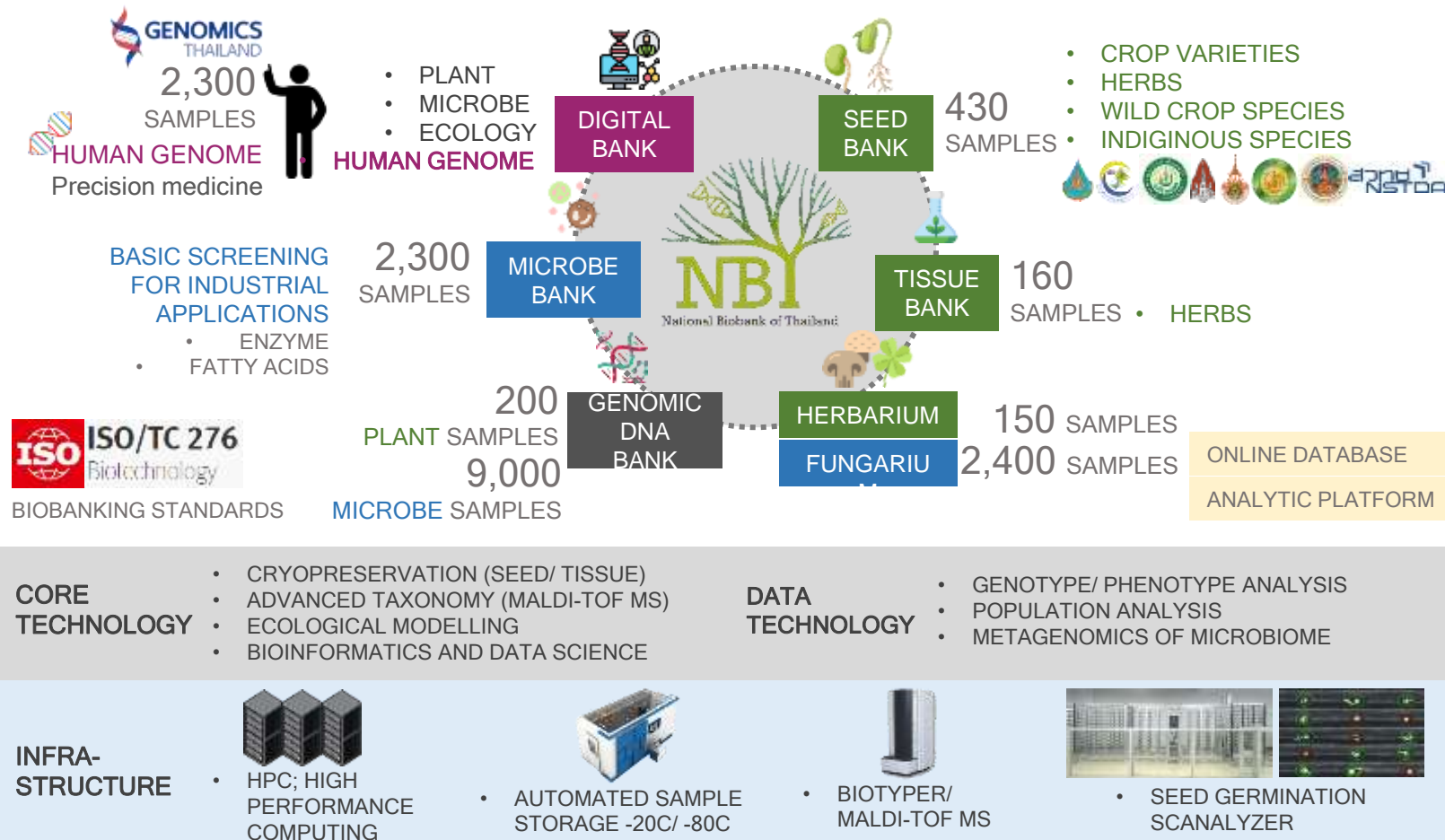


Microbial strains
(bacteria/ fungi/ yeasts/
protists/ algae/ virus)



National Biobank of Thailand

NBT FOR LONG-TERM CONSERVATION AND UTILIZATION OF THAI BIORESOURCES



PLATFORMS

THAI BIORESOURCES CATALOGUE

ECOSYSTEMS

PRECISION MEDICINE IN THAILAND

BCG MODEL



FOOD AND AGRICULTURE

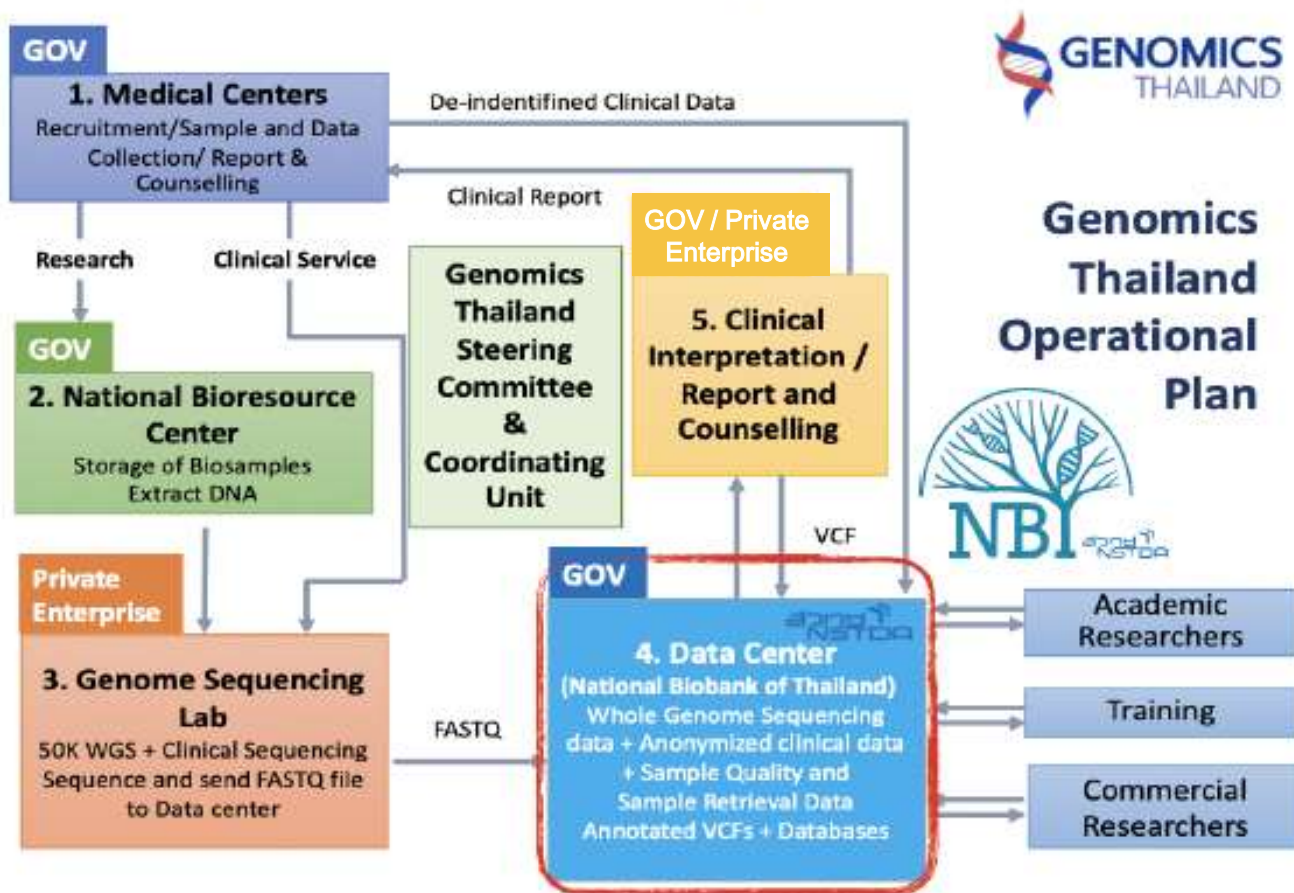
ENERGY AND MATERIAL

TOURISM

HEALTH & MEDICAL

Genomics Thailand

<https://genomicsthailand.com/Genomic/about>



5 Targeted Diseases

- Rare diseases
- Cancer
- Non-communicable diseases
- Pharmacogenomics

1,175 Whole genome sequencing (WGS)

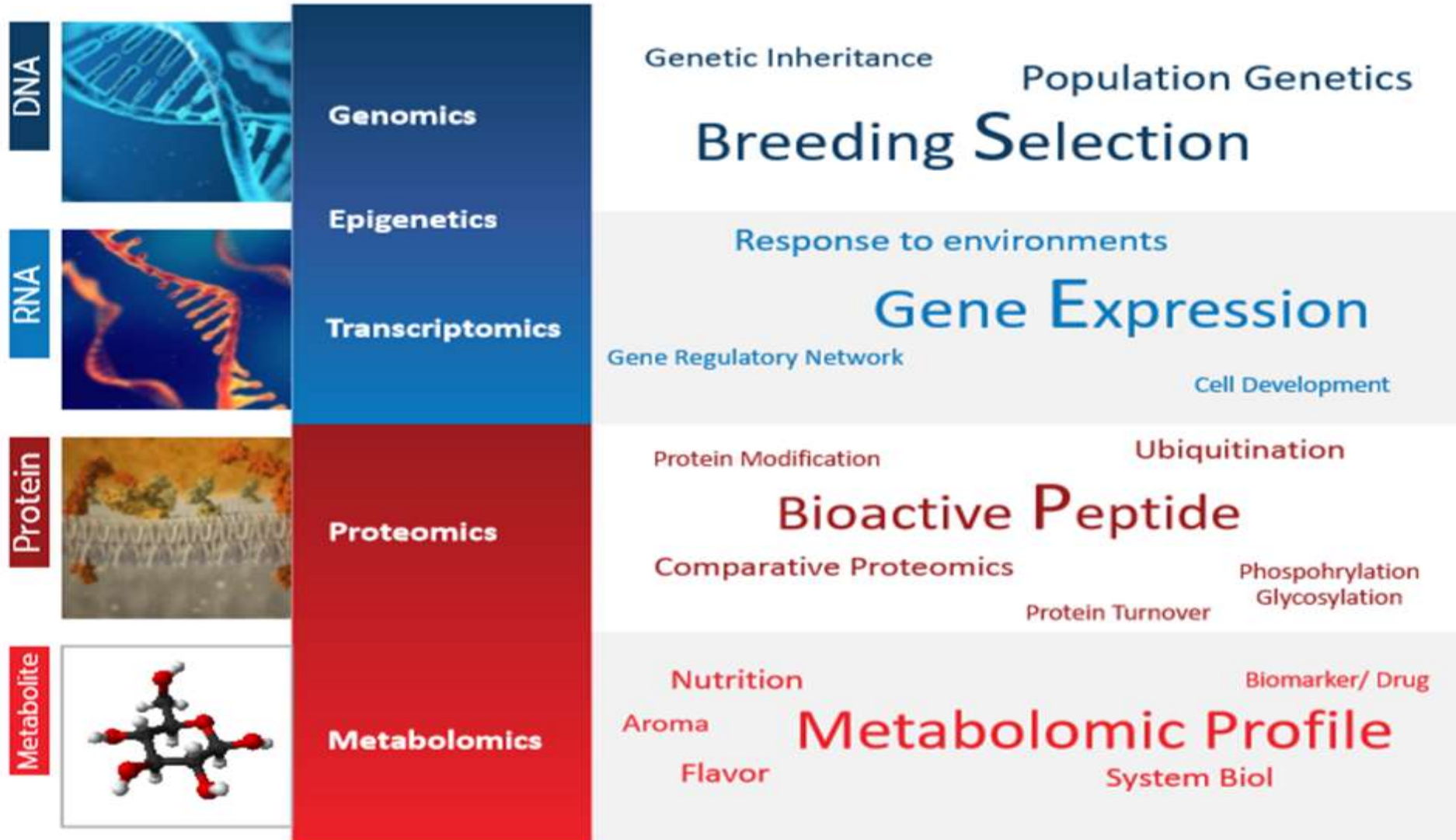
1,092 Whole exome sequencing (WES)

2,505 SNAP Array data



National Omics Center

National Omics Center



Thailand's Regional Science Parks & Eastern Economic Corridor of Innovation (EECi)



**A Translational
Research Hub Bridging
Research & Investment
across Thailand**



**Universities/
Research Institutes**



Target Industries

**USD 43 bil.
Investment in EEC
(cumulative 5 year Projection)**

**Regional
Science Parks**

**Startups / SMEs
LEs / MNCs**



**Modern Agriculture
& Adv. Biotechnology**

**Bio-Fuels &
Bio-Chemicals**

**Automation, Robotics
& Smart Electronics**

**Aviation
& Aerospace**

**High Performance
Battery & Modern
Transports**

Medical Device

TRL: 1 2 3 4 5 6 7 8 9

**Laboratory
Development**

**Scale-up, Demonstration,
Localization**

<https://www.eeci.or.th/th/>

Source : EECi, NSTDA

Biorefinery Pilot Plant

EECi

Biorefinery Pilot Plant

34.39% Overall construction progress



47.26% Non-GMP pilot plant

57.43% GMP pilot plant

Joint venture: Bio Base Europe Pilot Plant + NSTDA



The National Science and Technology Development Board approved the establishment of “Bio Base Asia Pilot Plant” to manage the biorefinery pilot plant on **May 25, 2563**.

KINGEN BIOTECH

*To be ASEAN's No.1 R&D-based biotechnology company
with manufacturing capabilities*

Kingen Holdings Stakeholders

Genexine

Innovative immunotherapeutic and next generation
novel long-acting biologics



Thailand's #1 cGMP capacity and CMC expertise



Business expertise in South East Asia and execution
capacity



<http://www.nbf.kmutt.ac.th/>

Conclusions

- Thailand has already been prepared for new economy.
- BCG model is now fully activated and put in action by Thai government and key stakeholders to shape up a country after disruption by COVID-19.
- International partners and global network are considered as key enablers.
- With more experiences on new mechanisms and business models, we will move forward at higher speed.



Thailand

Southeast Asia's prime destination for biotechnology development

Biodiversity



Human Capital



Infrastructure





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Thank You