

AIM/Impact

Recent achievement

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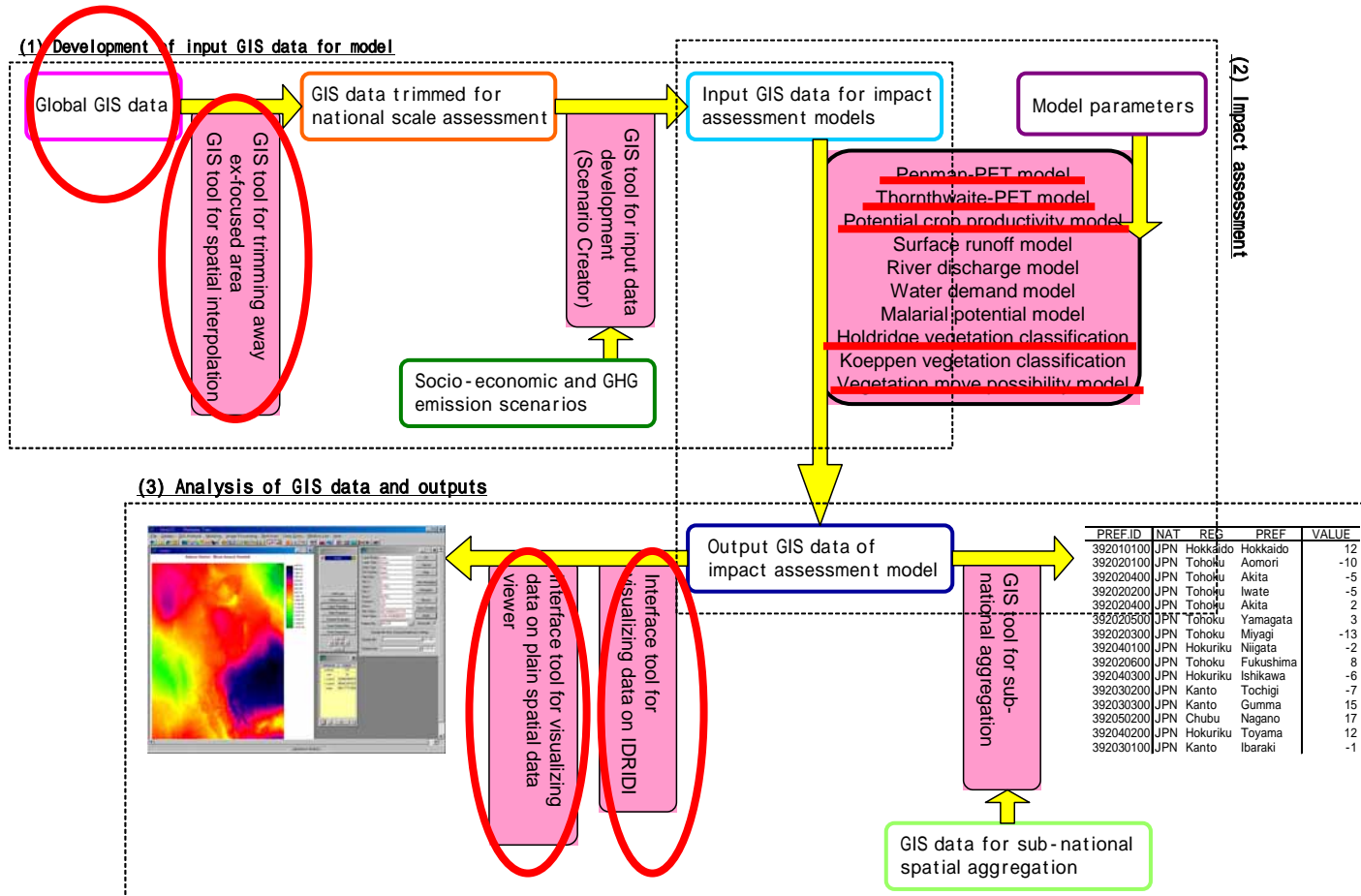
Research activities in FY2003

- AIM/Impact[Country]
 - Release of version 0.5 in June 2003
 - Information exchange with IGCI project
- AIM/Impact[Policy]
 - Conceptualization of model framework
 - Development (underway)
- Contribution to MA
 - Assessment of impacts on water resource and agriculture
- Adaptation
 - Improvement of detailed process models of water resource and agriculture considering adaptation

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Framework of AIM/Impact[Country]



WEB of AIM/Impact [Country]

- <http://www-iam.nies.go.jp/impact/country>
- A test-version package of models, GUIs, data is uploaded.
- There are usage-manuals of model commands and tool commands which are components of AIM/Impact [Country].
- Huge amount of GCM data which can be used with AIM/Impact[Country] is archived.

What is included in the test version: “package_ver0.5.zip”

- User interface
 - GUI for climate scenario preparation
 - GUI for crop productivity simulation
 - GUI for vegetation classification/shift simulation
- Data
 - Observed climate (Baseline)
 - LINK-CRU dataset distributed at IPCC-DDC
 - GCM projection
 - IS92a simulations
 - SRES simulations
 - Soil (for crop productivity model)
 - FAO/UNESCO Soil map of the world

Brief introduction to WEB page

- <http://www-iam.nies.go.jp/impact/country/index.html>

Roll of AIM/Impact[Country] in AIM project and future revision plan

- *Detailed* impact assessment which uses *process model* and *geographical data* will be done mainly using Impact [Country] on MS-Windows from now on (with some continuous help of GRASS-GIS on UNIX).
- Impact[Country] will be extended to evaluate *adaptation options* with the help of AIM collaborative researchers in *China, Korea, India* and other countries.
- Simplified impact functions (*climate response functions*) are created with based on the results of Impact[Country] and used in *economic IAM framework* such as AIM/Impact[Policy] and AIM/Ecosystem[Country].

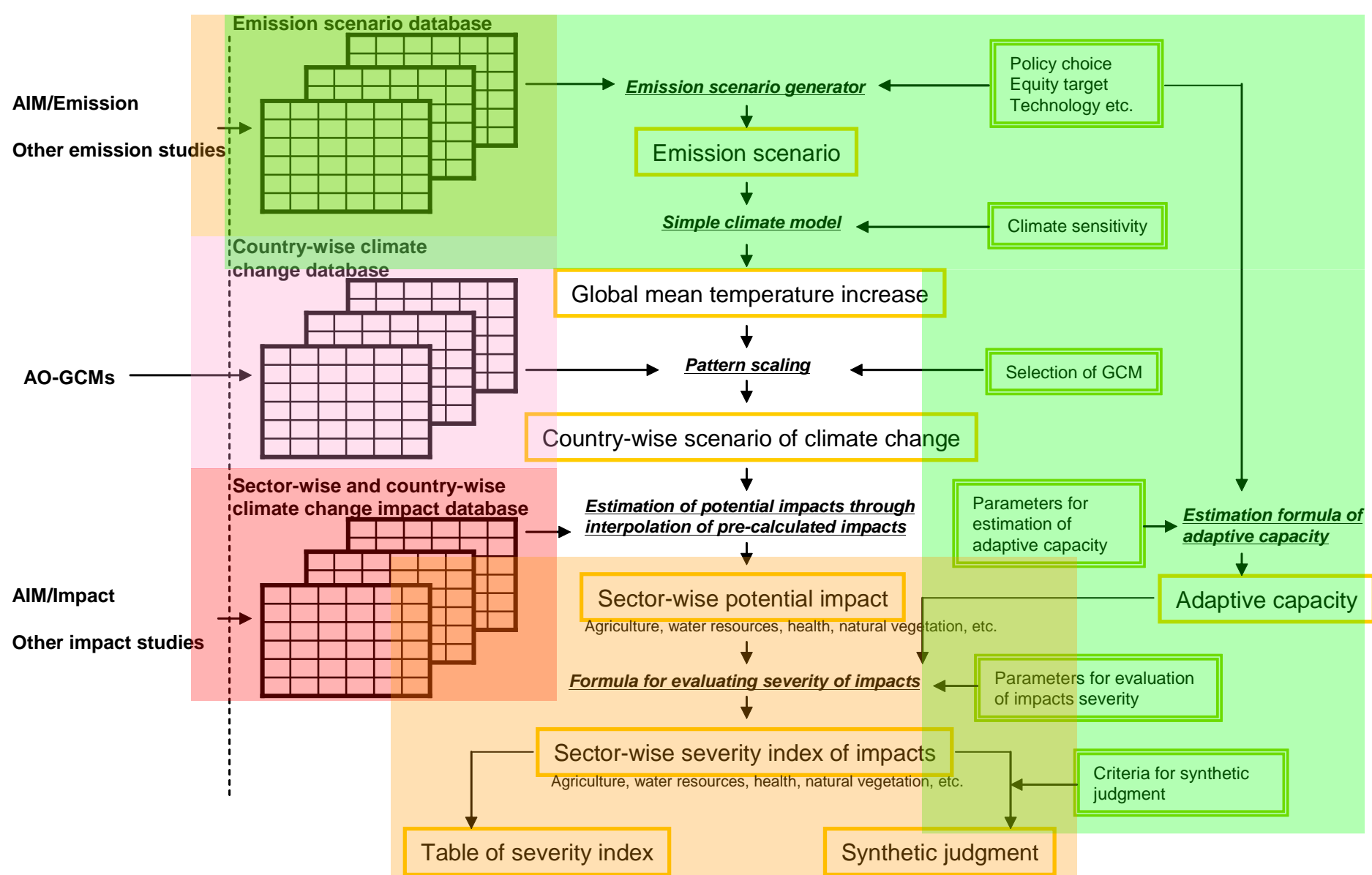
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Knowledge which policymakers expect impact researchers to provide

- However, since impact research assessment in AIM project (AIM/Impact) have put much focus on enhancing the model
- ability to reproduce detail of the process, it was not easy to provide these knowledge to policymakers as promptly as they want.
- In order to overcome this shortage of the model, we have
- decided to develop a simplified integrated assessment framework which enables on-demand evaluation of emission and adaptation policies.

AIM/Impact[Policy]

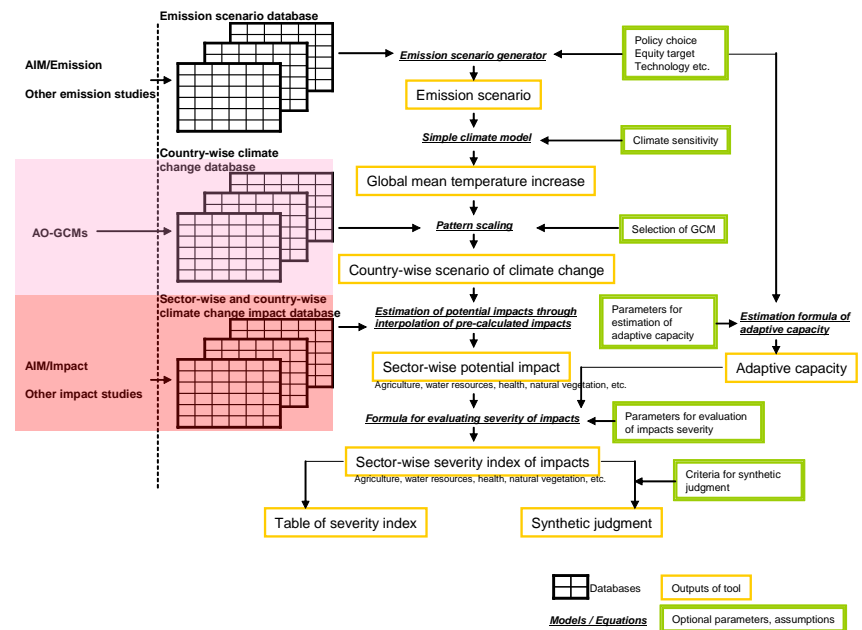


-In this model framework, existing knowledge on emission scenarios, climate projections and impact assessments are synthesized.

- By choosing GHGs emission path from the scenario data base or giving assumptions on socio-economic scenarios to be used in emission model, user can know consequent climate change impacts.

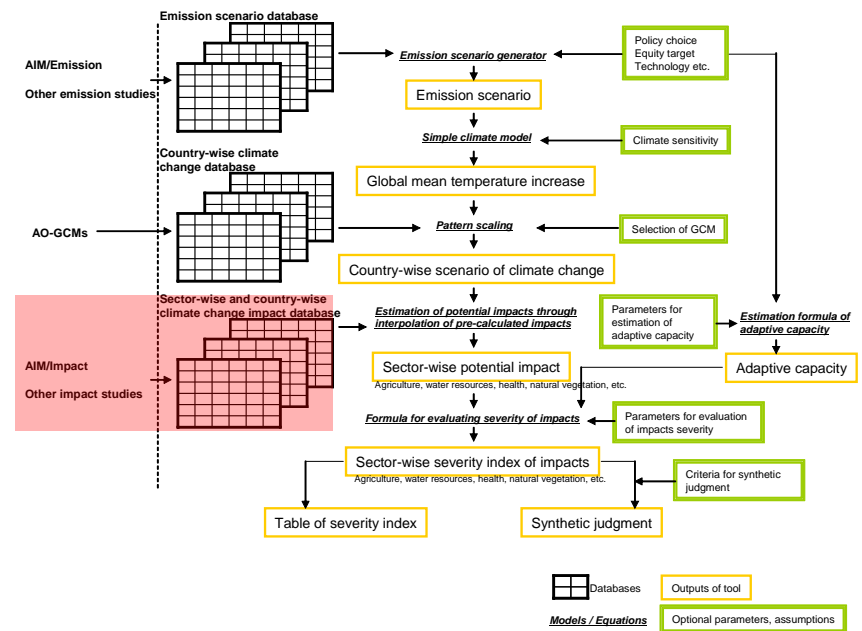
Characteristics of AIM/Impact [Policy]

- Ability to analyze large number of emission policies
 - Database of pre-simulated results of process-models
 - Country-averaged climate change (derived from GCM)
 - Anticipated impact in a sensitivity analysis style (derived from detailed impact studies) .
 - They are linked with the global temperature increase projected by simple climate model in order to estimate country-wise impact.



Characteristics of AIM/Impact [Policy]

- Comprehensiveness covering various impact sectors
 - Results of external impact research group as well as the results of AIM/Impact are contained in the impact database



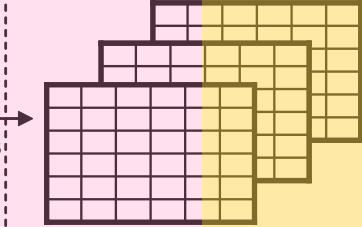
Characteristics of AIM/Impact [Policy]

- Treatment of uncertain parameters
 - Impact[Policy] includes list of adaptation measures with qualitative and quantitative information.
 - But it's difficult to predict what adaptation measures are taken and how effective they are, since they quite depends on characteristics of each society or impact receptor.
 - This tool requires a user to set the uncertain parameters from a range of value determined by socio-economic condition.
 - This feature is expected to increase user's acceptance to an output of the tool, because the uncertain parameters are not assumed by some other person but by himself.

Drs. Masui and Hijioka

AIM/Emission
Other emission studies

Emission scenario database



Emission scenario generator

Emission scenario

Simple climate model

Global mean temperature increase

Pattern scaling

Country-wise scenario of climate change

Policy choice
Equity target
Technology etc.

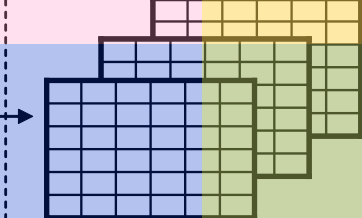
Climate sensitivity

Selection of GCM

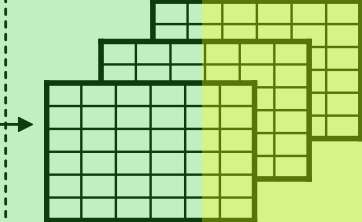
Mr Ishii and Takagi (FRIC)

AO-GCMs

Country-wise climate change database



Sector-wise and country-wise climate change impact database



AIM/Impact
Other impact studies

Estimation of potential impacts through interpolation of pre-calculated impacts

Sector-wise potential impact

Formula for evaluating severity of impacts

Sector-wise severity index of impacts

Parameters for estimation of adaptive capacity

Estimation formula of adaptive capacity

Adaptive capacity

Parameters for evaluation of impacts severity

Criteria for synthetic judgment

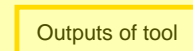
Table of severity index

Synthetic judgment

Takahashi

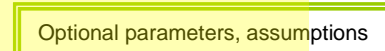


Databases



Outputs of tool

Models / Equations



Optional parameters, assumptions

Mr Ishii and Takagi (FRIC)

Snapshots of AIM/Impact[Policy]

AIM Impact Policy

Emission Scenario

Country Climate Scenario

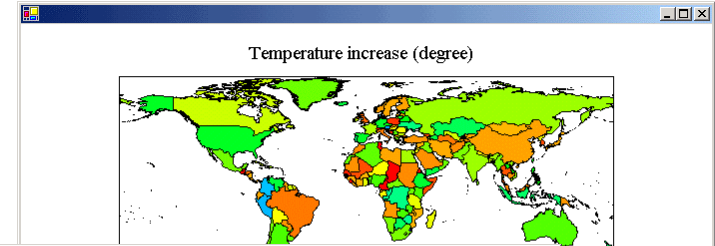
Sectional Impact

Severity index of impact

Calculate future climate Scenario
 Select base emission scenario
 Data directory: C:\test
 Case Name:
 Target year:

Select GCM scenario for pattern scaling
 GCM name:
 Scenario name:
 Base data:

Emission scenarios can be chosen and modified through graphical user interface.



Results of the assessment can be displayed in map style or in line graph style.

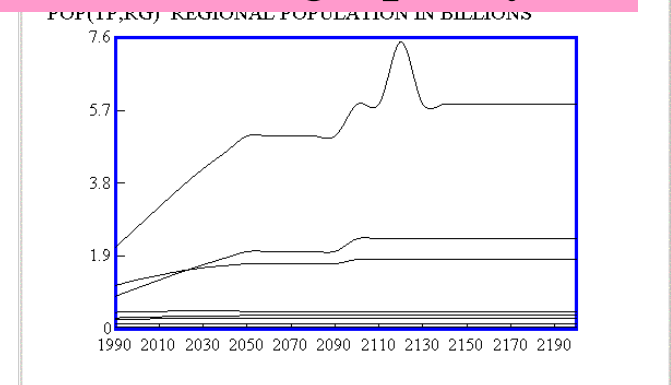
Global Climate Scenario Regional Climate Scenario Regional Economic Scenario

POP

		POP ENERGY EFFICIENCY IMPROVEMENT - PCT PER YR						
		1990	2000	2010	2020	2030	2040	2050
1	USAC	0.72	0.66	0.60	0.54	0.53	0.53	0.51
2	WEUR	0.66	0.66	0.60	0.46	0.45	0.44	0.42
3	JANE	0.66	0.60	0.60	0.39	0.38	0.37	0.34
4	EEFS	-1.00	1.72	1.60	1.49	1.47	1.46	1.41
5	ASIA	4.00	3.25	2.75	2.25	2.21	2.16	1.91
6	MEAS	1.20	1.38	1.80	1.38	1.38	1.32	1.21
7	AFRI	1.88	2.00	2.00	1.69	1.62	1.54	1.27
8	LATA	1.88	2.00	2.00	1.69	1.62	1.54	1.27

Temperature (C)

ID	Region	POP
1	CCSm_A2_2000	
2	CCSm_A2_2010	
3	CCSm_A2_2030	
4	CCSm_A2_2040	
5	CCSm_A2_2020	
6	CCSm_A2_2050	
7	Algeria	24437792
8	Azerbaijan	13348508
9	Albania	12476711
10	Armenia	8229420
11	Andorra	9223238
12	Angola	23305665
13	AmericanSa	27349999
14	Argentina	16839884
15	Australia	23276918
16	Austria	7275682
17	Antigua	26713535
18	Antarctica	-99990000
19	Bahrain	29115938
20	Barbados	27200569
21	Botswana	23780689
22	Bermuda	-99990000
23	Belgium	10583369



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Revision of process models and consideration of adaptation

□ Water resource

- Mr. Watase in Matsuoka Lab refined the *river discharge model* by newly introducing a *parameter fitting algorithm*. The refined model will be transplanted to AIM/Impact [Country] with the help of Mr. Jung Hui-Cheul (KEI).

□ Agriculture

- Mr. Murai in Masui/Hibiki Lab refined the crop productivity model by additionally considering *irrigation, mechanization, plant/harvest date adjustment* and *optimal selection of crop variety* (adaptations).

Crop productivity of wheat considering available adaptation level

Current

No adaptation case :

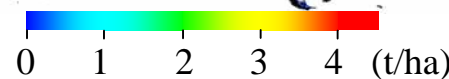
Change of crop variety : "NO"

Change of planting date : "NO"

Findings of the research

- In many developing countries, productivity improvement derived from increase in irrigation and mechanization has a potential to compensate for negative climate change impact anticipated in future. (This result overthrows the traditional AIM's results without considering adaptations.)

- However, without taking appropriate adaptation strategy, such a potential cannot be realized.



Conclusion

- Process-type impact assessment model will be developed and refined in the framework of AIM / Impact [Country] from now on.
- Impact[Country] will be extended to evaluate adaptation options with the help of AIM collaborative researchers in China, Korea, India.
- AIM/Impact[Policy] is under development for easy evaluation of various emission policies. It will enable policymakers to investigate the consequence of emission & adaptation very quickly.