

## BIOTECHNOLOGY

COMPILED BY JESELYN

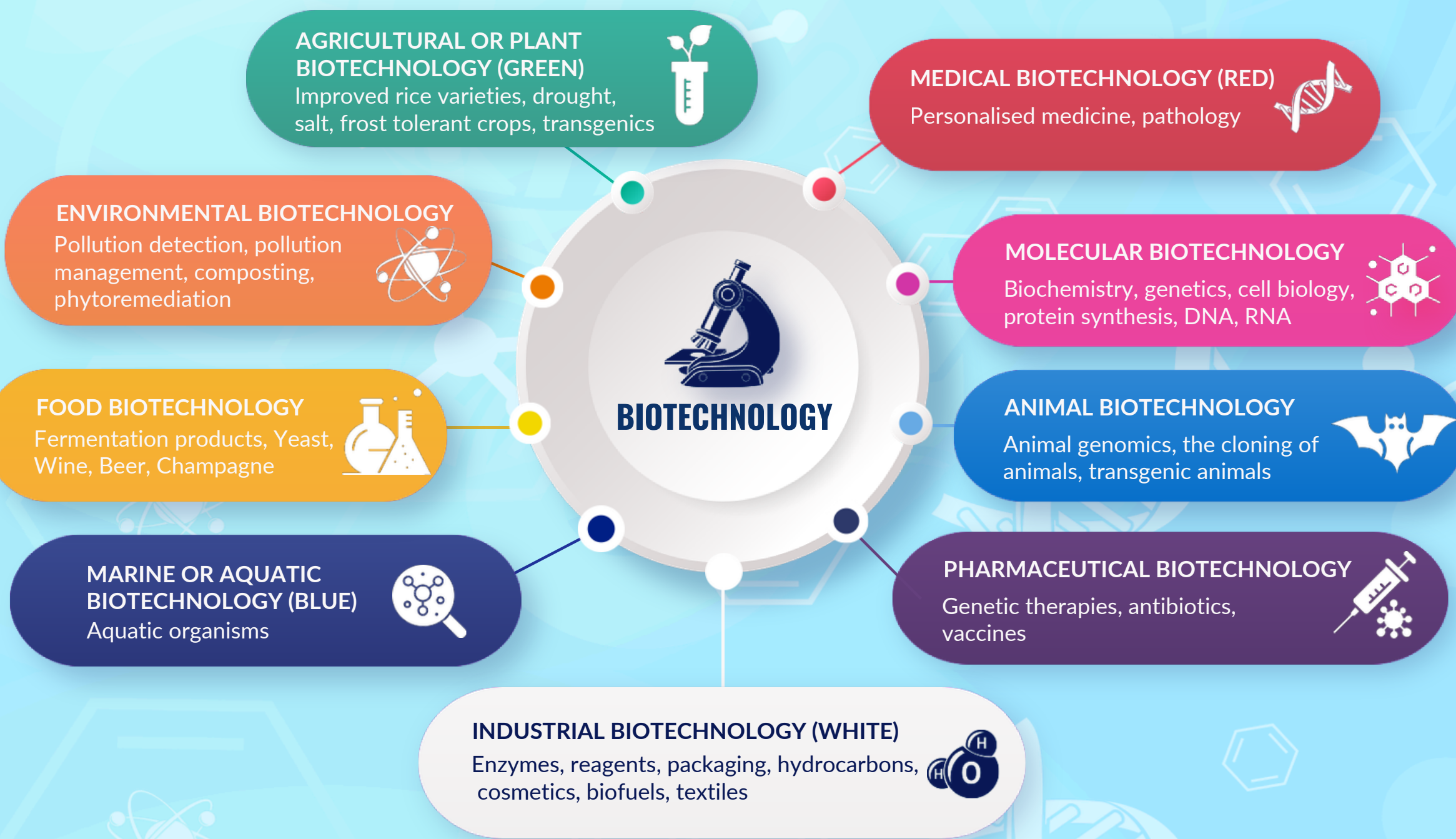
### WHAT IT IS, ITS RISKS, AND WHY GOVERNANCE MATTERS

The 1992 United Nations Convention on Biological Diversity (CBD) defines biotechnology as “any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific uses.”

Today, biotechnology is present in nearly every aspect of modern life, spanning medicine, agriculture, food production, animal science, pharmaceuticals, and the broader scientific field.

While these technologies offer significant advantages, they also carry inherent dual-use risks, where misuse, whether accidental or deliberate, remains a real possibility.

### APPLICATIONS OF BIOTECHNOLOGY TODAY



Source: Compiled from S. Heux, I. Meynial-Salles, M. J. O'Donohue, and C. Dumon. (2015). White Biotechnology: State of the art strategies for the development of biocatalysts for biorefining. *Biotechnology Advances* 33(8), 1653-1670.

### KEY ISSUES AND RISKS



Source: Compiled from V. Gupta, M. Sengupta, J. Prakash, B. Charan Tripathy. (2016). An Introduction to Biotechnology. *Basic and Applied Aspects of Biotechnology* 23 (1), 1-21.

### WHERE SOUTHEAST ASIA STANDS

What does the rapid advancement of biotechnology and the risks it poses mean for Southeast Asia? In part, it reflects how countries in the region perceive these risks differently, resulting in varied regulatory frameworks and legal approaches to governing biotechnology.

Countries	Biotechnology/ DURC Risk Perceptions	Legal Measures	List of Security Sensitive Biological Agents (SSBA)	Institutional Biosafety (Biosecurity/ Biorisks) Committee	Oversight Agencies
Brunei	Low	Guidelines		N/A	
Cambodia	Low	Guidelines	Draft	Mandatory	Yes
Indonesia	High	Guidelines	Draft	Voluntary	No
Laos	Moderate	Guidelines	Draft	Mandatory	Yes
Malaysia	Low	Guidelines	Draft	Voluntary	No
Myanmar	Low			N/A	
Philippines	Moderate	Guidelines	Draft	Voluntary	No
Singapore	Low	Law	Yes	Mandatory	Yes
Thailand		Law	Yes	Mandatory	Yes
Viet Nam	Moderate	Guidelines	Draft	Mandatory	Yes

Source: Compiled from J. Trajano, Jeselyn, and M. Caballero-Anthony. (2025). Convergence of Biotechnology and Artificial Intelligence: Implications on Biological Security. *RSIS Policy Report*.

### SAFEGUARDS FOR REDUCING RISKS: CONSIDERATIONS FOR SOUTHEAST ASIA



#### Leveraging ASEAN Institutional Platforms

Platforms such as the soon-to-be established ASEAN Biosafety and Biosecurity Network can play a vital role in fostering dialogue on responsible AI development and application in biotechnology.

#### Promoting Industry Self-Regulation

Self-regulation, which entails the voluntary adoption of guidelines and principles by scientists and industry players, will be the default approach. The scientific community plays a central role in this effort.

#### Standardising Governance Principles

ASEAN can promote the standardisation of AI/ biotechnological governance principles related to biological security, such as accountability, auditability, and traceability.

#### Enhancing Regional Capacity

ASEAN's emphasis on capacity-building and reducing development gaps among member states can be directed toward enhancing AI literacy, technical skills, and regulatory coherence.

#### Fostering Multi-Stakeholder Involvement

ASEAN can advocate for greater involvement of scientists, ethicists, the business sector, and civil society in regional AI-biosecurity governance, fostering a multi-stakeholder model that enhances transparency and legitimacy.

Source: Compiled from M. Caballero-Anthony, J. M. L. Montesclaros, Jeselyn, and J. Trajano. (2025). DURC Landscape in Southeast Asia: Prioritisation, Gaps, and Challenges. *Applied Biosafety* 30 (2), 178-188