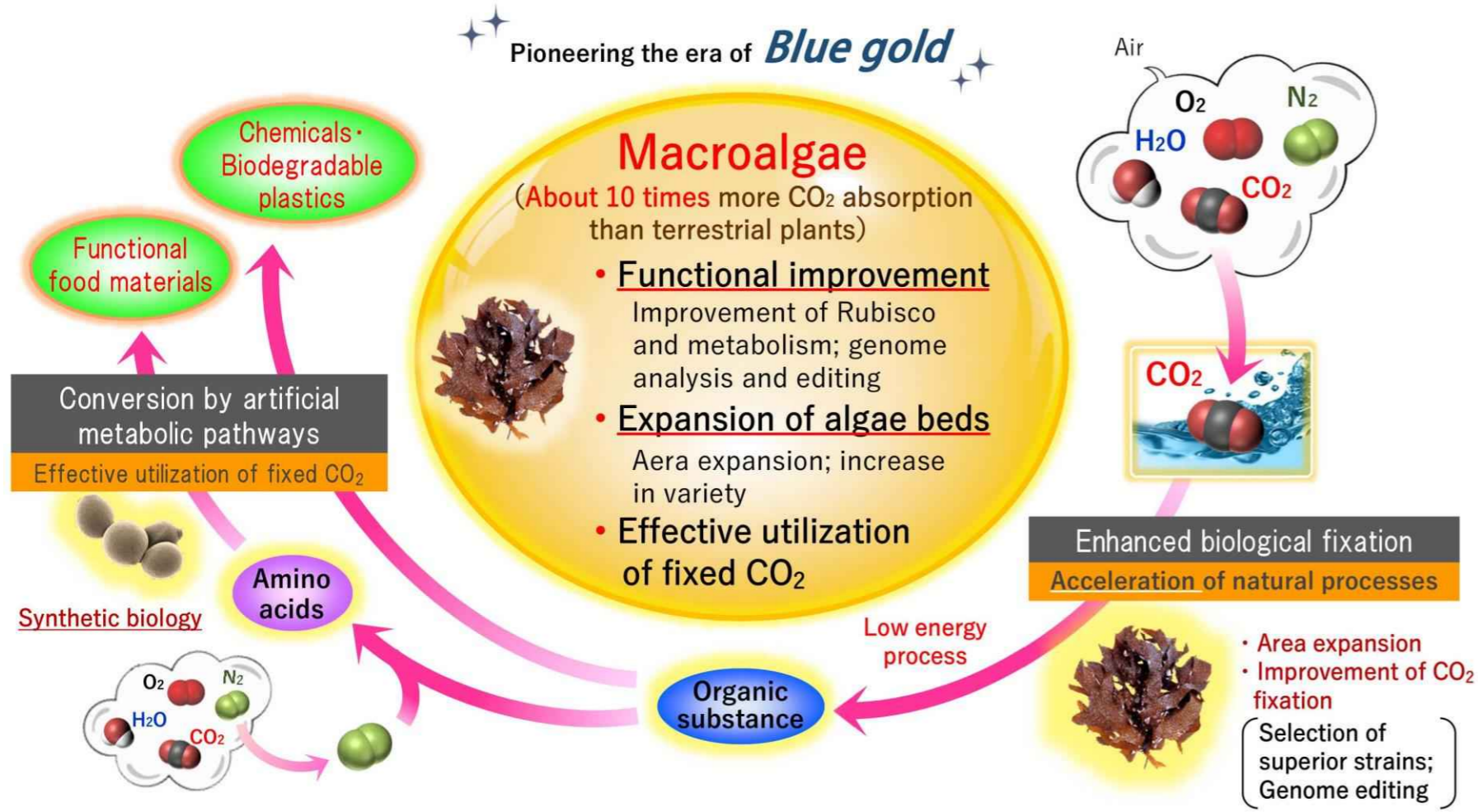


① Establishment of bioeconomy through acceleration of macroalgal CO₂ fixation



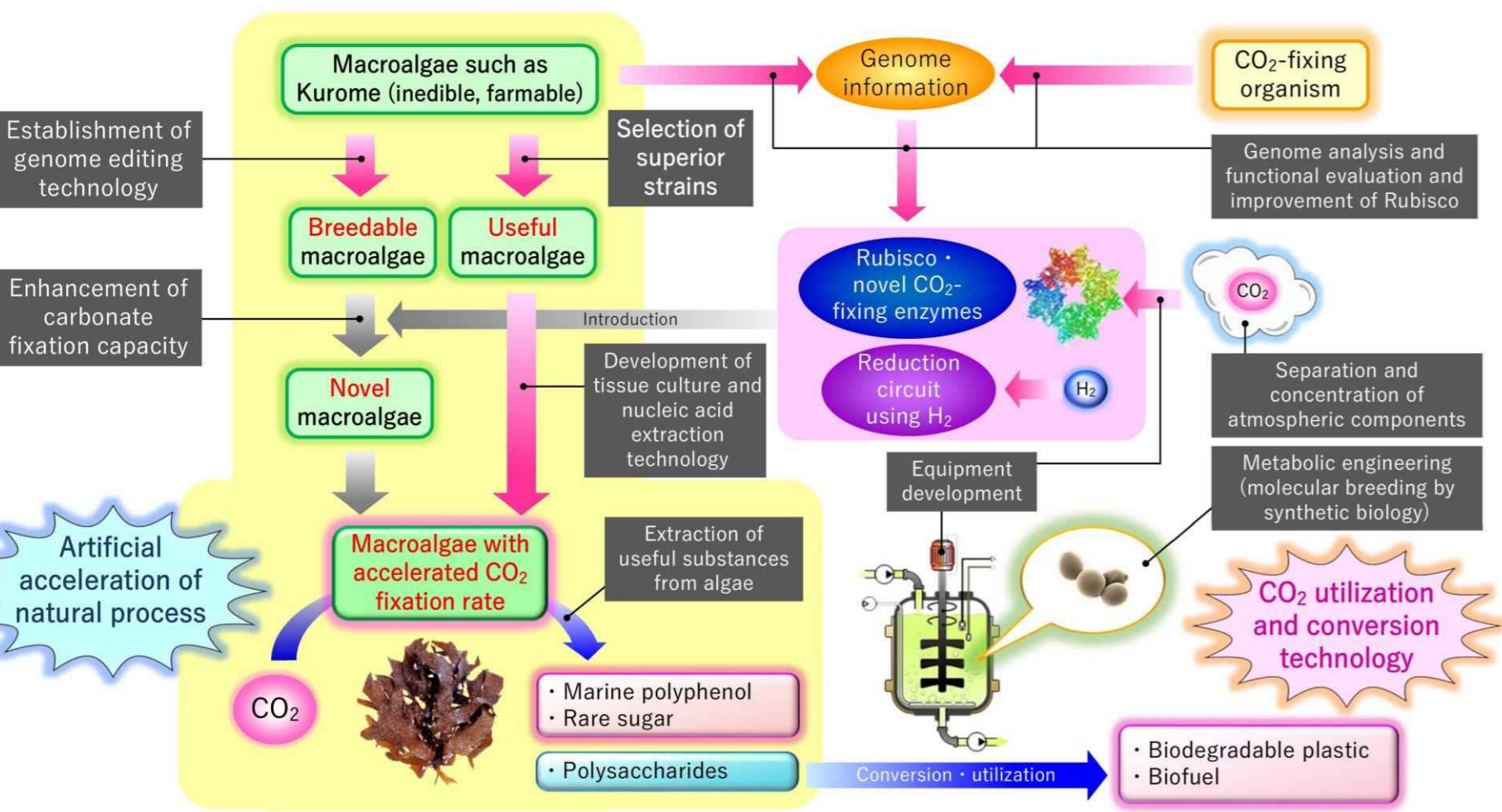
② Dominance of macroalgae and the 2050 scenario

	Starch sugar (1G)	Lignocellulose (2G)	Algae (3G)		Algae (3G)
Raw materials	Agricultural products	Forest	Microalgae	Macroalgae	Macroalgae
Productivity (t/ha/年)	11	9	10~20	30	150 ↑
CO ₂ fixation rate (kg-CO ₂ /m ² /年)	1.6	0.84	1.5~2.9	3.3	16.5
CO ₂ fixation ratio	2.3	1	7.6	13	327
Biomass energy production process	Simple	Complicated (Removal of lignin)	Simple	Simple (Utilization of alginate: important)	Simple
Problem	Competing with food	Using land	Using land, Contamination risk, high cost	Expansion of algae beds	Resolvable
Production condition	Sunlight, CO ₂ , Freshwater, Land, Fertilizer, Pesticides	Sunlight, CO ₂ , Freshwater, Land, Fertilizer, Pesticides	Sunlight, CO ₂ , Freshwater/Soda, Land	Sunlight, CO ₂ , Seawater	Sunlight, CO ₂ , Seawater

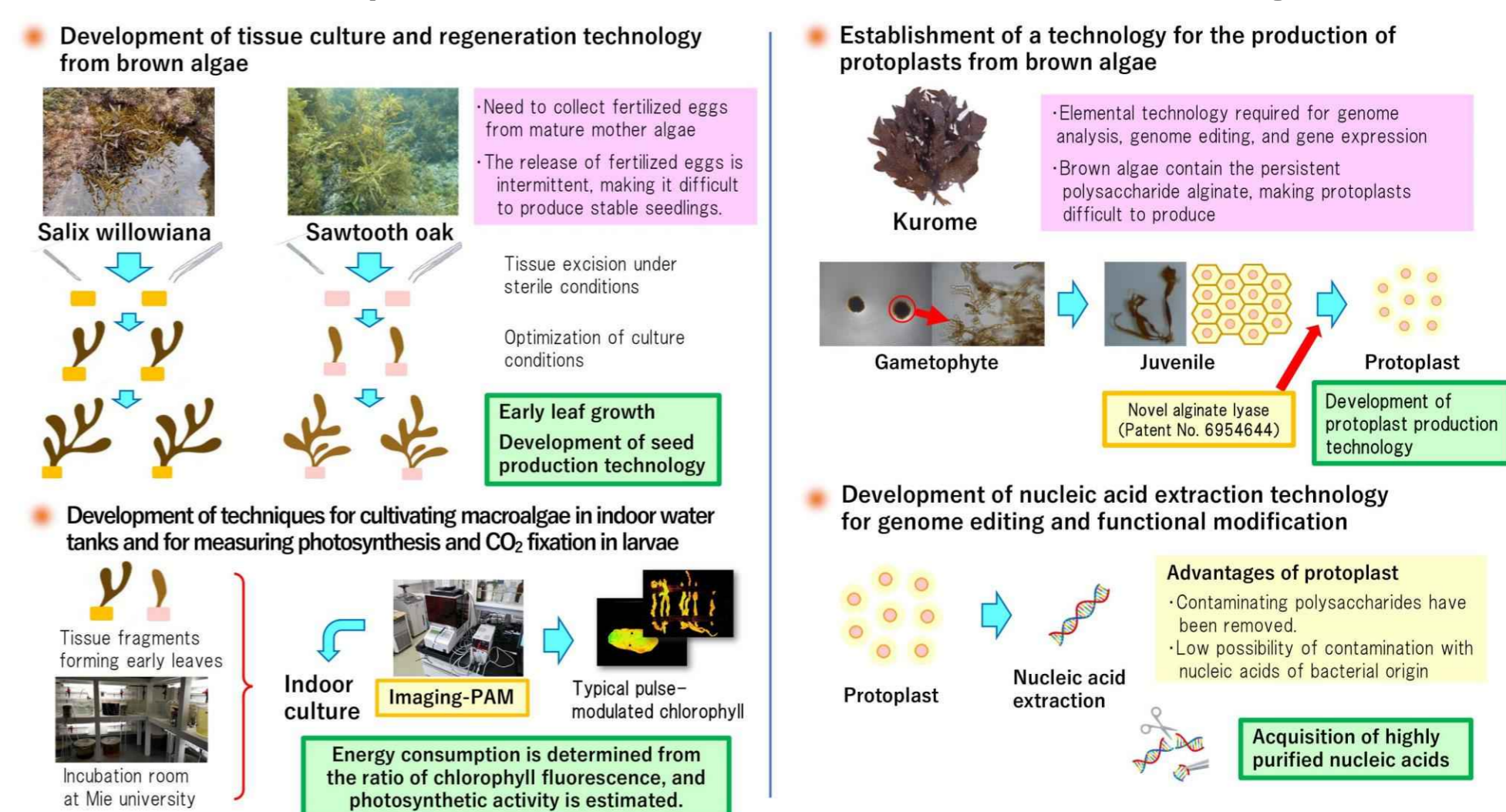
2050

[Reference]
• <http://www.ffpri.affrc.go.jp/research/dept/22climate/kyushuuruu/documents/page1-4-per-year.pdf>

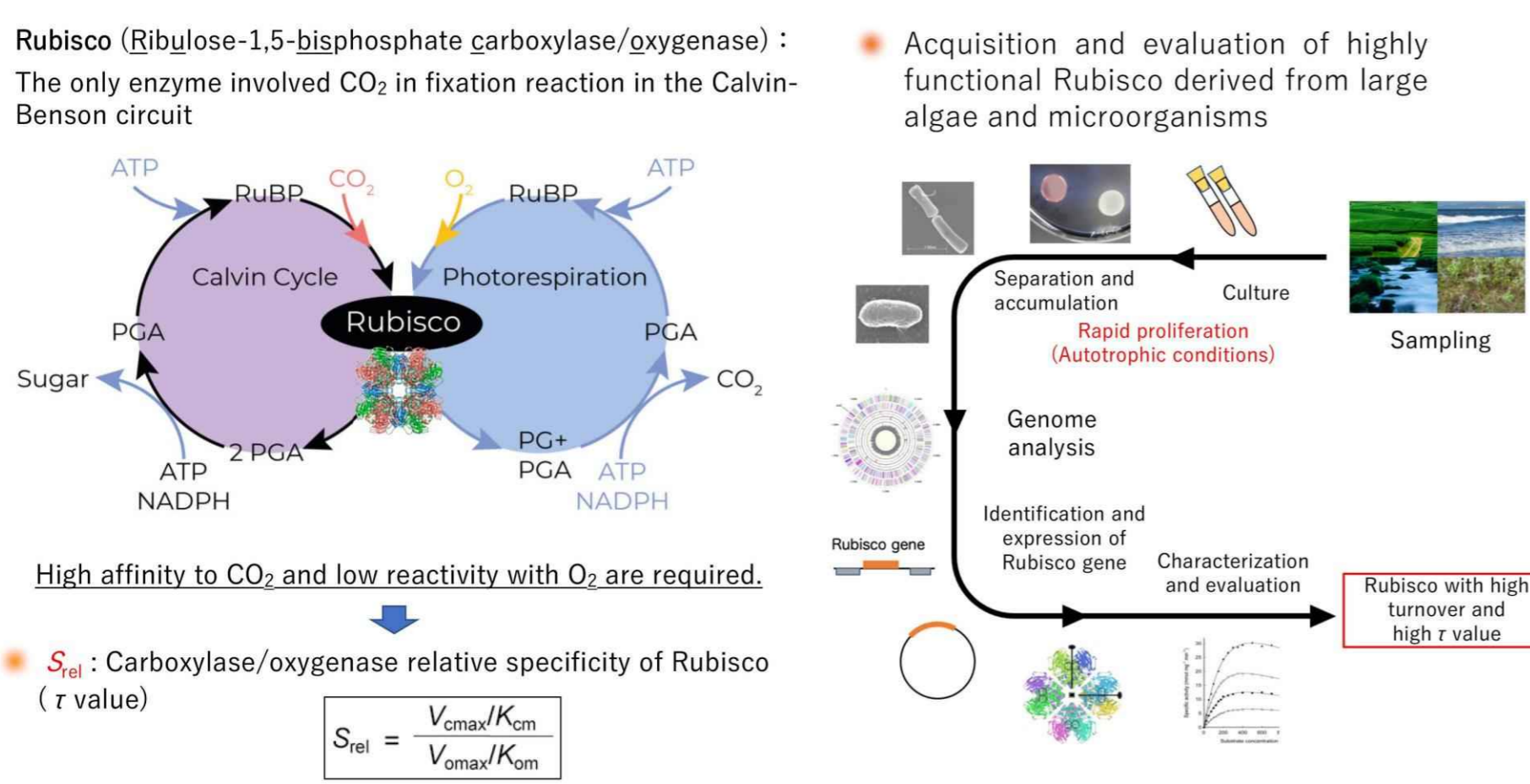
③ Project implementation structure (2022-2024)



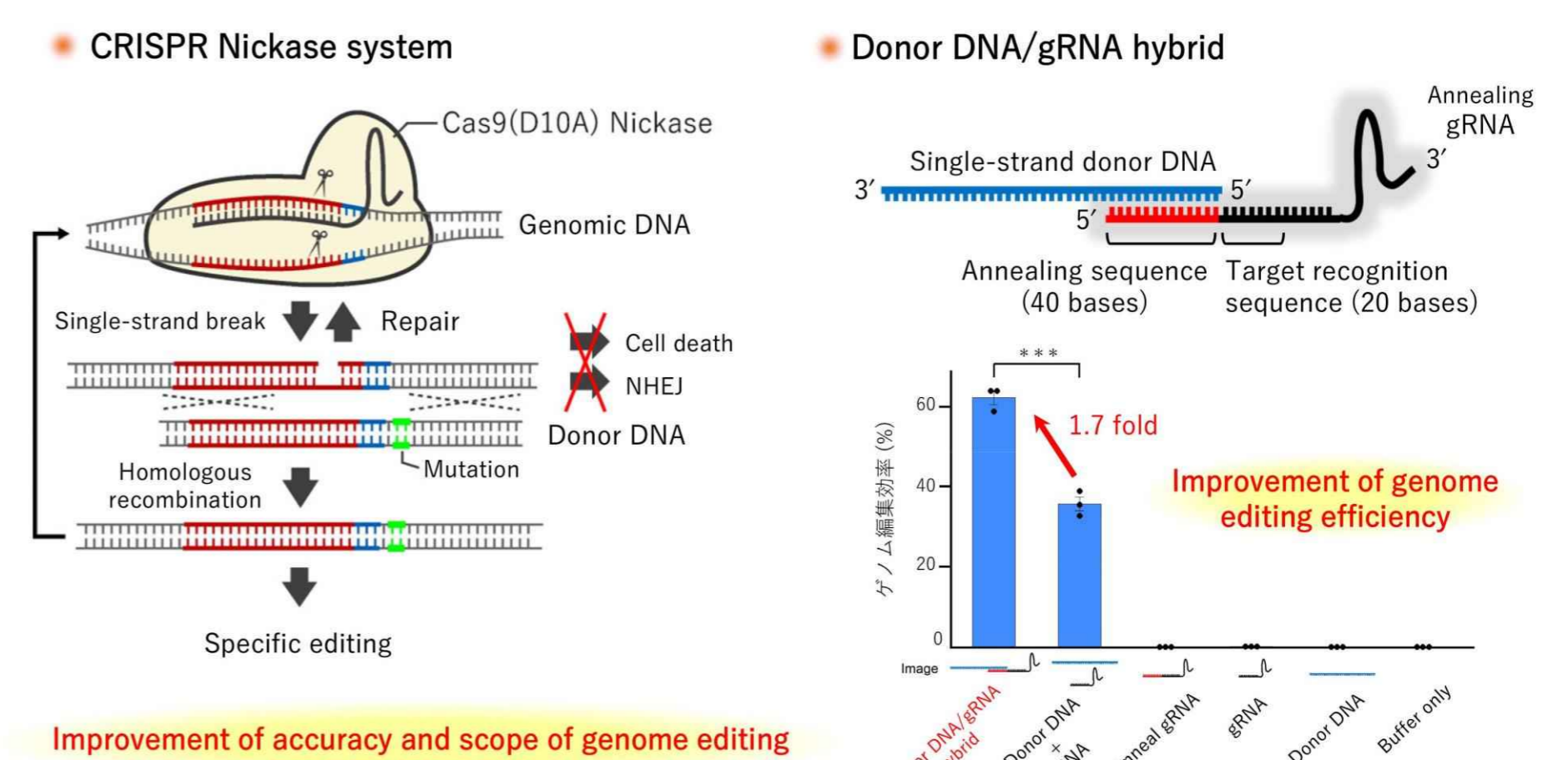
④ Development of basic technologies to accelerate the breeding, functional improvement and full utilization of macroalgae



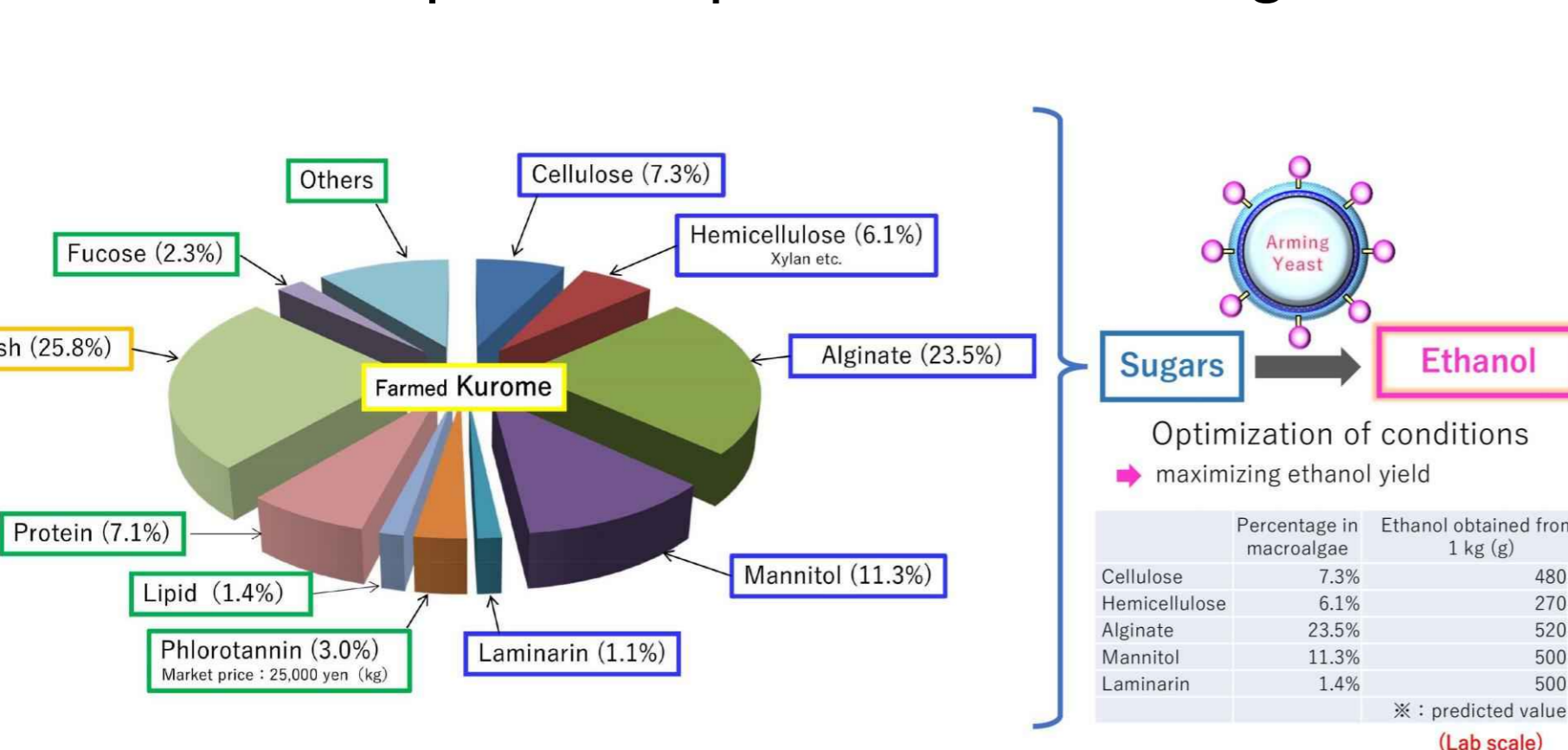
⑤ Exploration and functional evaluation of highly functional Rubisco for accelerating CO₂ fixation



⑥ Establishment of genome editing technology to accelerate breeding of macroalgae



⑦ Practical application of ethanol fermentation as part of a cascade production process from macroalgae



⑧ Equipment development and expansion of algal beds to expand production of macroalgae

