GROSS ECOSYSTEM PRODUCT

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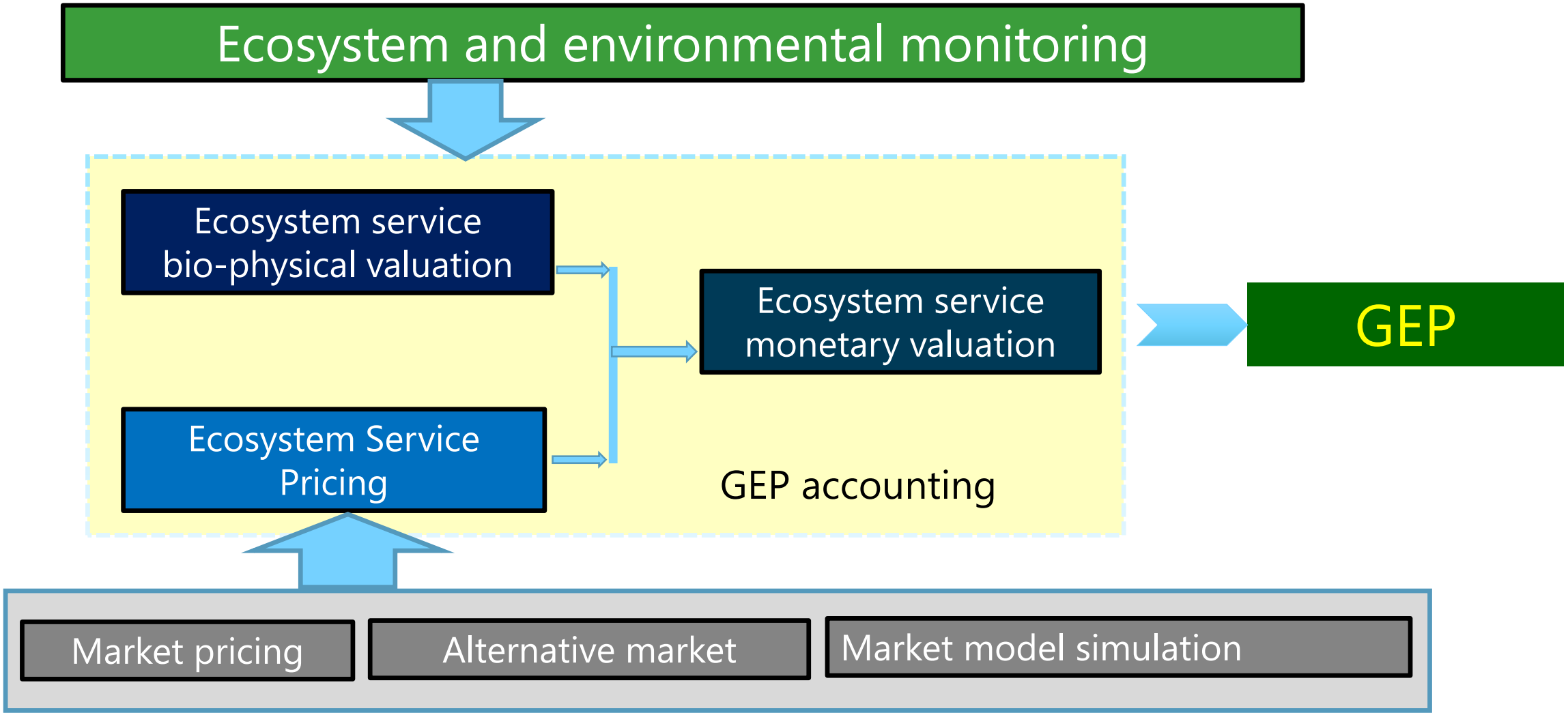
Gross Ecosystem Product (GEP)

GEP is the total value of final ecosystem goods and services supplied to human well-being in given region annually, like a county, a province, or a country.

GEP accounting methods



GEP accounting methods

- **Accounting of economic values of ecosystem goods and services**

✓GEP: the total economic value of ecosystem provision (EPV), Ecosystem regulating services (ERV) and cultural services (ECV) in the given area annually.

$$\mathrm{GEP} = EPV + ERV + ECV$$

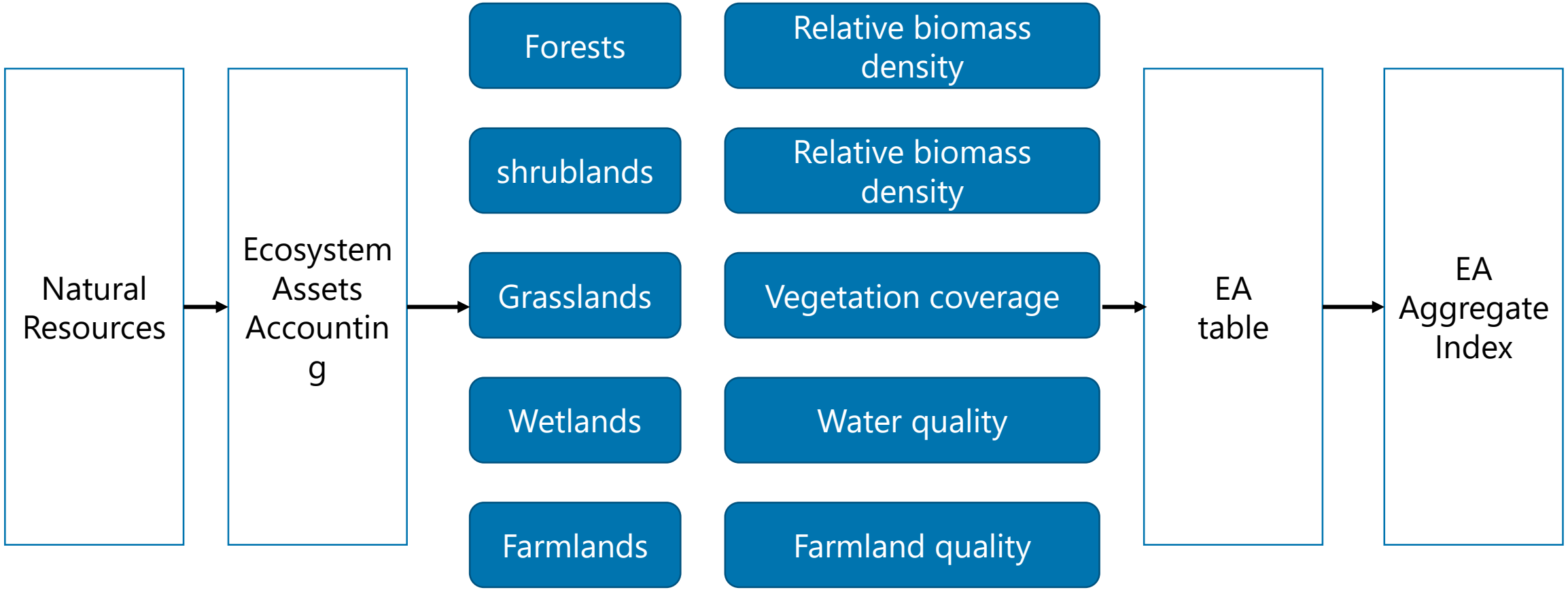
$$\mathbf{GEP} = \sum_{i=1}^{n} EP_i \times P_i + \sum_{j=1}^{m} ER_j \times P_j + \sum_{k=1}^{l} EC_k \times P_k$$

Ecosystem Asset (EA)

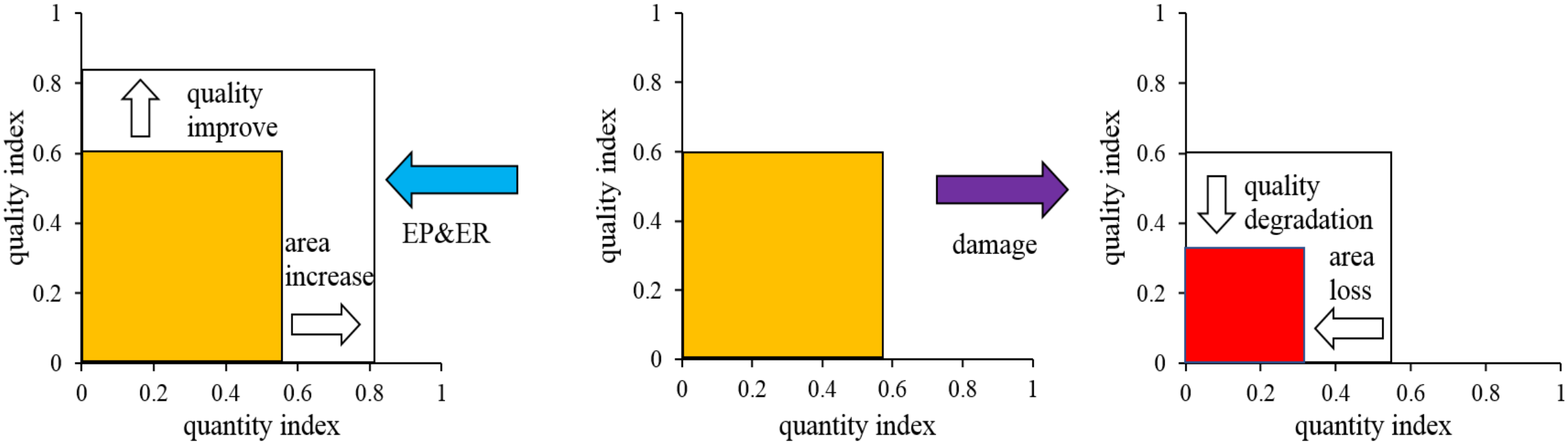
Ecosystem Assets are the natural resources that produce and provide ecological goods and services.

- Natural Ecosystem Assets
- Natural-Based Artificial Ecosystem Assets
- Wild fauna and flora resources

Ecosystem Asset Accounting Framework



Ecosystem Asset Accounting Framework

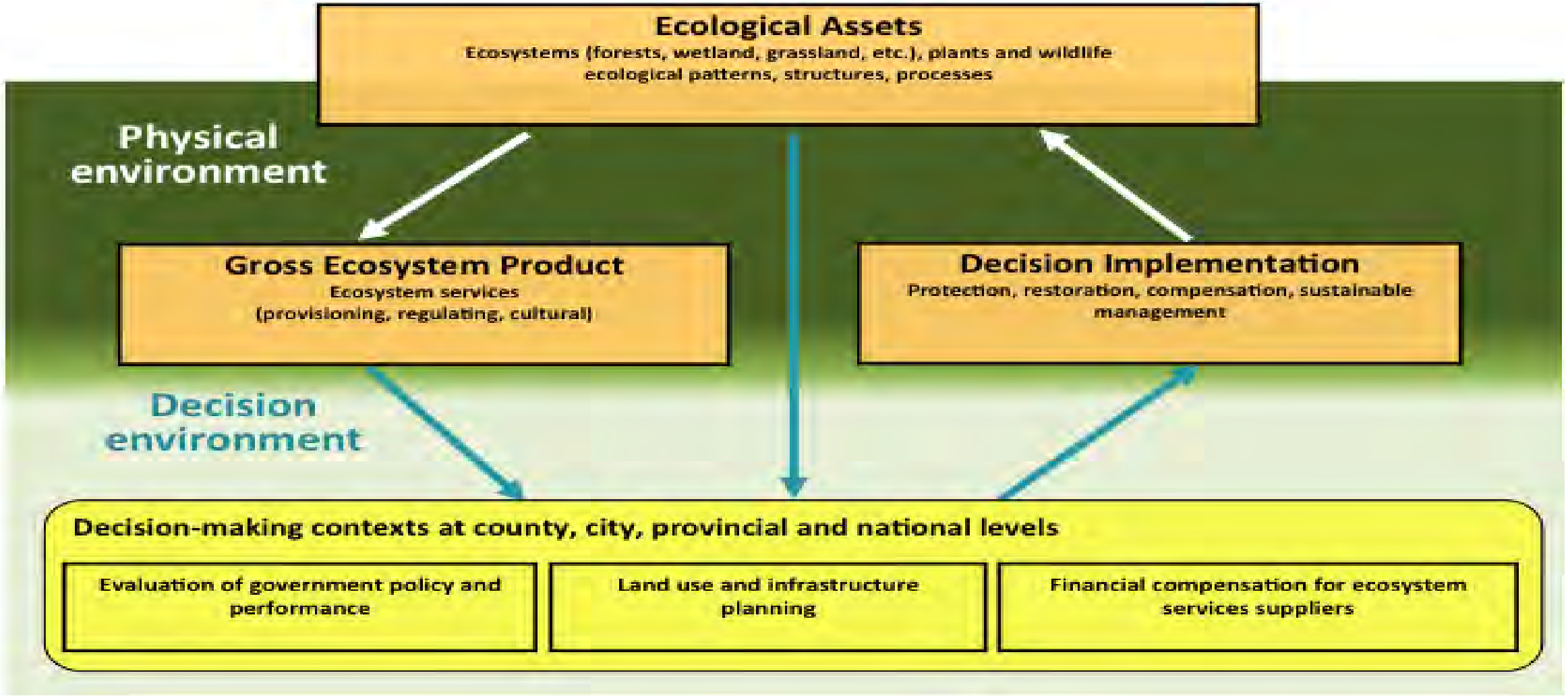


EA table

Category		Sub-category	Area against quality level						Quality Indicator
			Total	A	B	C	D	E	
natural ecosystems	Forests	Forests subtotal							Relative biomass density
		coniferous forest							
		deciduous forest							
		heropencedrymion							
	shrublands	Shrublands subtotal							
	grasslands	grassland							Vegetation coverage
	wetlands	Wetland subtotal							Water quality
		lake							
		river							
Natural based artificial ecosystems	farmlands	Farmland subtotal							Area Slope, soil organic matter Irrigation guarantee rate Effective soil thickness
		Dry farm							
		Paddy field							
		garden							

Concept of GEP

GEP accounting and policy implementation



ADVANTAGES AND OPPORTUNITIES

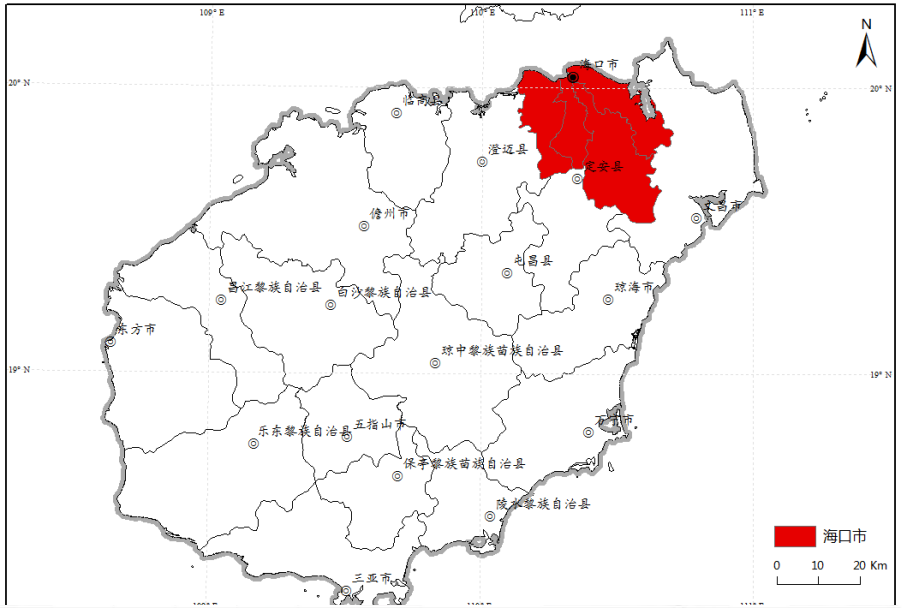
- GEP can be applied as a quantitative indicator for officials' performance appraisal and off-office auditing.
- GEP can be applied as a scientific basis for PES/Eco-Compensation and public financial transfers.
- GEP can be applied to measure the status of ecosystem services, which is an important indicator of sustainable development. It is also an critical indicator for measuring the progress of Eco-civilization.
- GEP is an universal measure of ecological status. It can be applied to various countries and regions, and all types of ecosystems.

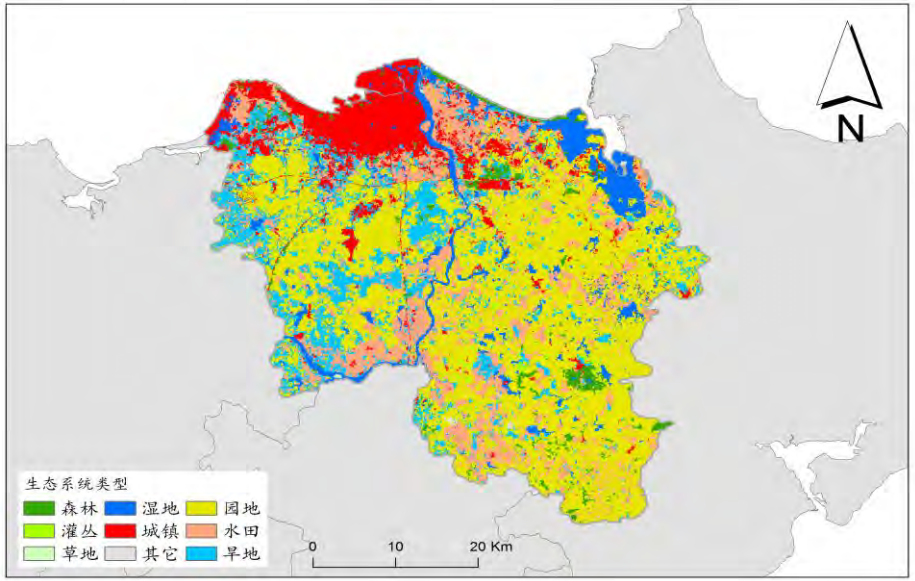
GEP PILOTS

IUCN China and RCEES are working with Chinese Central & local government at 30 GEP pilot studies: e.g.

►Guizhou & Qinghai Province
►Shenzhen & Tonghua City
Qiandongnan Prefecture
►Xing'an League, Ganzi Prefecture, Ordos City
►Arxan City, Xishui County
►Haikou City
►10 counties of Guizhou province

GEP Case Study – Haikou City

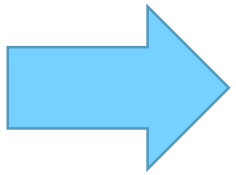




- Total 2289.09 Km2
- 2.2m population
- Sea area 830 km2
- Coastline 172.7 km.
- Monsoon tropical climate zone.
- Farmland 78.32%, urban 11.99%, wetland 6.15% water resources 1.9 b m3 (reservoir 1.5 b m3)

Study scope

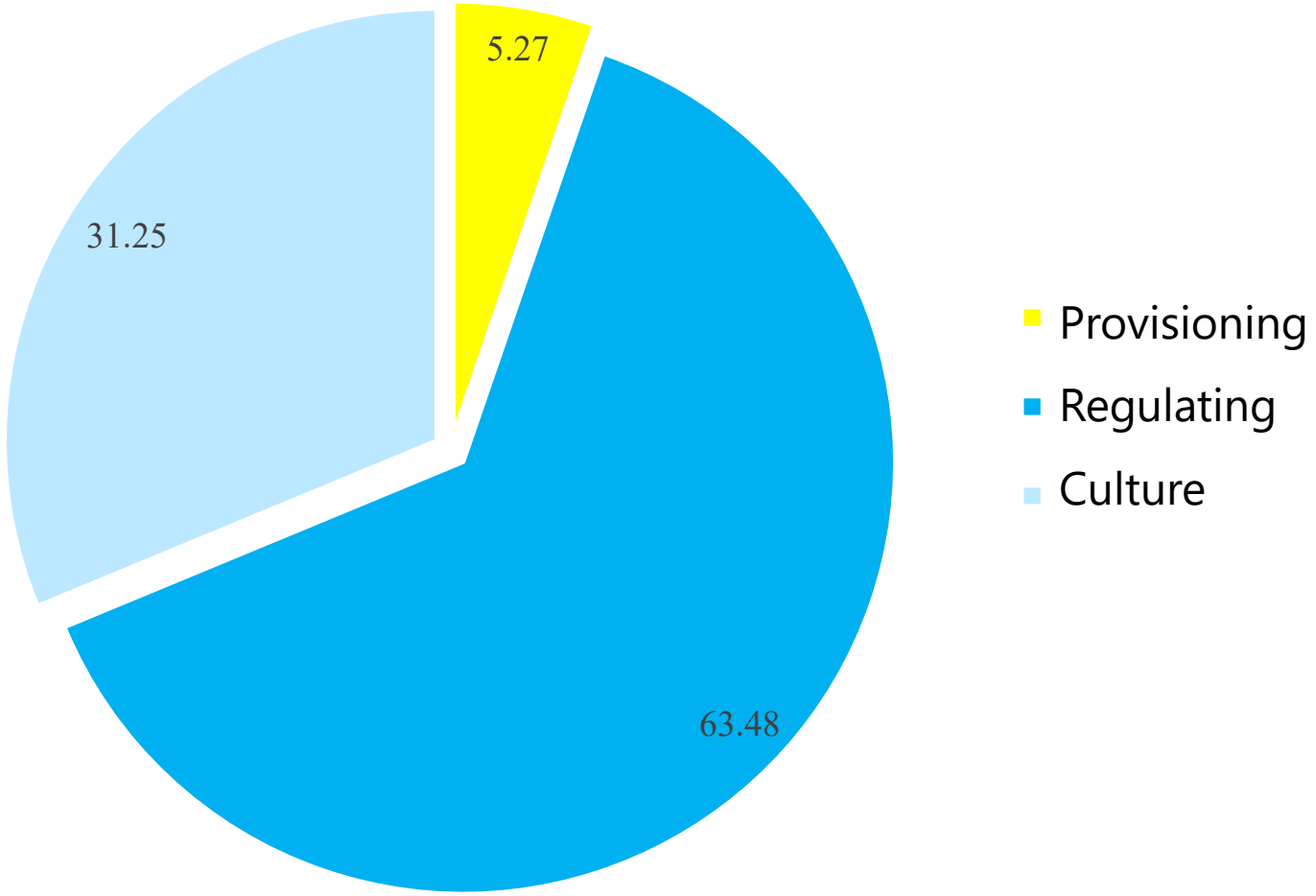
- 2015, 2016, 2017
- Overall ecosystem condition
- Conservation effectiveness
- Contribution to economy and social development



- Natural resources balance sheet;
- Government officials performance evaluation and assessment
- PES

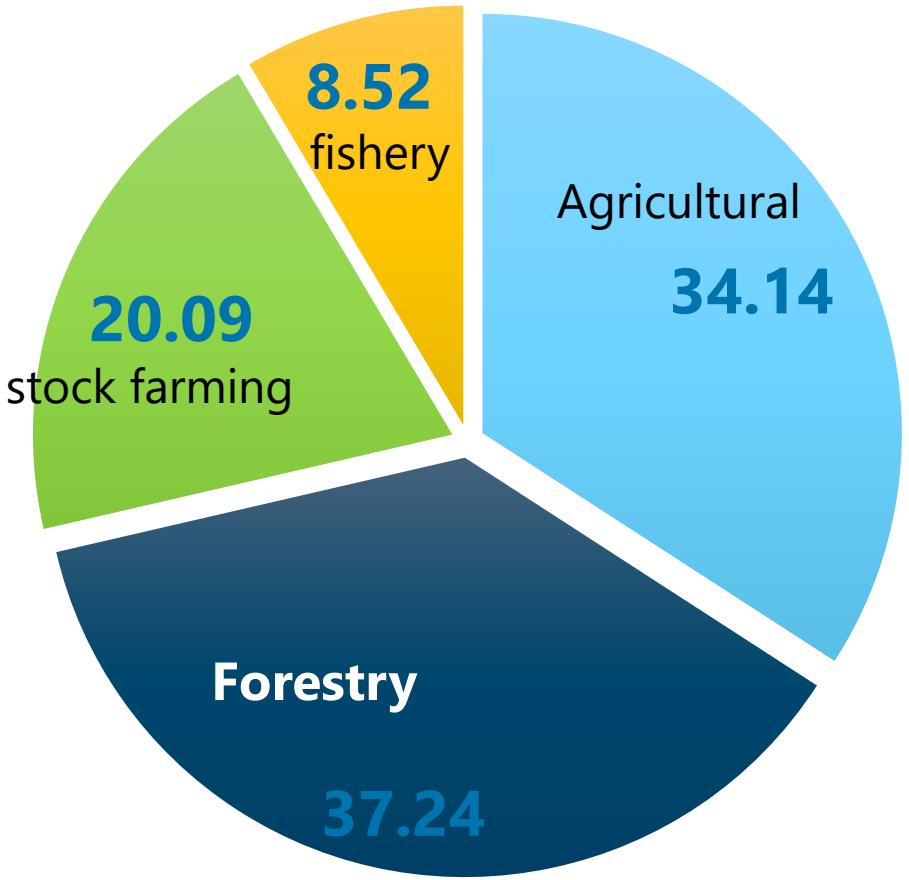
Services	Indicators	Quantity indicators	Value indicators	Value valuation methods
Provisioning services	Agricultural products	Production of agricultural products	Value of agricultural products	Market price method
	Forestry products	Production of forestry products	Value of forestry products	
	Animal products	Production of animal products	Value of animal products	
	Fishery products	Production of fishery products	Value of fishery products	
	Water resources	Water consumption	Value of water resources	
Regulating services	Water retention	Amount of water retention	Value of water retention	Alternative cost/ shadow price
	Soil retention	Amount of soil retention	Value of sediment reduction	
			Value of diffused pollution reduction	
	Flood mitigation	Lake: adjustable storage capacity	Value of flood mitigation	
		Reservoir: flood control storage		
		Swamp: stagnant water		
		mangroves: stagnant water		
	Carbon sequestration	Amount of carbon sequestration	Value of carbon dioxide sequestration	
	-oxygen release	Amount of oxygen release	Value of oxygen release	
	Air quality maintenance	Amount of SO_2 absorption	Value of SO_2 treatment	
		Amount of NO_X absorption	Value of NO_X treatment	
		Amount of dust reduction	Value of dust treatment	
	Water purification	Amount of COD reduction	Value of COD treatment	
		Amount of total nitrogen reduction	Value of total nitrogen treatment	
		Amount of total phosphorus reduction	Value of total phosphorus treatment	
	Climate regulation	Energy consumption of plant transpiration	Value of plant transpiration	
		Energy consumption of water surface evaporation	Value of water surface evaporation	
		Energy consumption of ocean surface evaporation	Value of water surface evaporation	
	Biological control	Area of pest and disease occurrence	Value of biological control	
	Costal Protection	**Reduction of wind and wave**	**Value of disaster prevention and dam construction**	
Cultural services	Natural landscape	Number of tourists	Value of landscape recreation	Travel cost method

2017 GEP

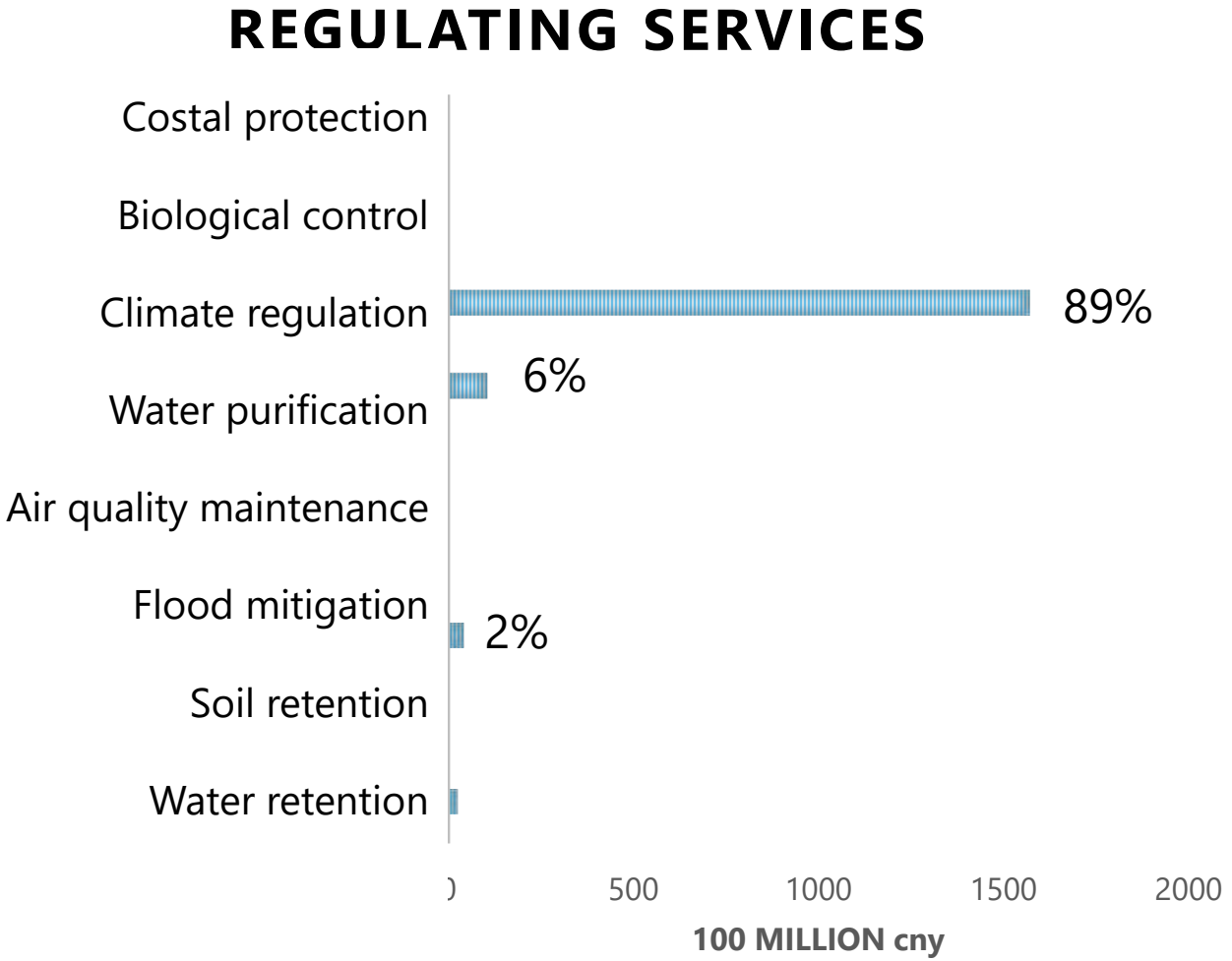


- 2017，Haikou City GEP 276 billion CNY, ~1.99 times GDP
- Regulating Services，63.48%；
- Culture Services, 31.25%；
- Provisioning Services, 5.27%。

Provisioning and regulating services



Provisioning Services

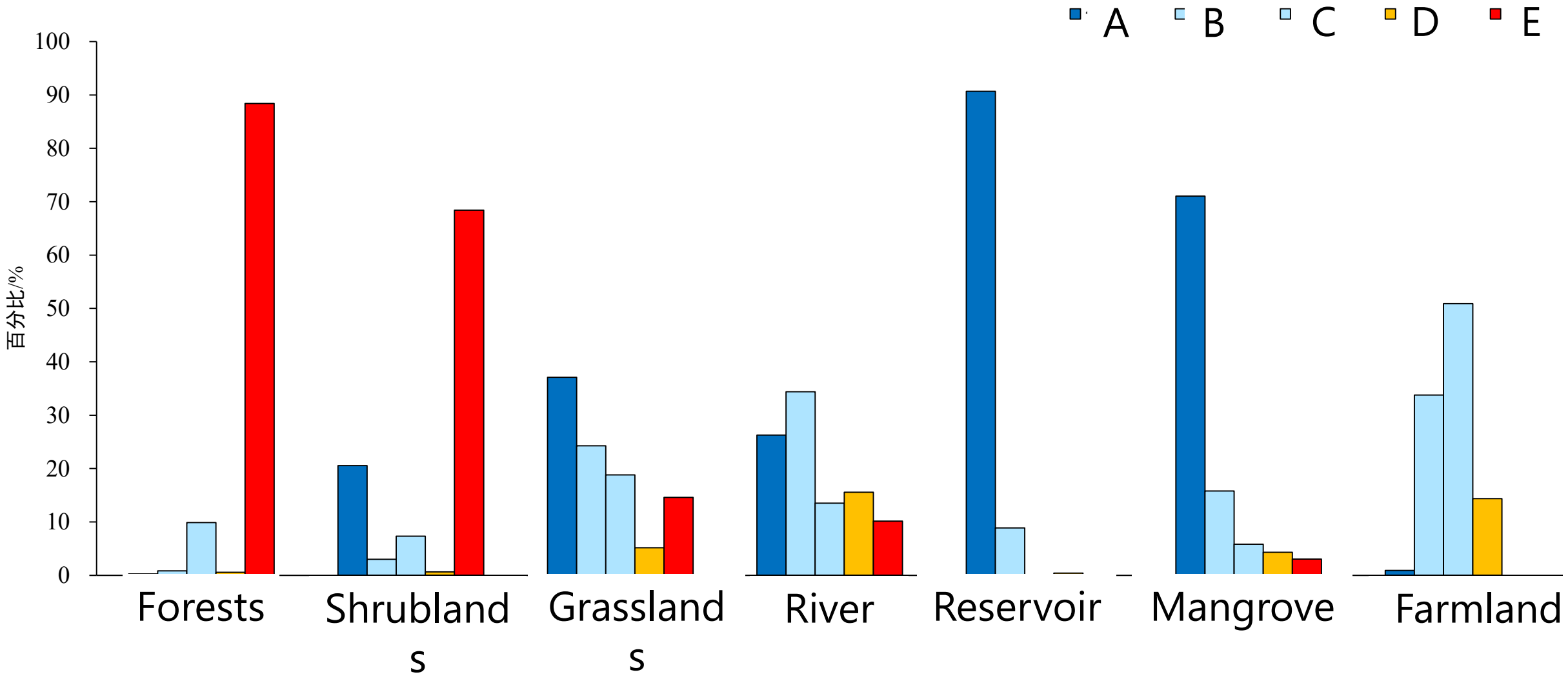


2015 – 2017 GEP

	2015 Billion CNY	2016 Billion CNY	2017 Billion CNY	2015-2017 change rate
Provisioning	13.5	14.6	14.5	1.30
Regulating	171.9	174.6	175.3	1.38
Cultural	47.3	59.1	86.3	71.58
Total	232.6	248.2	276.1	15.64

- “Belt and Road Initiative” and continuously increases the development of overseas routes
- cruise travel routes and accelerate cruise touris

EA Quality (2017)



EA Index (2015/2017)

Year	Aggregate Index	Forests	Shrublands	Grasslands	Farmlands	Wetlands
2015	140.6	1	1.6	0.1	124.5	13.4
2017	142.9	1.18	1.8	0.31	125.9	13.8
Difference	**2.30**	**0.18**	**0.20**	**0.21**	**1.40**	**0.40**

EA Index increased by 1.6%

Thanks

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