



Regional Science and Technology Cooperation for Sustainable Development in East Asia

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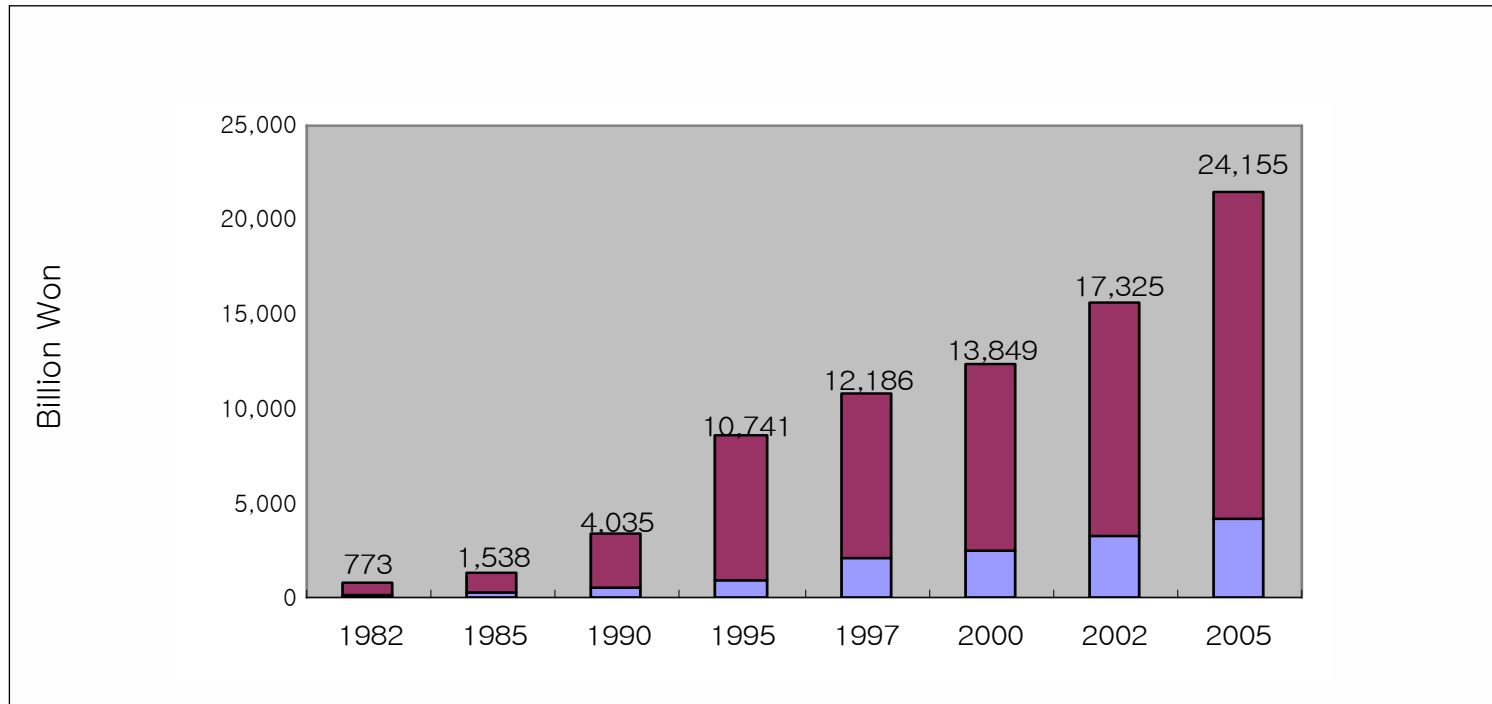
- ❖ *Is the Korean development sustainable?*
- ❖ *Is the NEA economic dynamism sustainable?*
- ❖ *What need be done to make the NEA economic dynamism sustainable?*



Is the Korean Development Sustainable?



S&T Efforts in Korea: R&D Investments

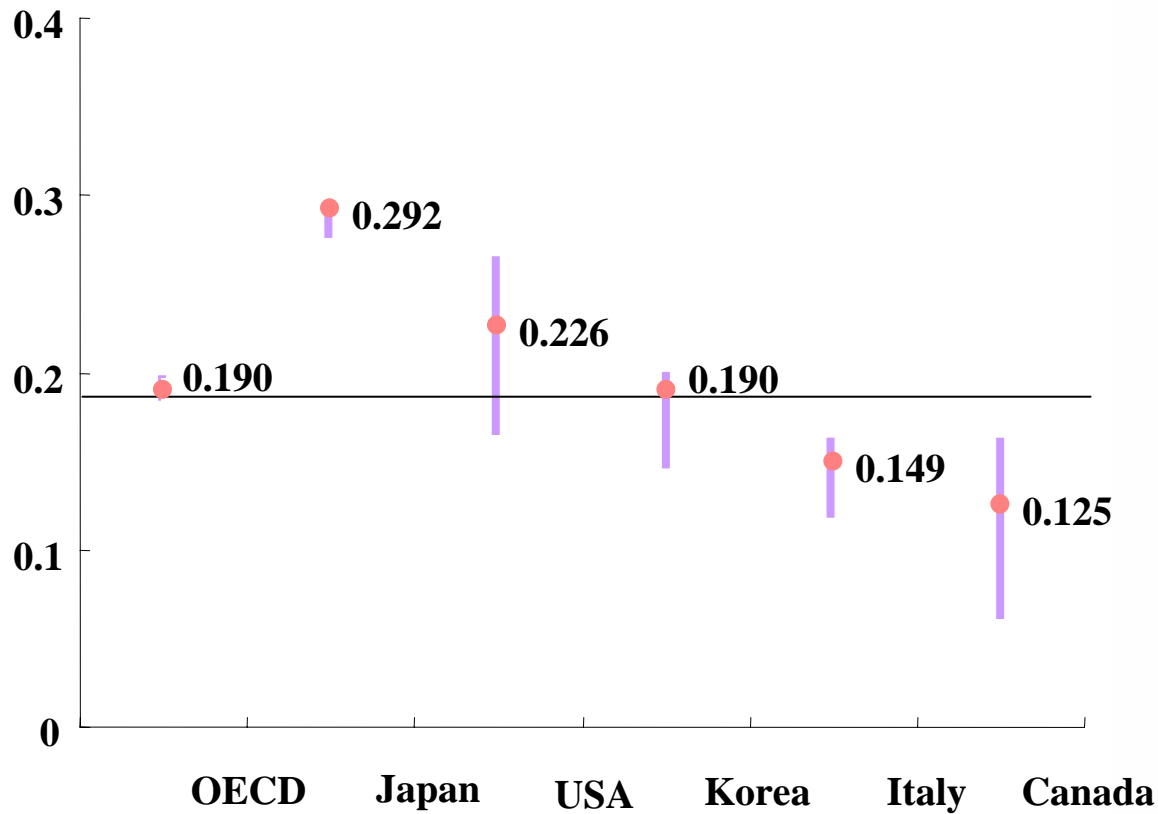


Now, Korea is the 6th largest R&D investor among OECD countries



R&D and TFP Growth

R&D Elasticity of TFP (1991~2004)





Growth Accounts: S&T's Contribution

		1971-1989		1990-2004		1971-2004	
		Growth by (%)	share (%)	Growth by (%)	share (%)	Growth by (%)	share (%)
Labor		2.22	29.1	1.17	20.4	1.75	25.9
Capital		3.24	42.5	2.58	45.0	2.95	43.4
TFP		2.16	28.4	1.98	34.6	2.08	30.7
	R&D Stock	1.77	23.3	1.74	30.4	2.07	30.6
Real growth		7.62	100	5.73	100	6.79	100



Korea Today

□ Economic developments:

- GDP(2005): \$788 billion, 12th largest economy
- Industrial competitiveness:
World top industries: DRAM, shipbuilding, automobiles, and 71 products command world top market shares.
- International trade(2005): \$546 billion, 12th largest trading country

□ Science and technology developments:

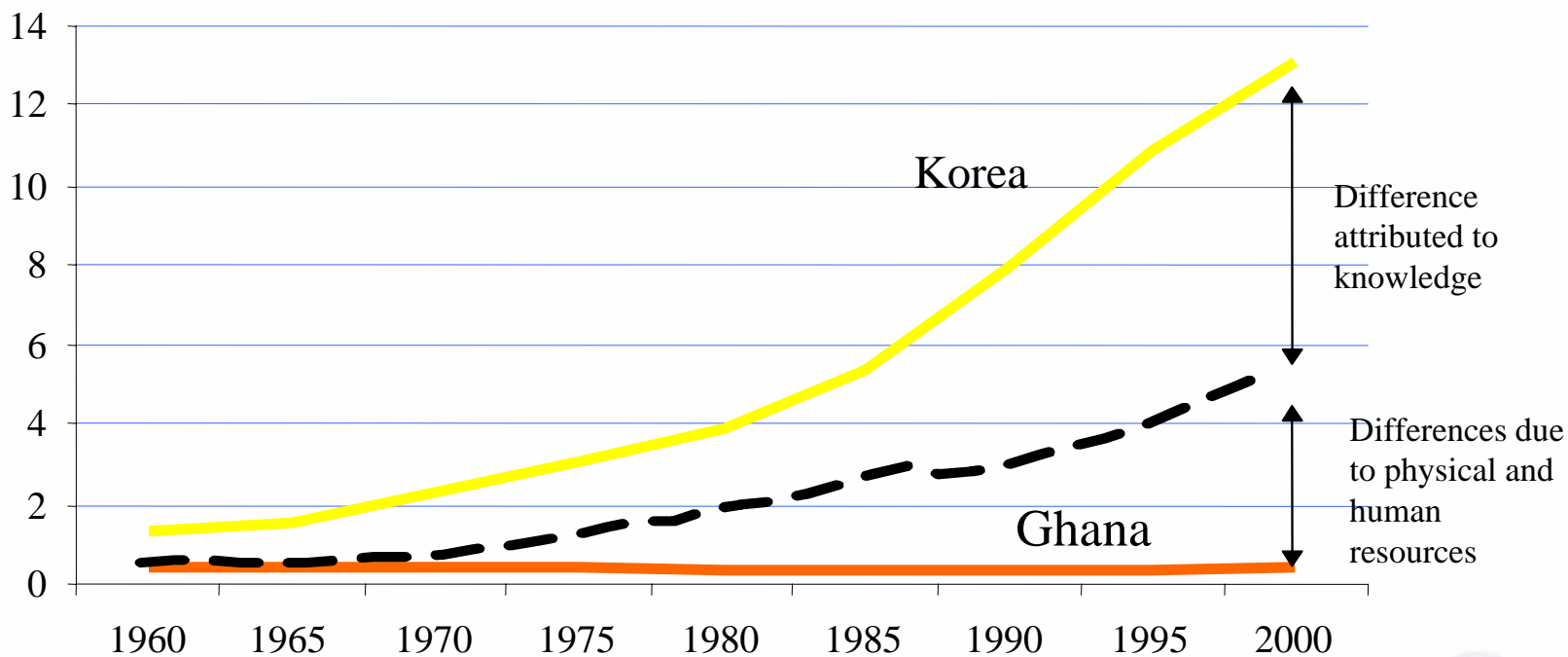
- R&D investments(2005): \$23.6 billion, 7th largest spender in R&D
- Korean share in patents(2005):USPTO(4.4%, 5th), EPO(4%, 6th), JPO(1.6%, 5th)
- Scientific publications(SCI): 14th in the world



GDP/Capita growth: Korea vs Ghana

Knowledge makes the Difference between Poverty and Wealth...

Thousands of constant 1995 US dollars





But Can Korea Sustain the Growth?

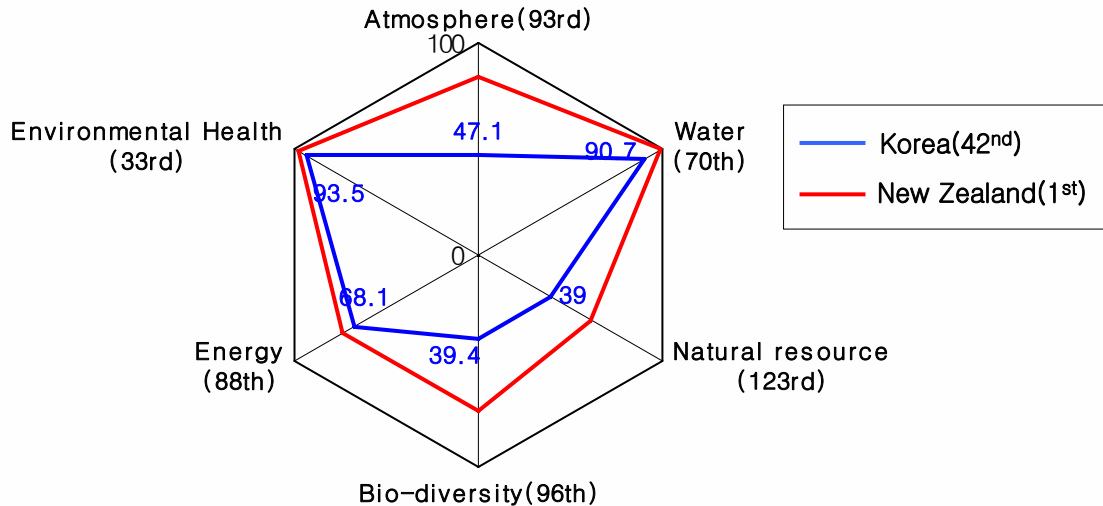
- ❑ **Economic sustainability:** Growth potential, ageing population, energy, scientific capability, etc.
- ❑ **Social sustainability:** Income inequality, labor relations, ageing population, etc.
- ❑ **Environmental sustainability:** Air pollution, resource depletion, energy, etc.



□ Environmental Performance Index (EPI, 2002, 2006)

- ❖ 2002 Korea : 15th among 23 countries
- ❖ 2006 Korea : 42nd among 133 countries

	Korea	NZ	Finland	Belgium	USA	Japan	China
'06 EPI (133 countries)	42	1	3	39	28	14	94
'05 ESI (146 countries)	122	14	1	112	45	30	50
'02 EPI (23 countries)	15	-	3	19	14	22	-





Korea now pursues a new development strategy in a way to delink economic development from environmental degradation and social imbalances.



Is the Economic Dynamism of the Northeast Asia Sustainable?



Northeast Asia Is In a Similar Situation

- ❑ NEA harbors world's most dynamic economies: China, Japan, and Korea
 - The three countries account for about 20% of the world GDP, and 15% of the world trade.
 - China today is rewriting economic growth history as Japan and Korea did in the past.
 - A recent study by RAND predicts that the economies of China, Japan, India, Korea and Indonesia will constitute about 45% of the global economy within 10 years from now.



Northeast Asia Is In a Similar Situation

- ❑ The region excels others in science and technology, too
 - The three countries command a pool of 1,300 thousand R&D S&E (Japan: 660k, China 550k, Korea 100k) which is larger than that of the US and equivalent to 40% of the combined R&D manpower of the OECD.
 - They are also the major R&D investors, and now they invest in R&D as much as the EU's total R&D investment.
 - The three countries produce about 12% of world total SCI publications, which is less than proportionate to the resources put in R&D. But the growth rate has been world top.
 - Similar developments have been observed in patenting, too.



Northeast Asia Is In a Similar Situation

- ❑ But can NEA sustain the recent growth into the future?
 - Economic sustainability: Declining growth potential due to ageing population, constraints in energy supply, weak scientific capability (in particular, Korea), etc.
 - Social sustainability: Inter-regional inequality (China), inter-personal economic inequality (Korea, China and Japan), ageing population, inter-generational conflicts, labor disputes (in particular in Korea), etc.
 - Environmental sustainability: Pollution (air and water), migratory resource management (fisheries, etc), acid rain, etc.

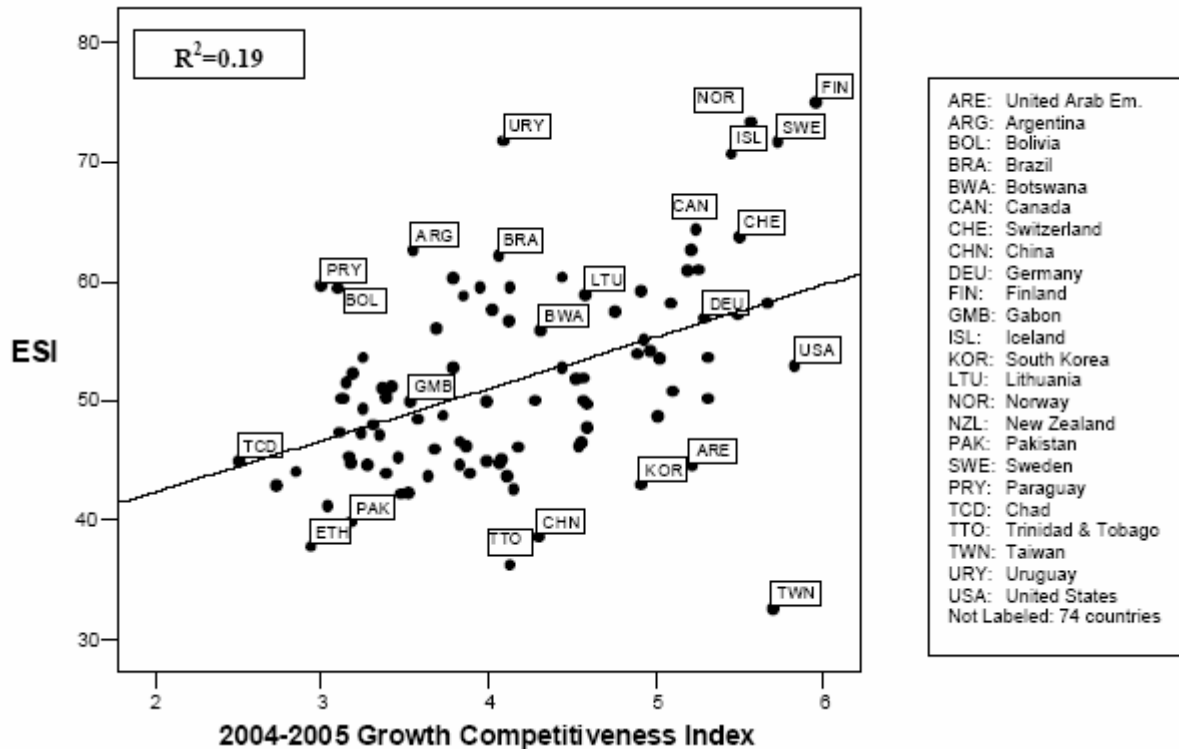


Northeast Asia: a Single Eco Community

- ❑ NEA forms a single ecological community, because of the geographical proximity and climate contiguity of China, Japan, and Korea
 - Seasonal winds carry pollutants (acid particular matters, etc) across the whole region
 - The semi-enclosed seas of region transport polluted matters from the surrounding land as well as from ships
 - Fast industrialization and urbanization are putting great strains on the ecological health of the region - China, Japan and Korea emit considerable amount of sulfur dioxide (14.7 million tons) and nitrogen oxide that cause acid rain

Environmental Consequences of the Development

□ Environmental Sustainability Index (WEF, 2005)



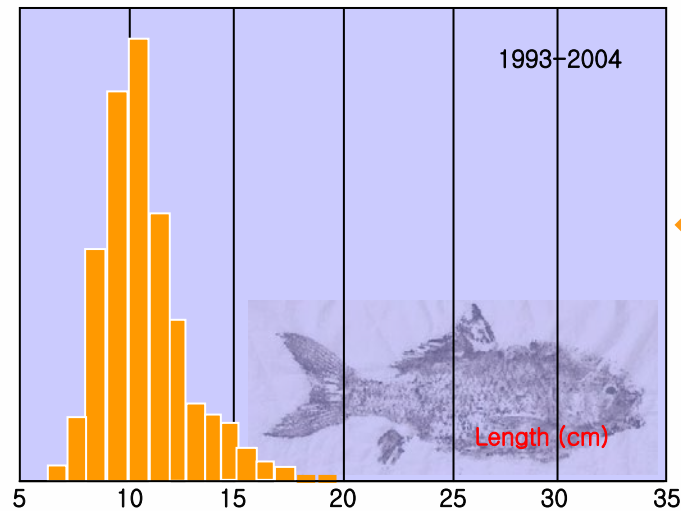
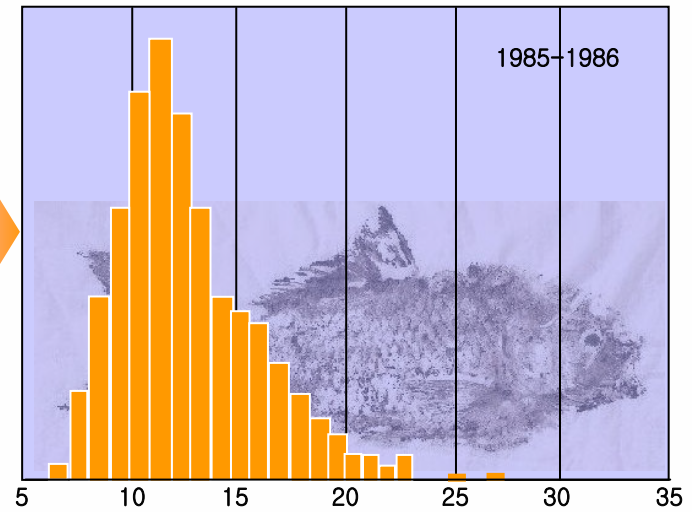
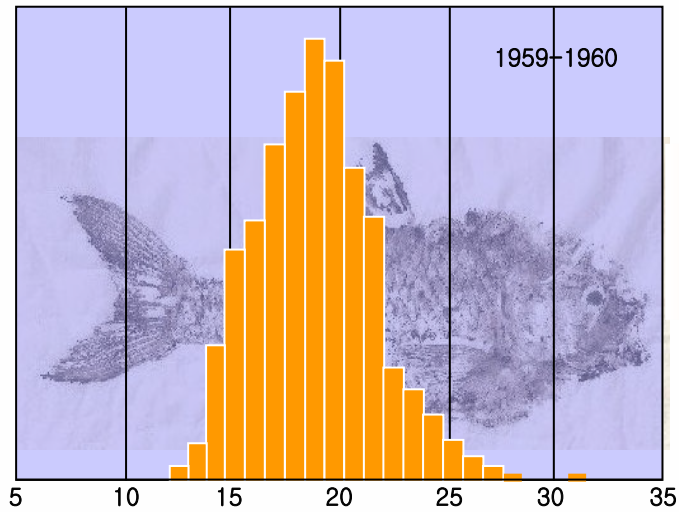
- ❖ China and Korea performed very poorly in terms of environmental sustainability relative to economic competitiveness.



- ❑ The seas of the NEA region also are suffering from trans-boundary pollution, and over-fishing
 - The World Watch Report called the Yellow Sea as one of the seven “dying” seas, second only to the Black Sea in terms of environmental degradation
 - With rising industrialization and over-fishing, fisheries resources have been considerably damaged and reduced
 - In addition, increased traffic across the seas have resulted in oil spills from ships and other pollutions



Shrinking Fish: Yellow Sea

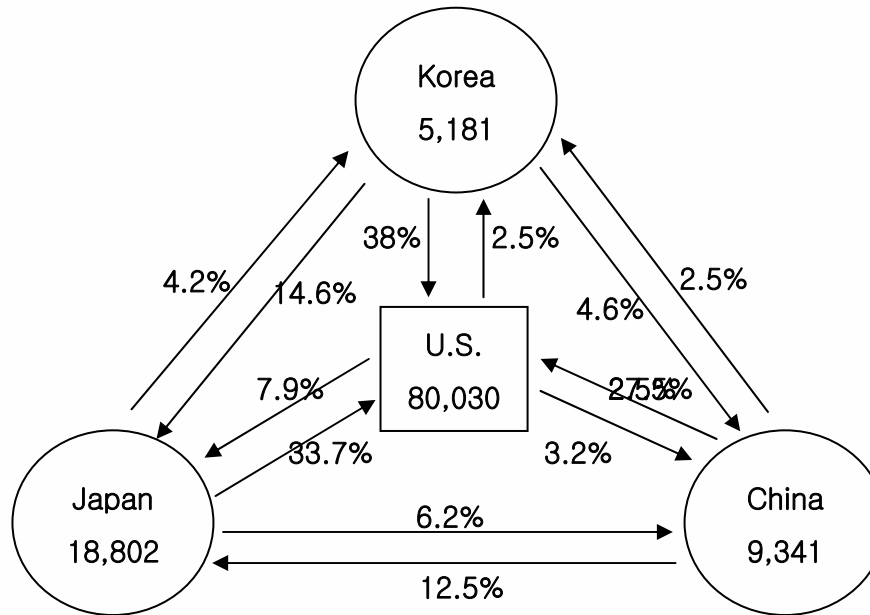




- ❑ In addition, there are such issues of regional concern as energy supply, infectious diseases, natural disasters, and others that require collective actions of the regional countries
- ❑ Despite such issues, regional cooperative efforts to understand scientific nature of the problems and to develop technologies to deal with problems



Regional Research Cooperation in NEA



International co-publications between the U.S. and the Northeast Asia Countries, 1990-2001 SCI :

NEA countries are working more closely with the US than with their neighboring countries.



What should be done to make the economic dynamism of NEA sustainable?

Regional countries' efforts to enhance scientific capabilities to deal with the issues they face, while at the same time, to promote regional cooperation in S&T for collectively deal with the issues



Regional S&T Cooperation: Suggestions

- ❑ Building political consensus: A most straightforward way of achieving this is to have top S&T policy-makers to meet and have policy dialogues on the issues of mutual interests
- ❑ Consensus-building among the science communities of the region: Spontaneous efforts within the science communities to build a regional level forum for dialogues and interactions.
- ❑ Exchanges of scientists and engineers
- ❑ Regional program for collaborative research in the areas that require regional collective actions
- ❑ These programs need be initiated by the government in such a way to promote and facilitate non-governmental cooperation.



Thank you