

NAVIGATING  
THE **FUTURE OF WATER**  
IN THE **NEW NORM**



Malaysia International  
Water Convention 2021  
Virtual Event 20-24 September 2021

Conference Track  
Green Technologies and Circular Economy

**Responsible Research and  
Industry-Academia Partnership  
to Enhance Indigenous  
Green Technologies**  
23<sup>rd</sup> September 2021



Prof. Dr. Ma'an Alkhatib  
International Islamic University Malaysia



United Nations  
Educational, Scientific and  
Cultural Organization

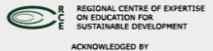


• UNESCO Chair on Future Studies  
• - Anticipation for Sustainability and  
• Well-being



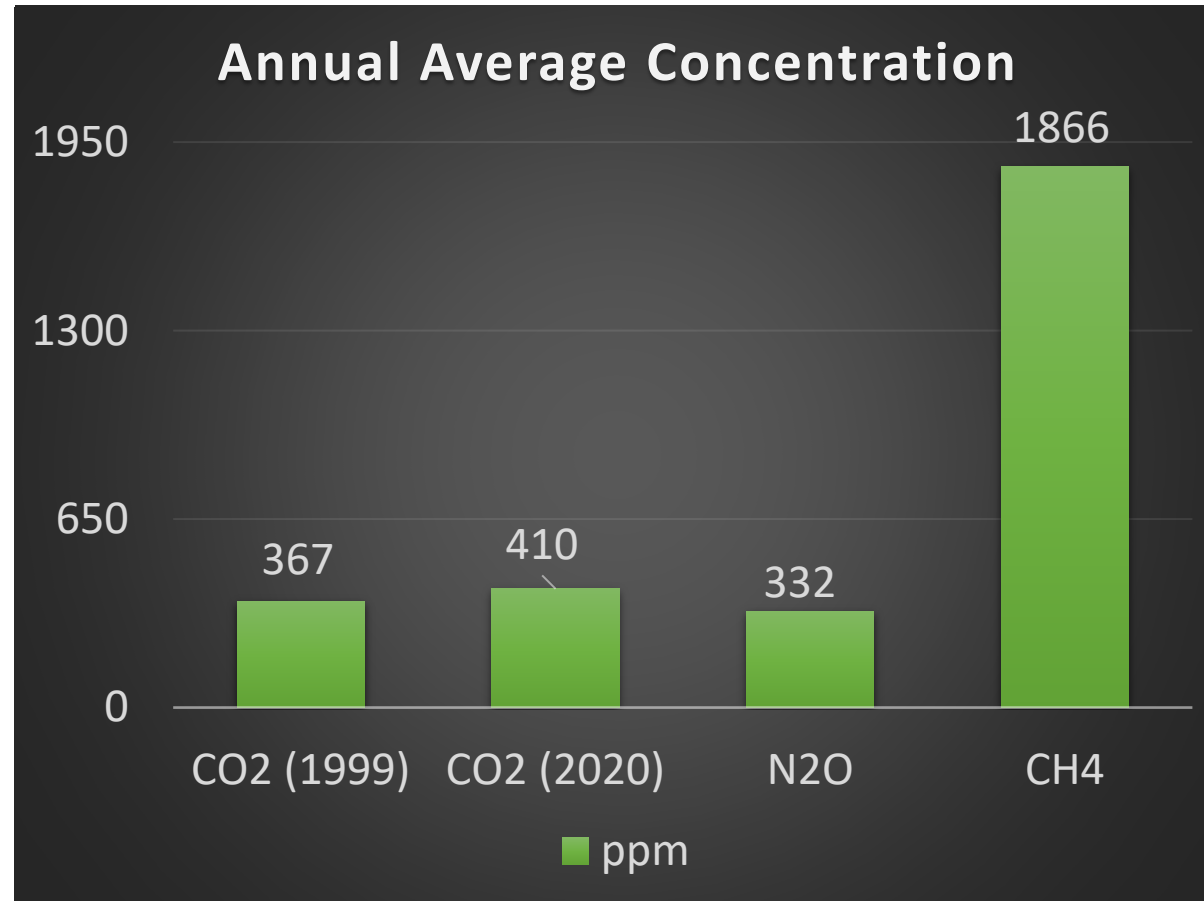
الجامعة الإسلامية العالمية ماليزيا  
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA  
يونسفوسيتي: إسلاماً، إنساناً، إيماناً، إبداعاً، إغشياً، مليئاً  
Garden of Knowledge and Virtue

AN INTERNATIONAL AWARD-WINNING INSTITUTION FOR SUSTAINABILITY



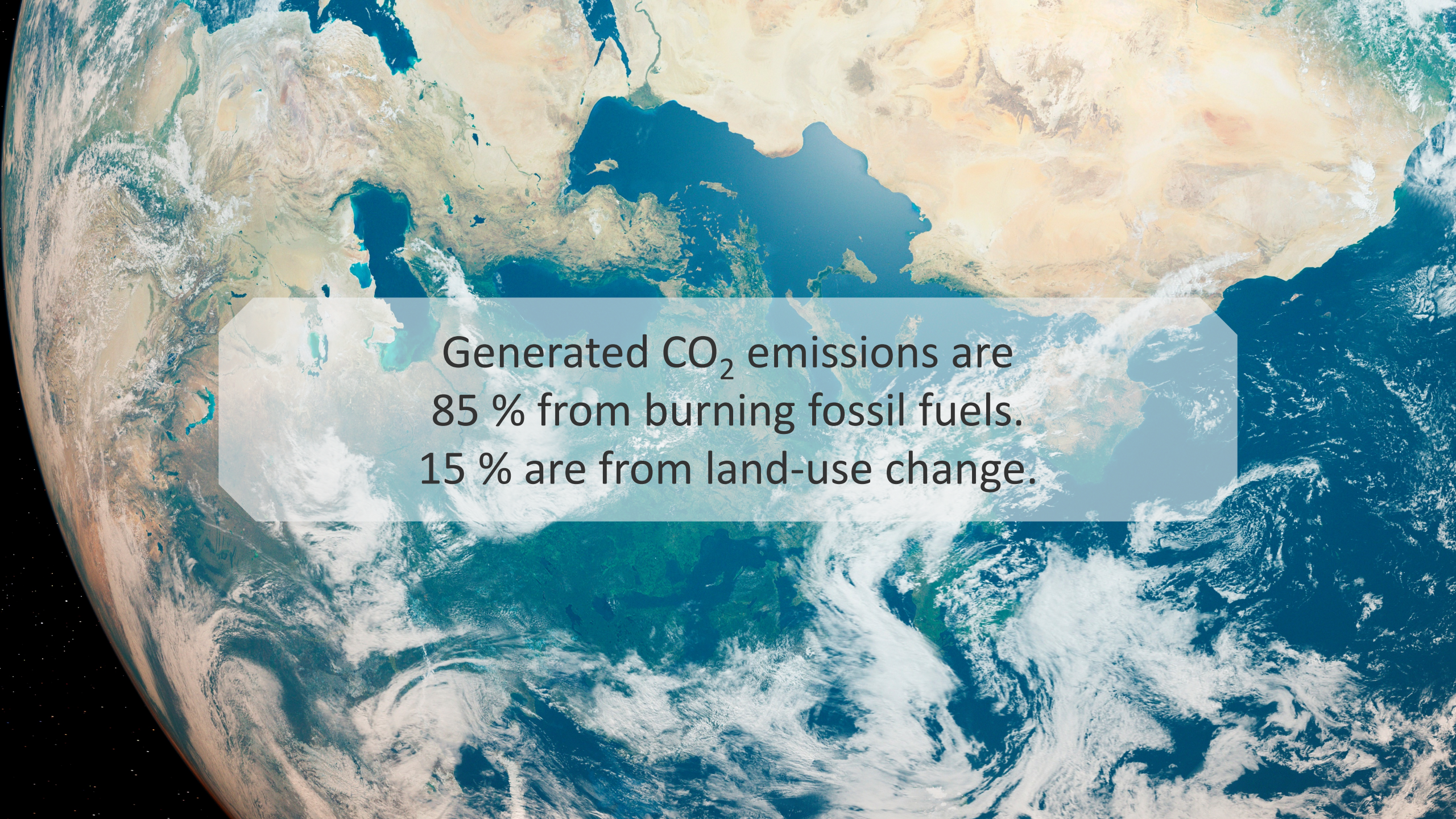


# Climate Change




Intergovernmental Panel on Climate Change (IPCC) 2021



A satellite image of Earth showing the Middle East, North Africa, and parts of Europe and Asia. The image is a composite of several satellite photos, showing the intricate patterns of land, water, and clouds. The colors are vibrant, with deep blues for the oceans and lighter blues for the clouds. The landmasses are in shades of brown, tan, and green, indicating different types of terrain and vegetation. The overall image has a high-resolution, detailed appearance.

Generated CO<sub>2</sub> emissions are  
85 % from burning fossil fuels.  
15 % are from land-use change.

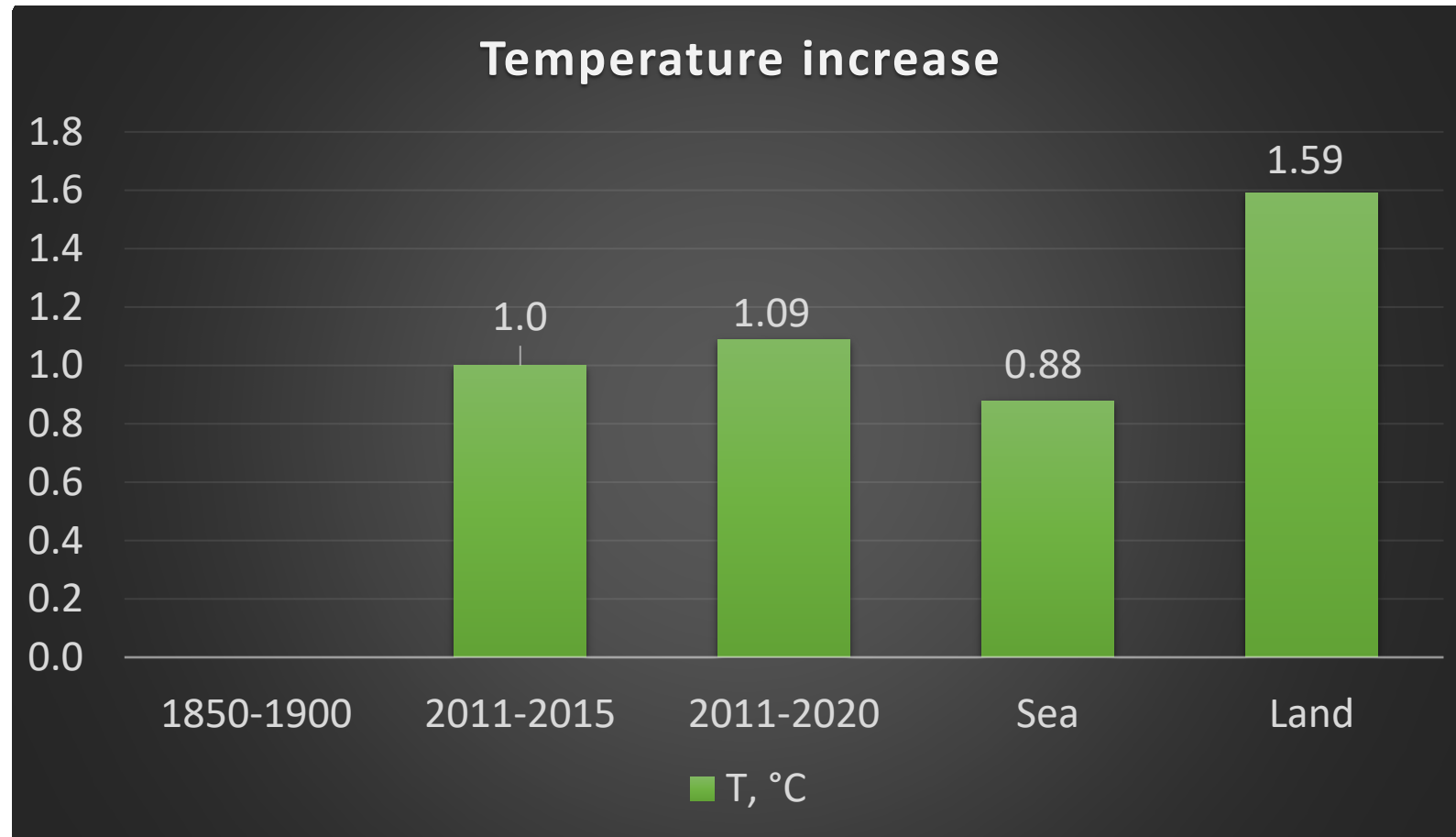


A satellite image of Earth showing the Middle East, the Red Sea, and the surrounding oceans. The land is depicted in shades of tan and brown, while the oceans are deep blue. White clouds are visible swirling over the ocean surfaces. A white text box is overlaid on the image.

Globally about 56% per year of CO<sub>2</sub> emissions  
from human activities are taken up by  
Land and ocean over the past 6 decades

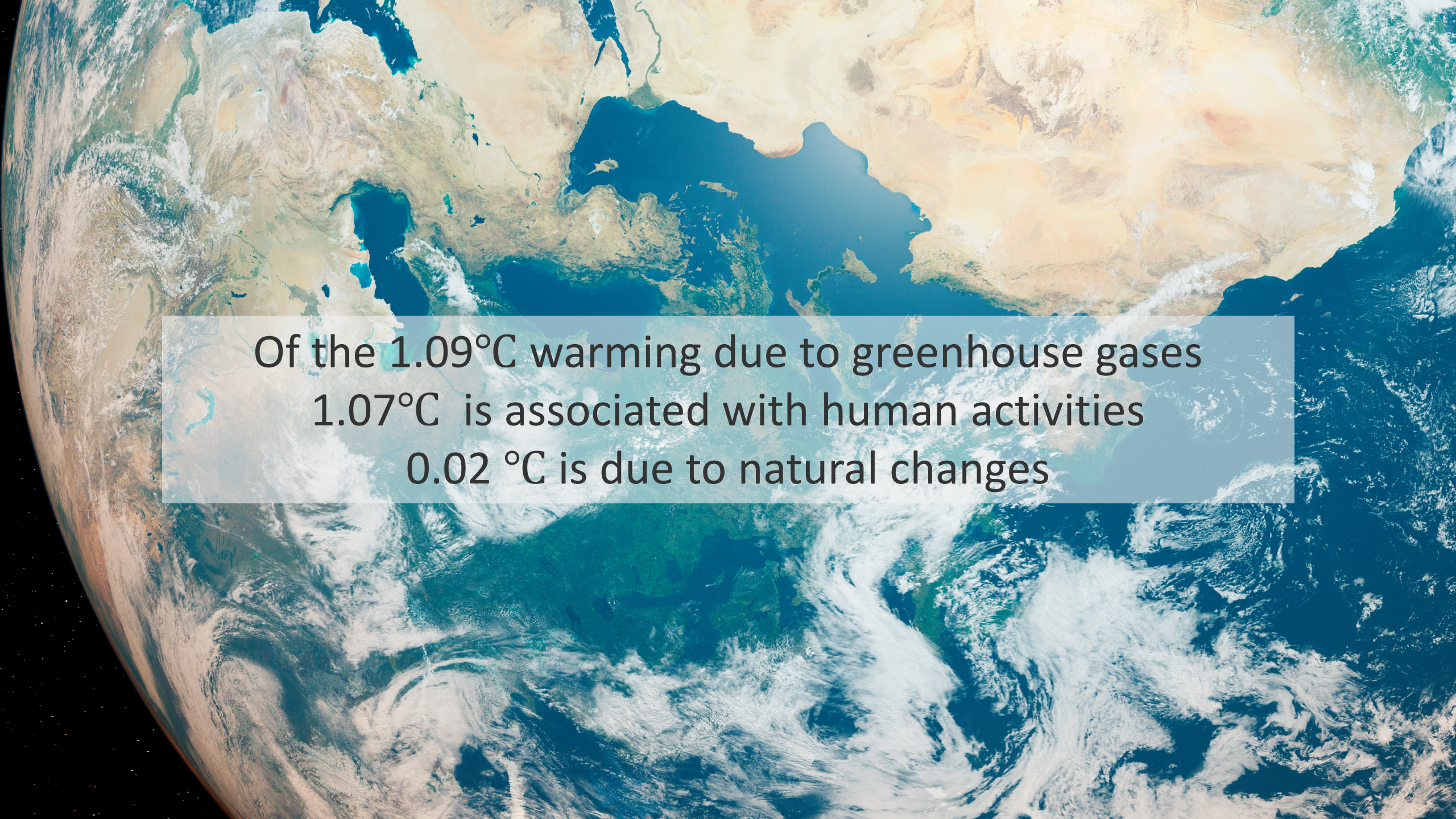


# Climate Change



Intergovernmental Panel on Climate Change (IPCC) 2021



A satellite image of Earth showing the Middle East, the Red Sea, and the surrounding oceans. The land is mostly brown and yellow, indicating arid regions, while the oceans are deep blue. White clouds are visible over the water and some land areas.

Of the  $1.09^{\circ}\text{C}$  warming due to greenhouse gases  
 $1.07^{\circ}\text{C}$  is associated with human activities  
 $0.02^{\circ}\text{C}$  is due to natural changes



# Effect of Climate Change and Economic Growth on Water

Water contamination

Water consumption

Drought

Contamination

Increasing strain  
on wastewater  
treatment

Floods

Water stress

Climate change



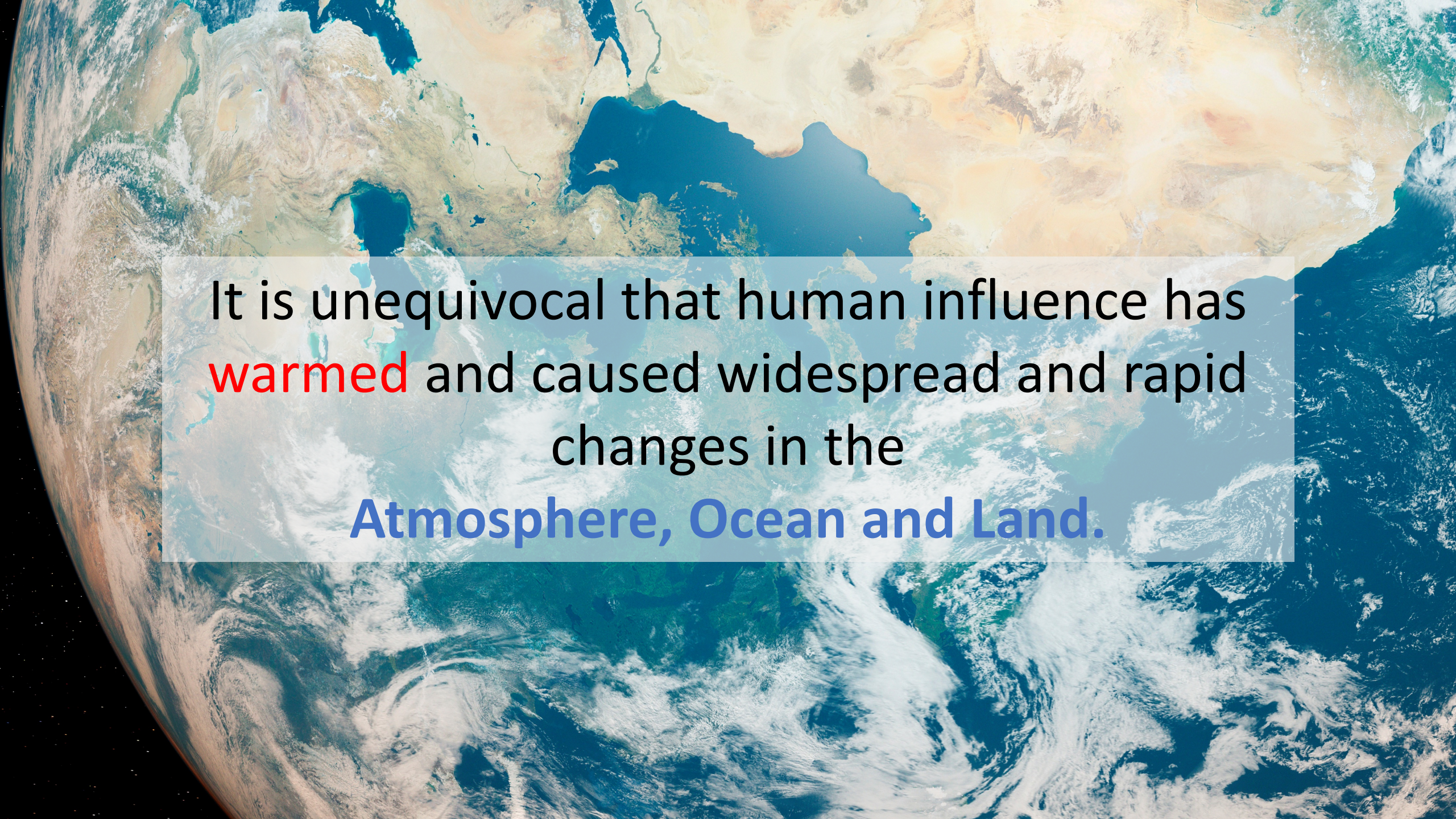
Population growth of  
many nations



Rapid development





A satellite image of Earth showing the Middle East, the Red Sea, and the surrounding oceans. The land is depicted in shades of tan and brown, while the oceans are deep blue. White clouds are visible swirling over the ocean surfaces. A semi-transparent blue rectangular box is overlaid on the center of the image, containing text.

It is unequivocal that human influence has  
**warmed** and caused widespread and rapid  
changes in the  
**Atmosphere, Ocean and Land.**

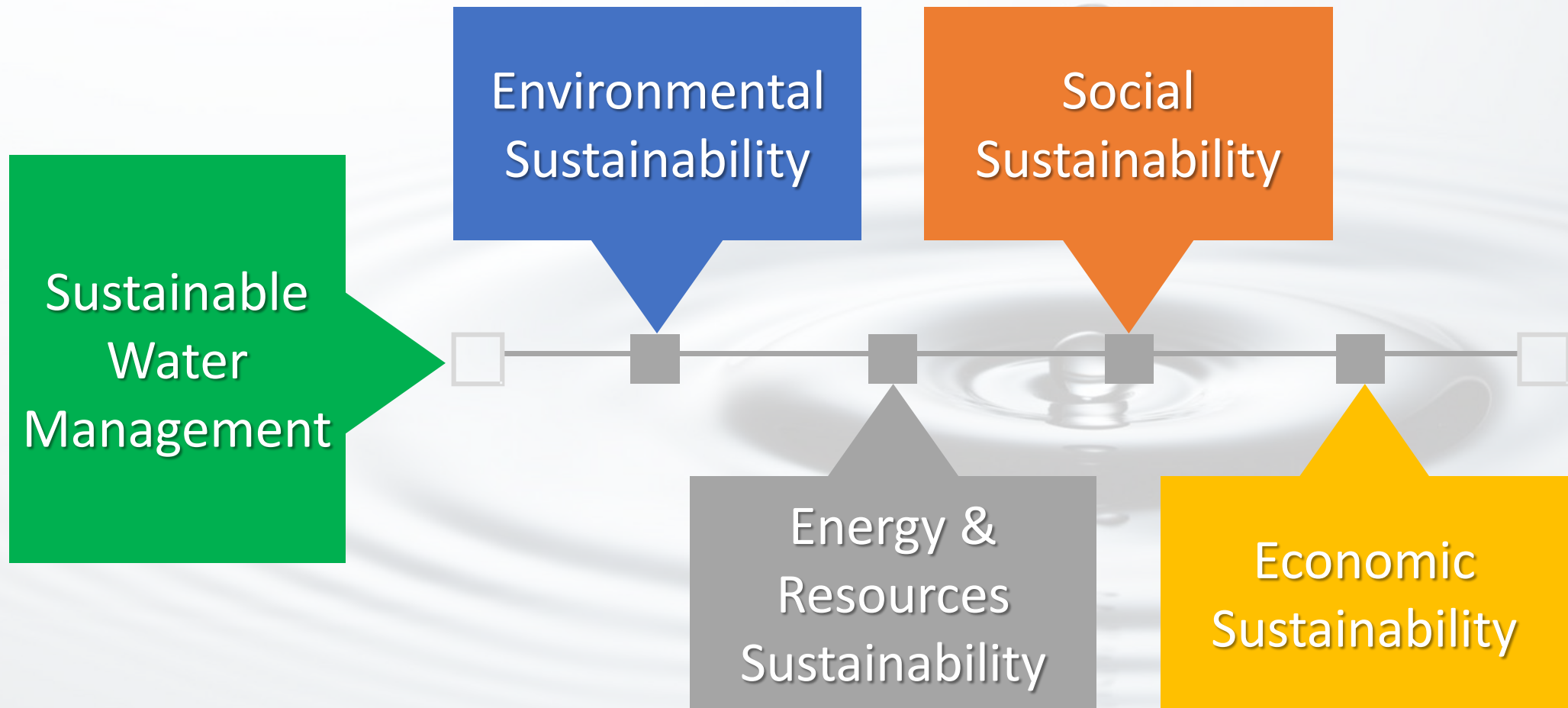


A satellite image of Earth showing the Middle East, the Red Sea, and the surrounding oceans. The land is depicted in shades of brown and tan, while the water is a deep blue. White clouds are visible swirling over the oceans. A semi-transparent blue rectangular box is overlaid on the center of the image, containing white text.

No physical or environmental impediments  
can stop global warming  
**HUMANITY** must choose to act



To realize sustainable answers to today's environmental problems, it needs long term planning and measures.





# Utilize Green Technology in Water Sector

```
graph TD; A[Utilize Green Technology in Water Sector] --> B[Create Solutions]; B --> C[Improve economic throughput]; C --> D[Conserves natural resources]; D --> E[Minimise harmful impacts]; E --> F[This where Responsible Research and Development (R&D) is essentially needed];
```

Create Solutions

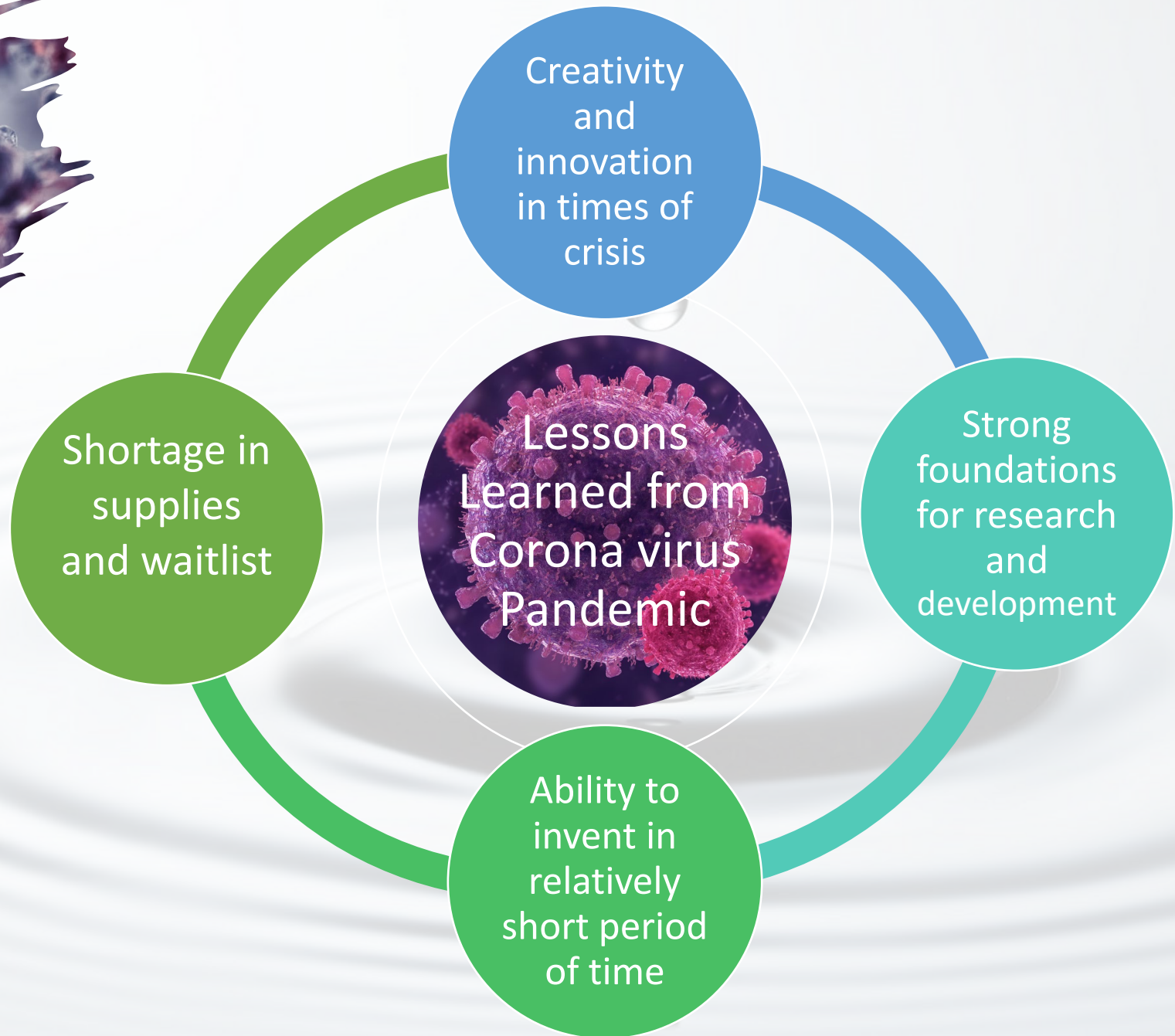
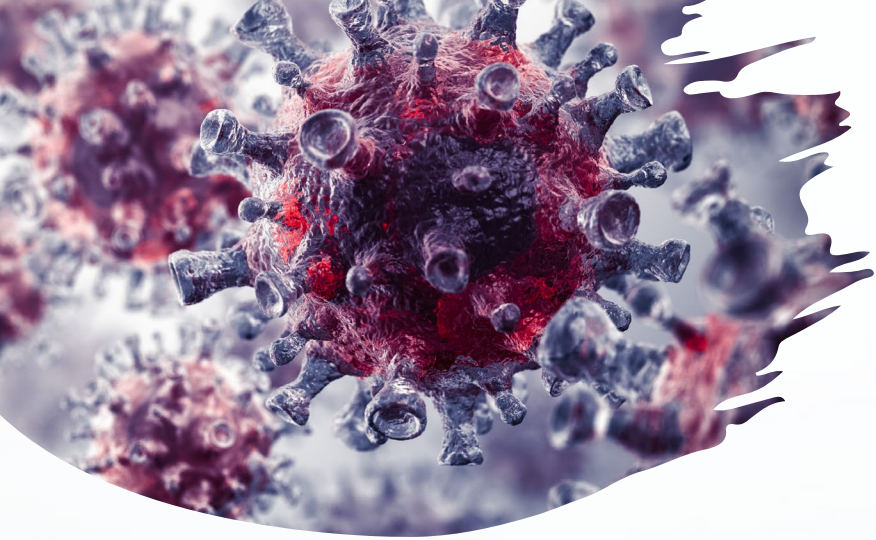
Improve economic throughput

Conserves natural resources

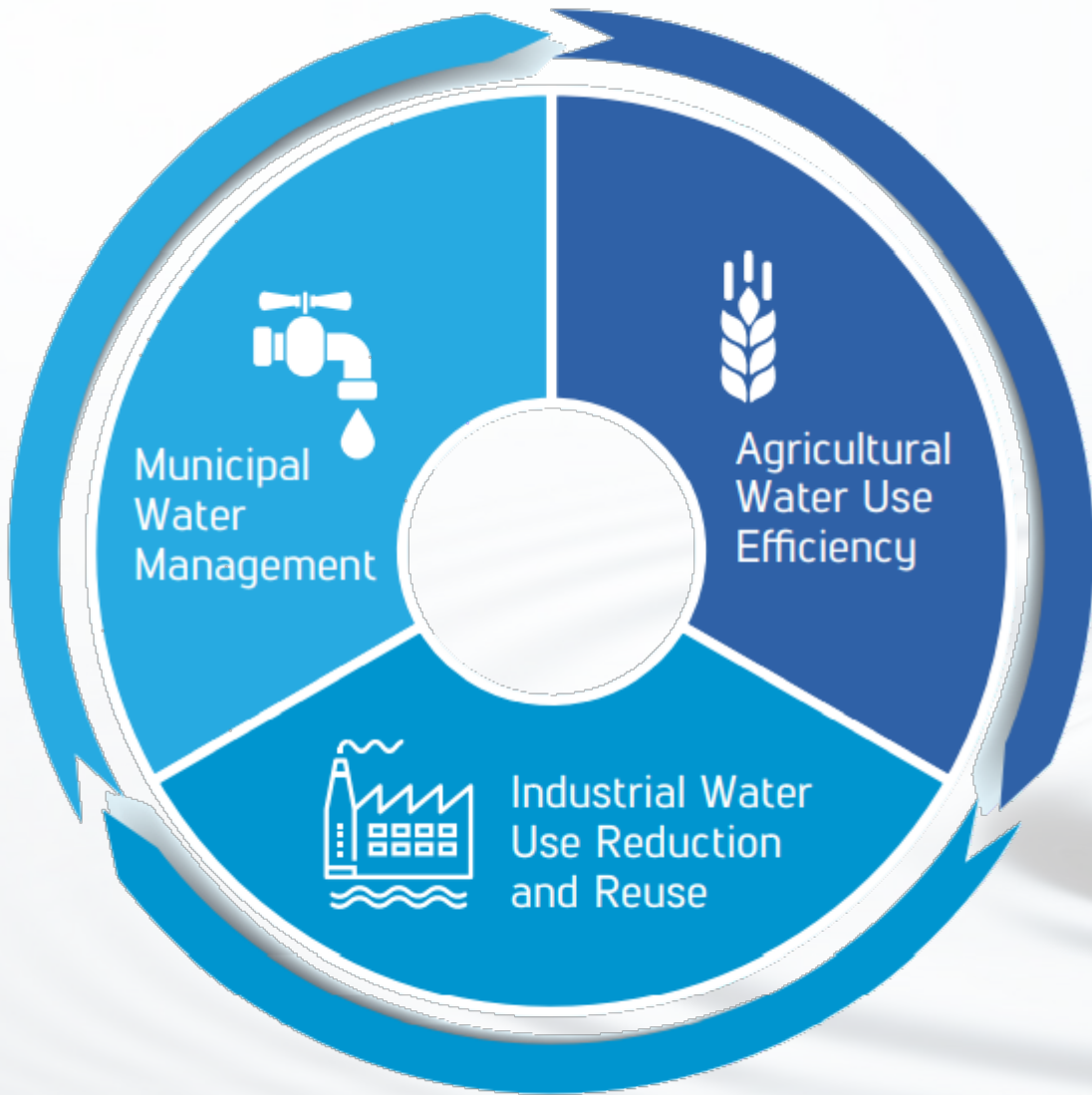
Minimise harmful impacts

This where Responsible Research and Development (R&D) is essentially needed









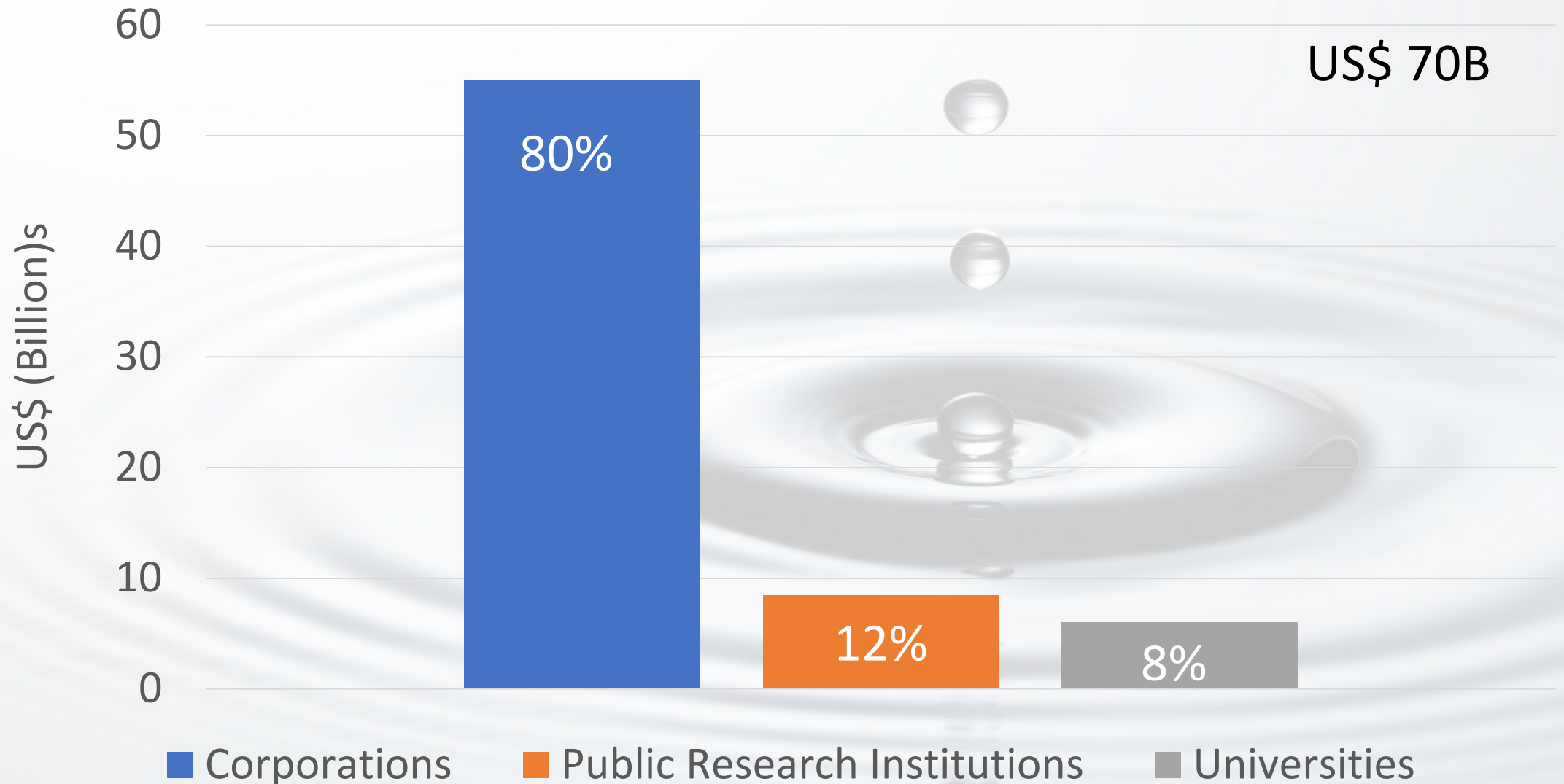
**WATER DEMAND AREAS**



**SOLUTION AREAS**

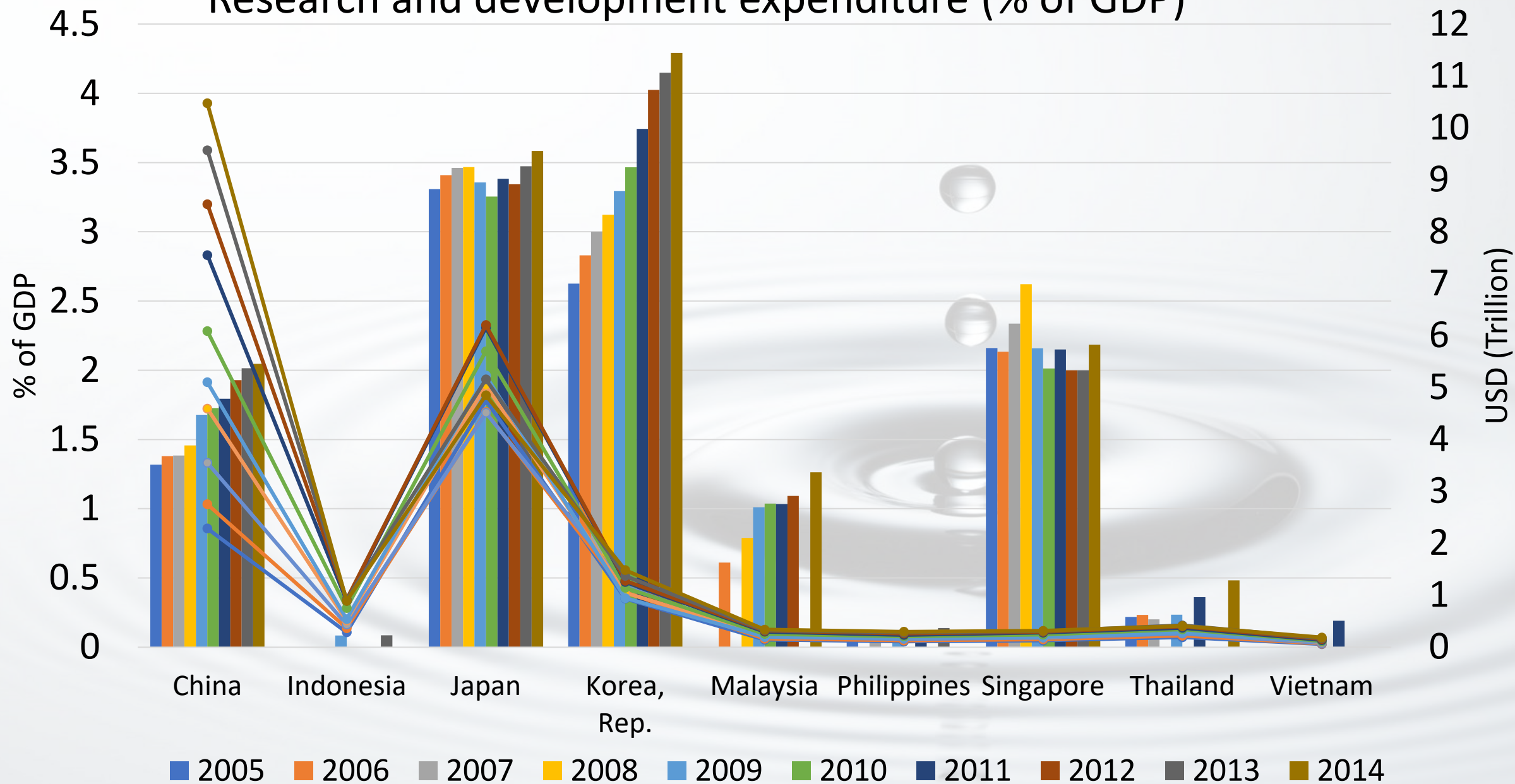


## S. Korean Expenditure on R&D by Sector (2019)



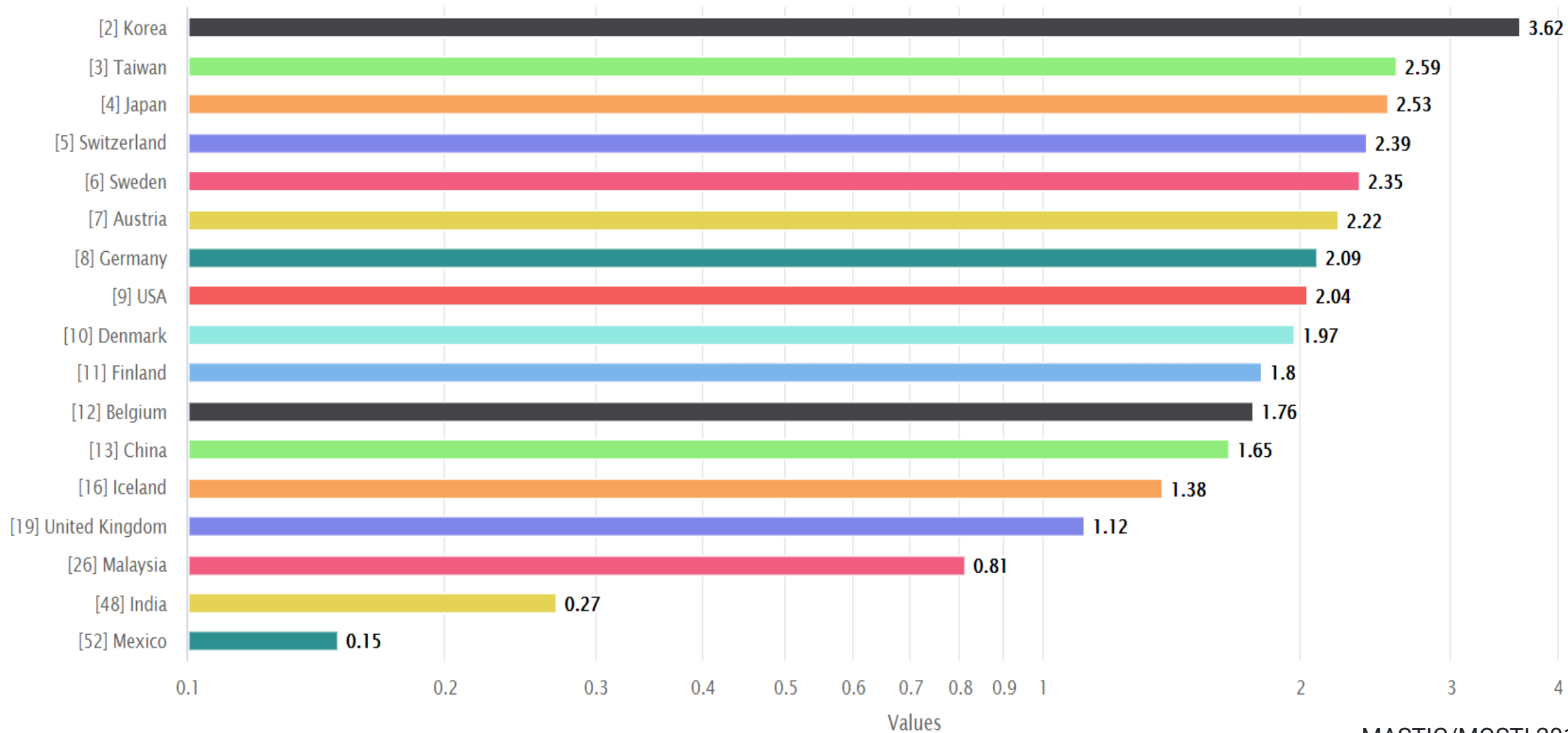


# Research and development expenditure (% of GDP)



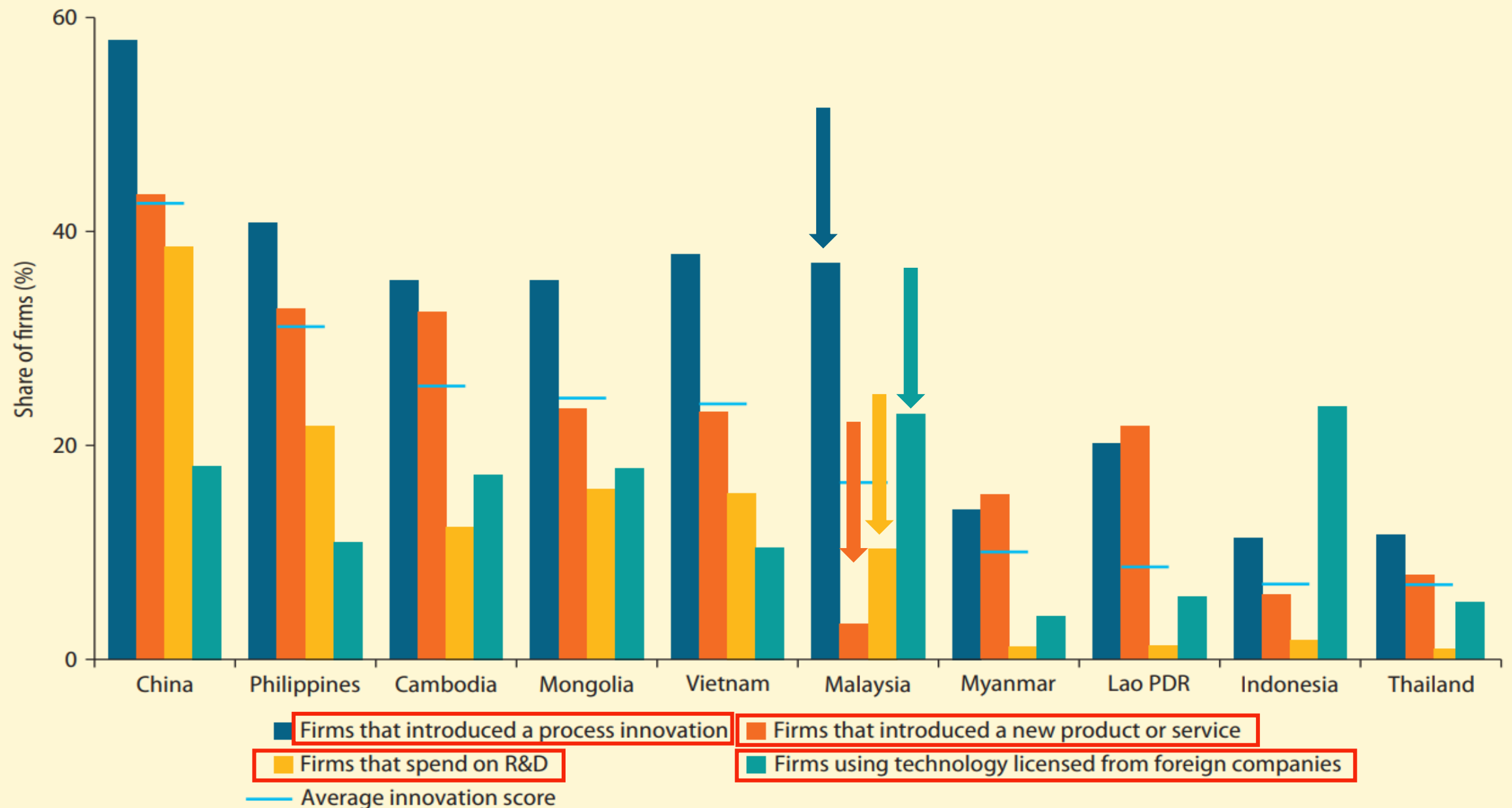


## International Comparison of Business Expenditure on R&D (Percentage of GDP) (%)





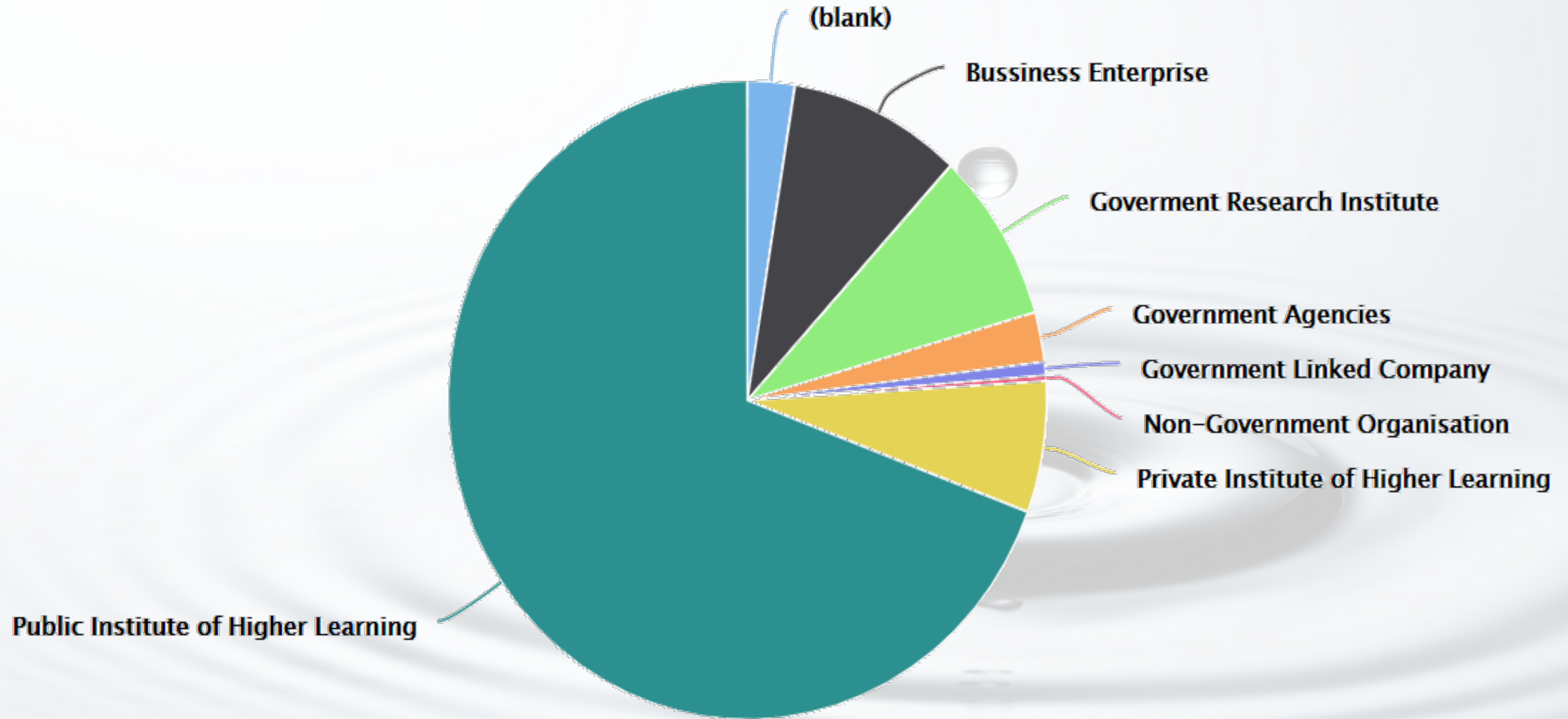
## Developing East Asian countries vary widely in firm-level innovation activity



Source: World Bank calculations using latest World Bank Enterprise Survey data. Note: The innovation score captures both innovation outputs and inputs. It is calculated as the average of the likelihood that firms have a product innovation, a process innovation, positive research and development (R&D) spending, or license technology from foreign companies.

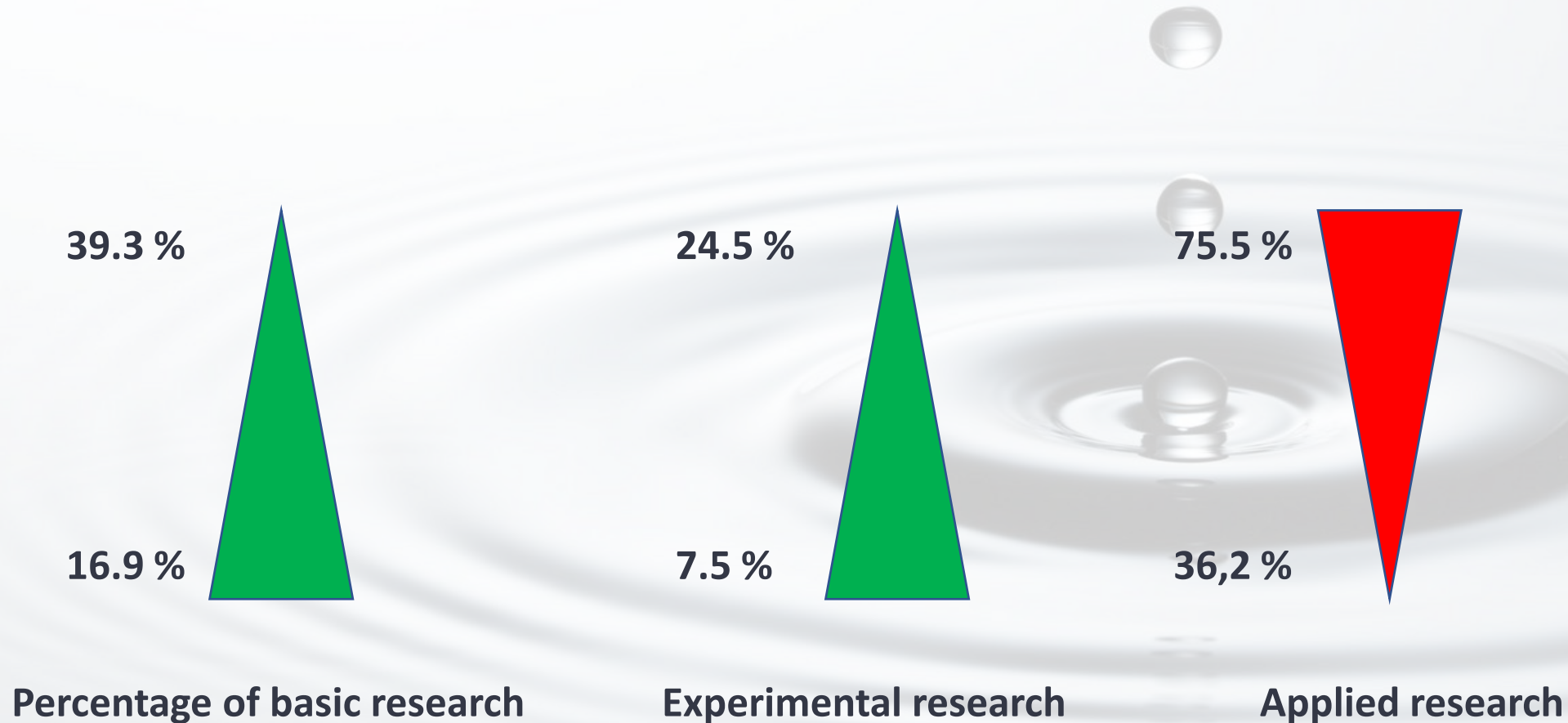


# Number of local products/technologies by organizational category in Malaysia





# Expenditure by research orientation between 2014 and 2018





⚡ Challenges

Innovation CHASM

Impact?

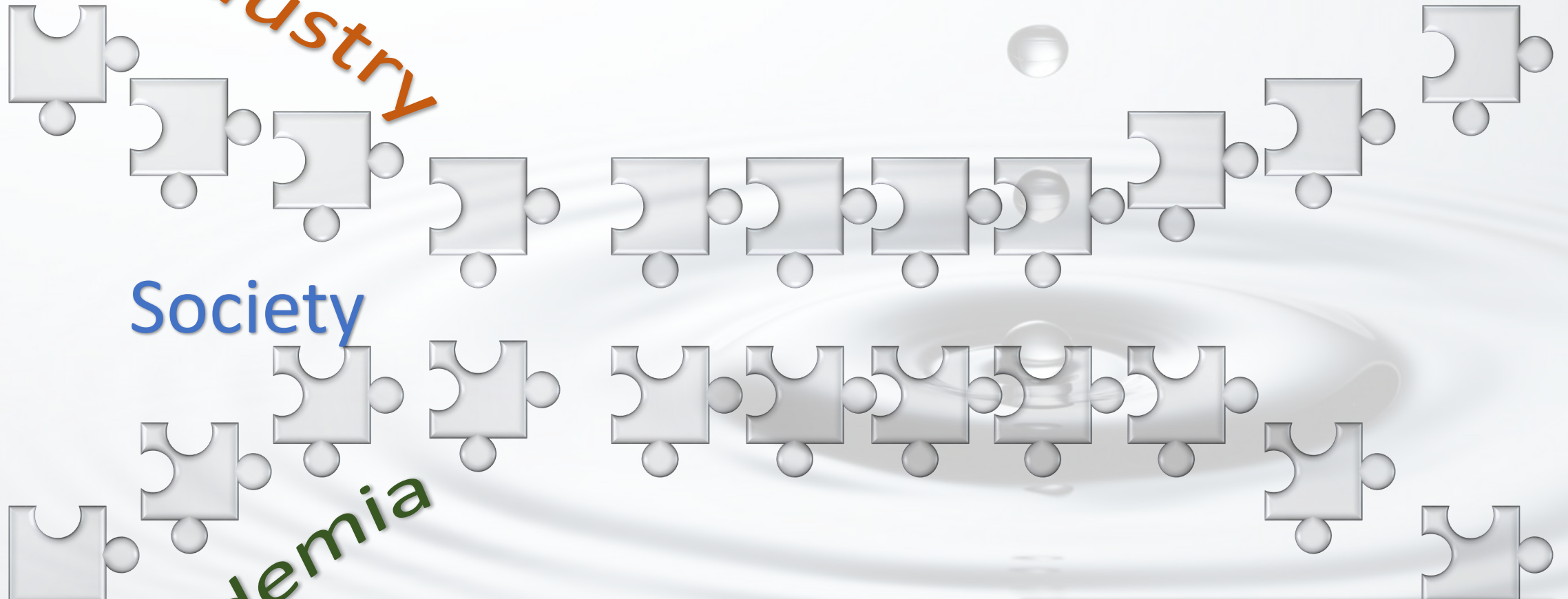
Industry

Society

Academia

R&D Time?

Academia-Industry  
-Society





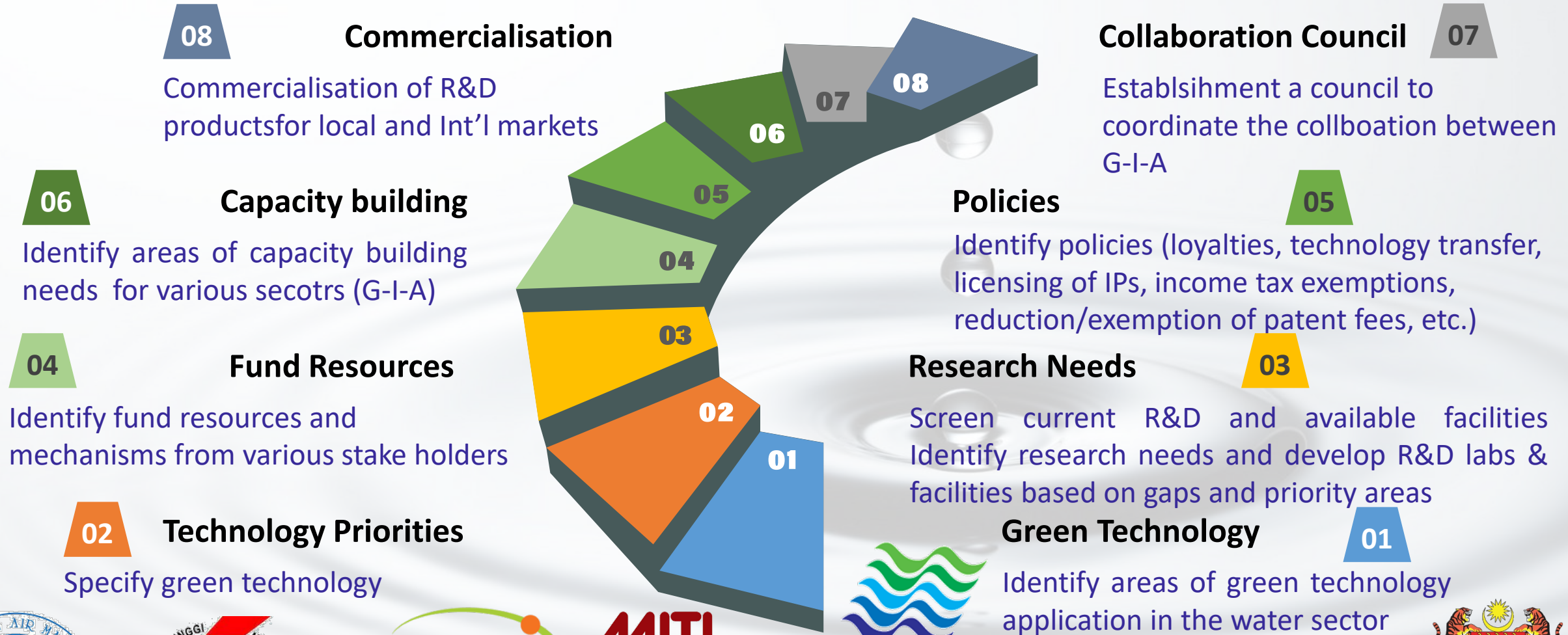
# RESPONSIBLE & INDIGENOUS RESEARCH on Green Technology for water sector



Country-level collaboration between  
Governments, Business and Civil Society to  
**ACHIEVE WATER SECURITY**



# Framework for G-I-A Collaboration towards Indigenous Green Technology R&D in Water Sector



INITIATE DIALOGUE SESSIONS on ADOPTING GREEN TECHNOLOGY in WATER  
SECTOR BETWEEN GOVERNMENT, INDUSTRY AND ACADEMIA



# CONCLUSIONS

- Urgent need to use green technology in general and in the water sector in particular to address the adverse effects of climate change
- Support responsible R&D practices in green technologies to address the needs of the water sector, create local technologies with international standards and to address water security challenges especially in times of crisis.
- Enhance the collaboration between Industry – Government – Academia in R&D planning, funding and execution for impactful outcome through an efficient collaboration framework



Thank You!

Q&A