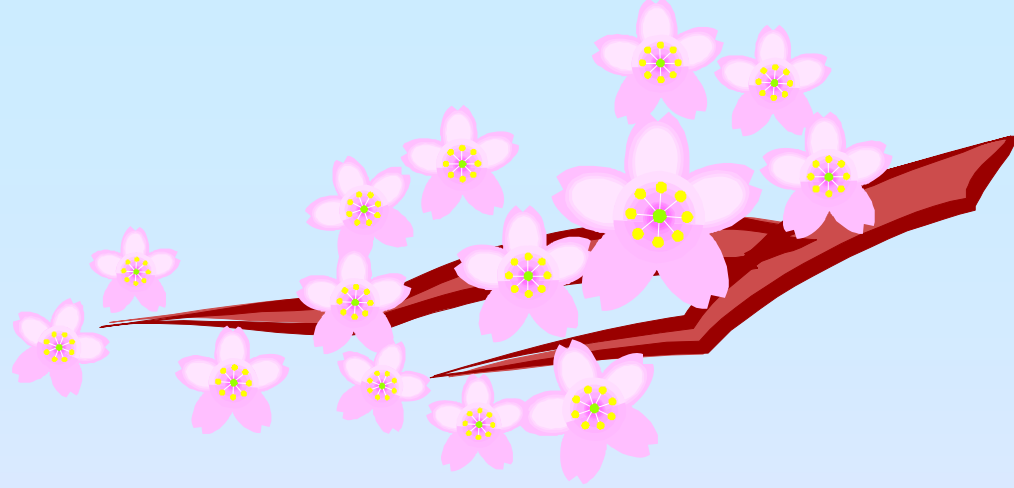


**InLCA/LCM2006**

**October, 5, 2006**



# ***Novel Evaluation Method for Social Sustainability affected by using ICT Services***

***Masayuki Tsuda***

***Jiro Nakamura, Kazue I Takahashi, Shiro Nishi***

**NTT Energy and Environment Systems Laboratories, NTT Corporation**

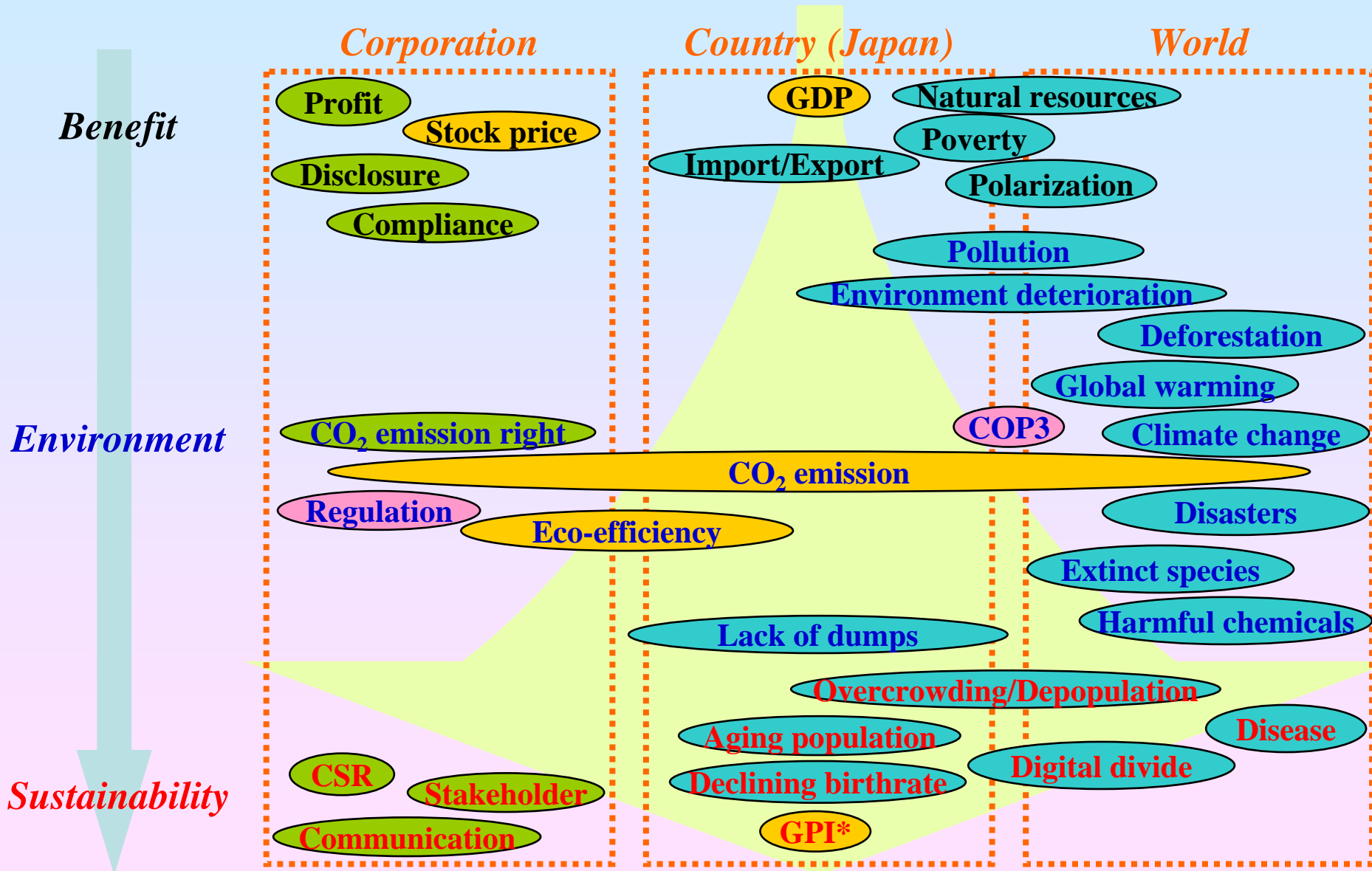
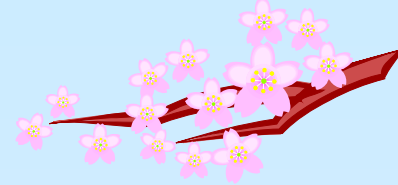
***Mika Takaoka***

**College of Business, Rikkyo University**

**This study was sponsored by RISTEX of JST**

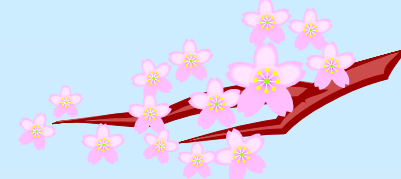


# Background: Shift to Sustainability



\*GPI: Genuine Progress Indicator

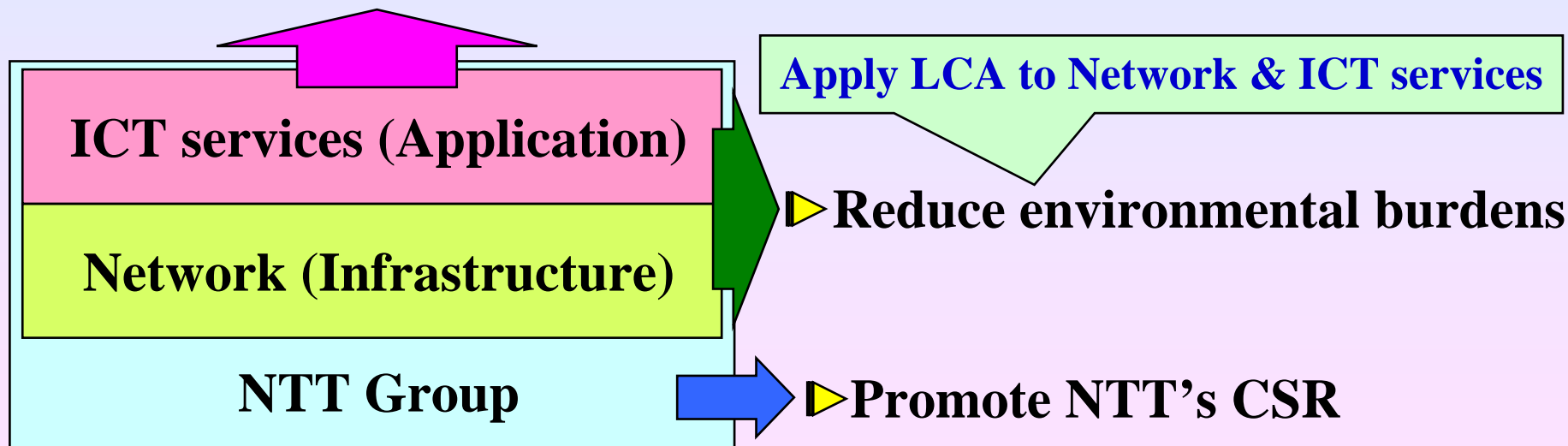
# Background: NTT Group's Mission



**“We will contribute to solving various social and environmental issues in Japan and overseas through our broadband and ubiquitous services.”**

**(From NTT Group's Mission Statement)**

**▶ Solve social problems**



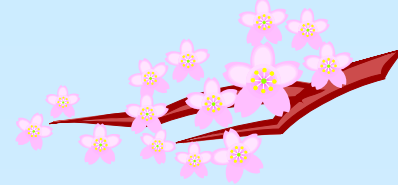
**Apply LCA to Network & ICT services**

**▶ Reduce environmental burdens**

**▶ Promote NTT's CSR**

**▶ Contribute to realization of sustainable society**

# *Background: Effects of ICT Services*



## **Will ICT services contribute to realization of sustainable society ?**

### **Positive effects**

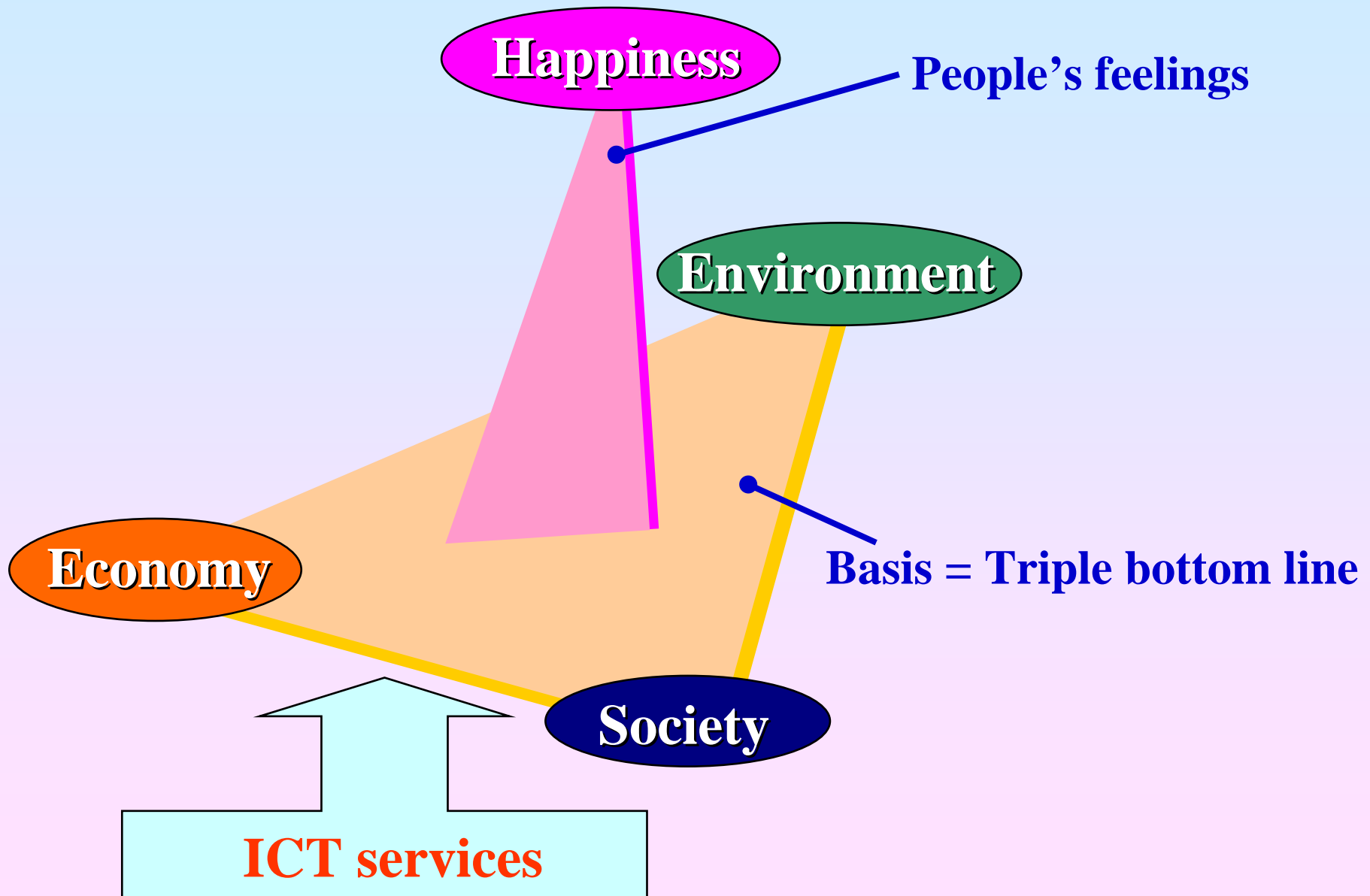
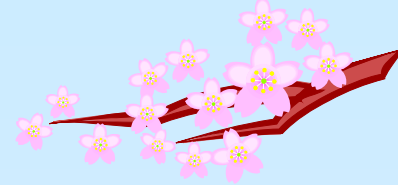
- ▶ **Reduce environmental burdens**
  - ▶ Dematerialization
  - ▶ Substitution of transportation
  - ▶ Increased efficiency
- ▶ **Perform activities without error**
  - ▶ Perfect operation and awareness
  - ▶ Convenient and comfortable life
- ▶ **Eliminate adverse conditions**
  - ▶ Avoid accidents and crime
  - ▶ Avoid illness
  - ▶ Save time

### **Negative effects**

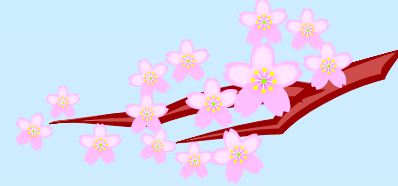
- ▶ **Increase environmental burdens**
  - ▶ Energy consumption
  - ▶ Natural resources
  - ▶ E-waste
- ▶ **New social issues**
  - ▶ Leaked information
  - ▶ Digital divide
- ▶ **Economic issues**
  - ▶ Cost of introducing services



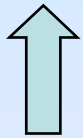
# *Background: What is Sustainable Society?*



# *Aim / Concept*



**Aim**



**Evaluating the contribution of ICT services to the realization of a sustainable society**

**Purpose of this study**

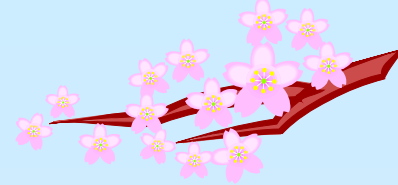
**Develop new index**

- ▶ **Indicate contribution of ICT services to realization of sustainable society**
- ▶ **Quantitative and comparable common measure**
- ▶ **Applicable to service design**

**Future**

**Extend to macroscopic evaluation of social contribution of corporations, autonomous communities and countries, as well as ICT services**

# *Gross Social Feel-good (GSF) Index*



**Happiness**

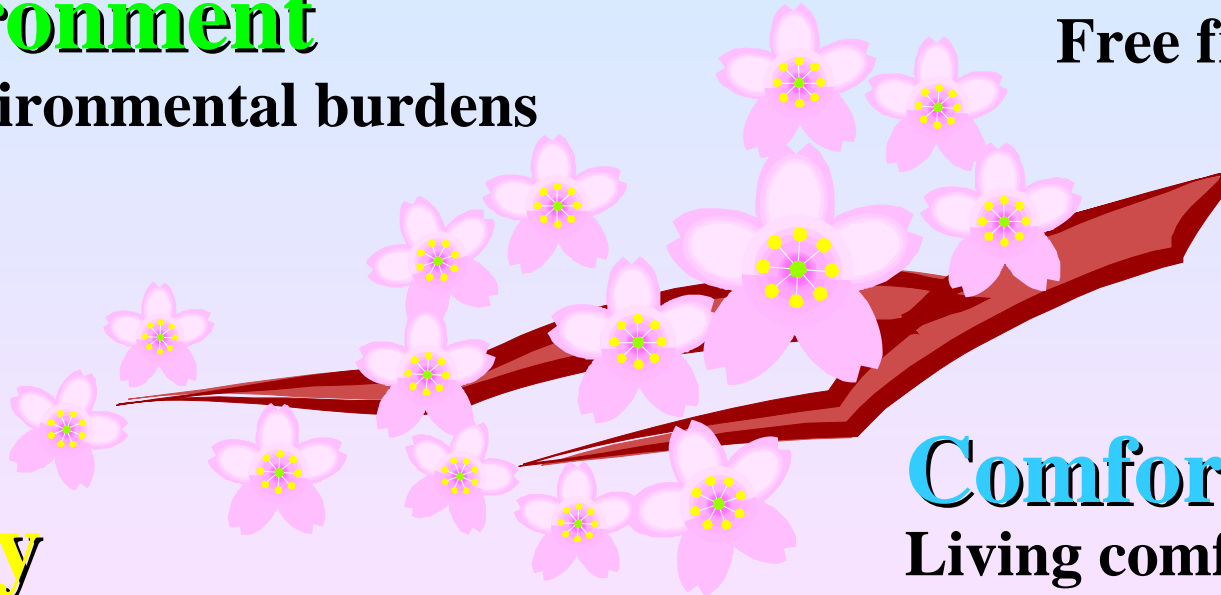
Being happy

**Health**

Free from disease

**Environment**

Few environmental burdens



**Safety**

People or their belongings safe

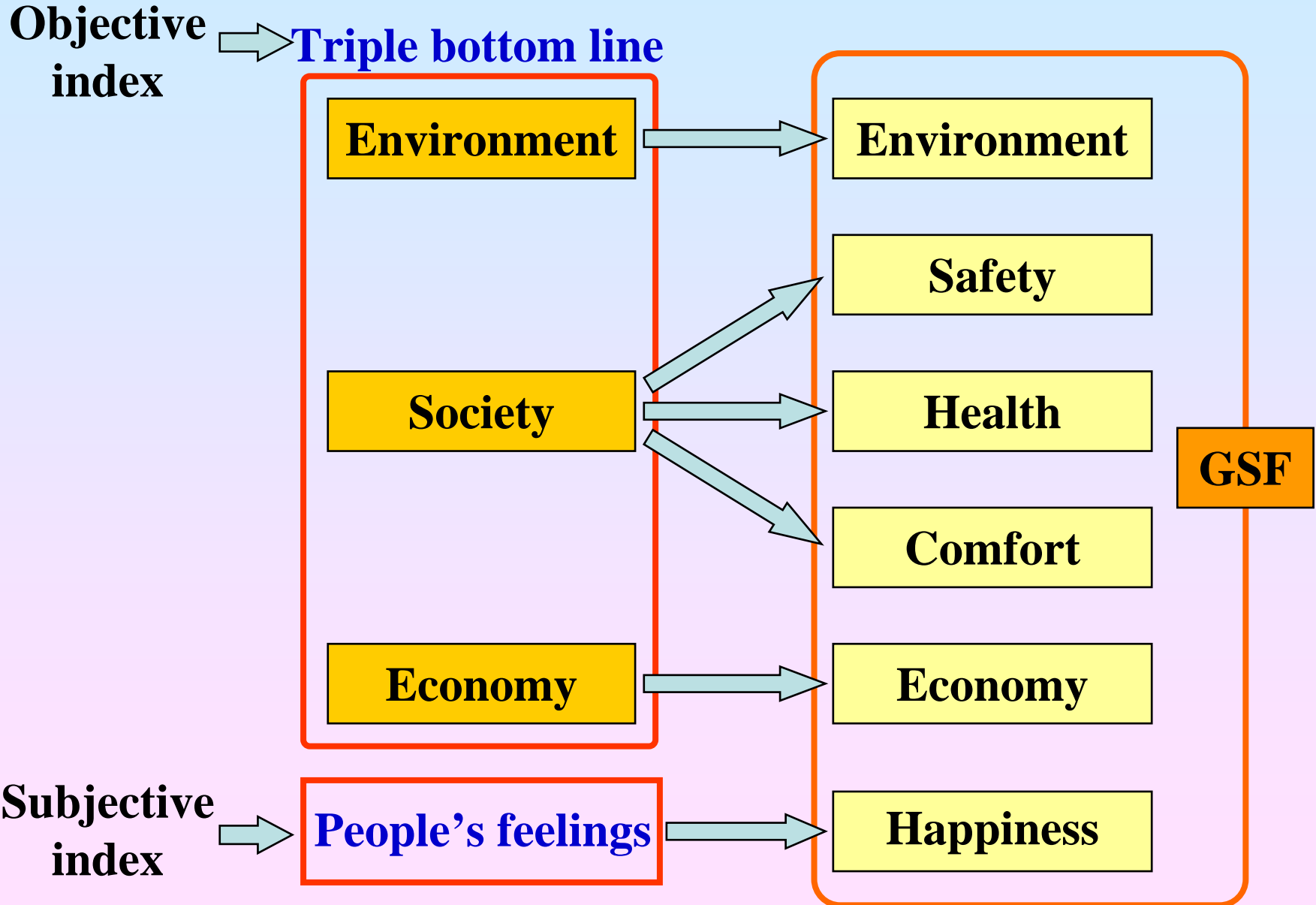
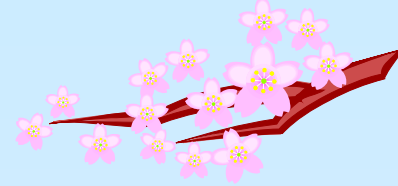
**Comfort**

Living comfortable life

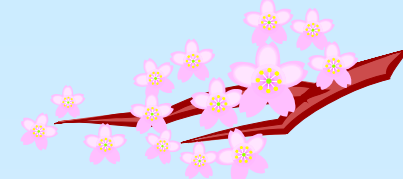
**Economy**

Good cost-benefit performance

# Framework of GSF Index



# Environment Index



**GSF**

*Environment*

**Safety**

**Health**

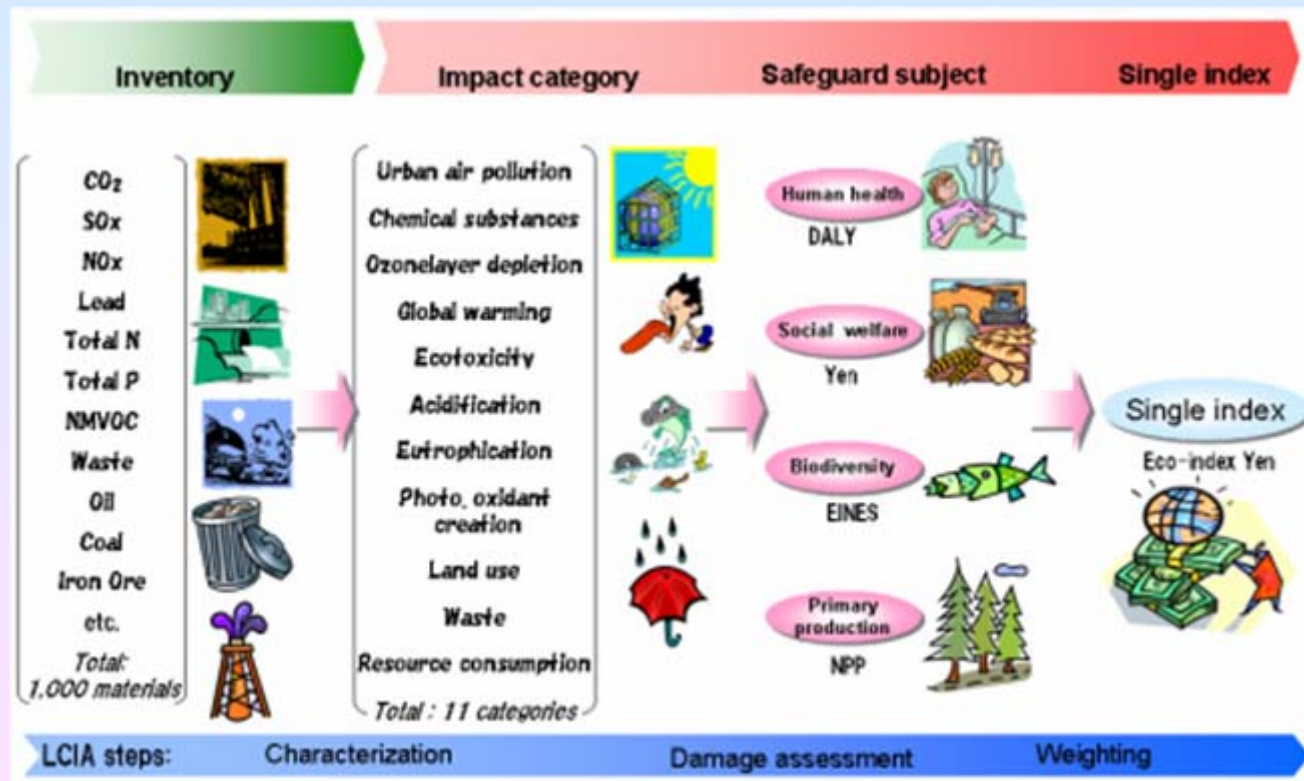
**Comfort**

**Economy**

**Happiness**

**LIME**

**Life-cycle impact assessment method based on endpoint modeling**

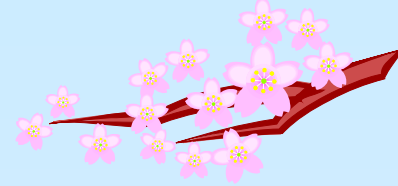


**Evaluate damage to endpoints such as human health and ecological risks caused by 11 impact categories**



Research Center for Life Cycle Assessment  
<http://unit.aist.go.jp/lca-center/cie/index.html>

# Safety Index



**GSF**

**Environment**

*Safety*

**Health**

**Comfort**

**Economy**

**Happiness**

**Accidents**

▶ **Avoid accidents**

Number of traffic accidents, Casualties

**Disasters**

▶ **Avert damage caused by natural disasters**

Casualties, Amount of damage

**Crime**

▶ **Avoid crime**

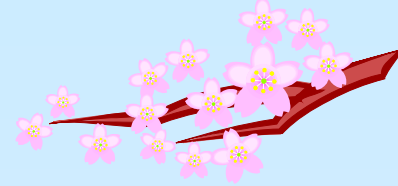
Number of crimes, Amount of damage

**Information security**

▶ **Personal information protection**

Number of information leaks, Amount of damage

# Health Index



**GSF**

**Environment**

**Safety**

*Health*

**Comfort**

**Economy**

**Happiness**

**Health care**

▶ **Maintain health**

Athletic performance level, Number of patients

**Disease**

▶ **Avoid illness**

Number of sick people, Medical expenses

**Medical treatment**

▶ **Effective and efficient treatment**

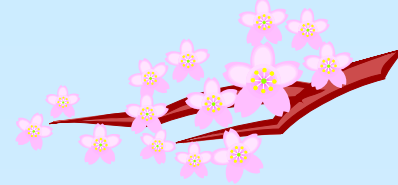
Death rate, Number of patients

**Stress**

▶ **Avoid stress-related illness**

Number of people with stress-related illness

# Comfort Index



**GSF**

**Environment**

**Safety**

**Health**

***Comfort***

**Economy**

**Happiness**

**Various opportunities**

▶ **Obtain various opportunities**

Employment rate, Number of tourists

**Barrier free**

▶ **No differential, disparity, gap and divide**

Number of people to whom service is available

**Simplicity**

▶ **Use services easily**

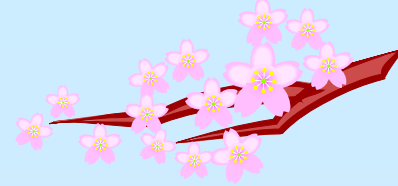
Number of errors in operation, Intent to use rate of services

**Ubiquitous**

▶ **Use services at any time and any place**

Service available area, Number of wireless terminals

# *Economy Index*



**GSF**

**Environment**

**Safety**

**Health**

**Comfort**

***Economy***

**Happiness**

**Cost-benefit performance**

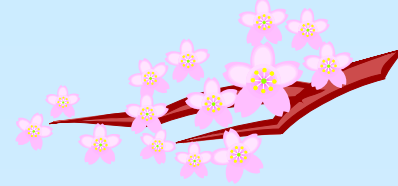
▶ **Cost**      **Initial/running/disposal cost**

System price, Communications expense,  
Maintenance fee

▶ **Benefit**    **Economic Impact**

Reduced cost, Increased income

# Happiness Index



**GSF**

**Environment**

**Safety**

**Health**

**Comfort**

**Economy**

***Happiness***

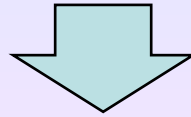
**Survey**

**Evaluate people's feelings**

▶ **Satisfaction with service and society**

▶ **Questionnaire**

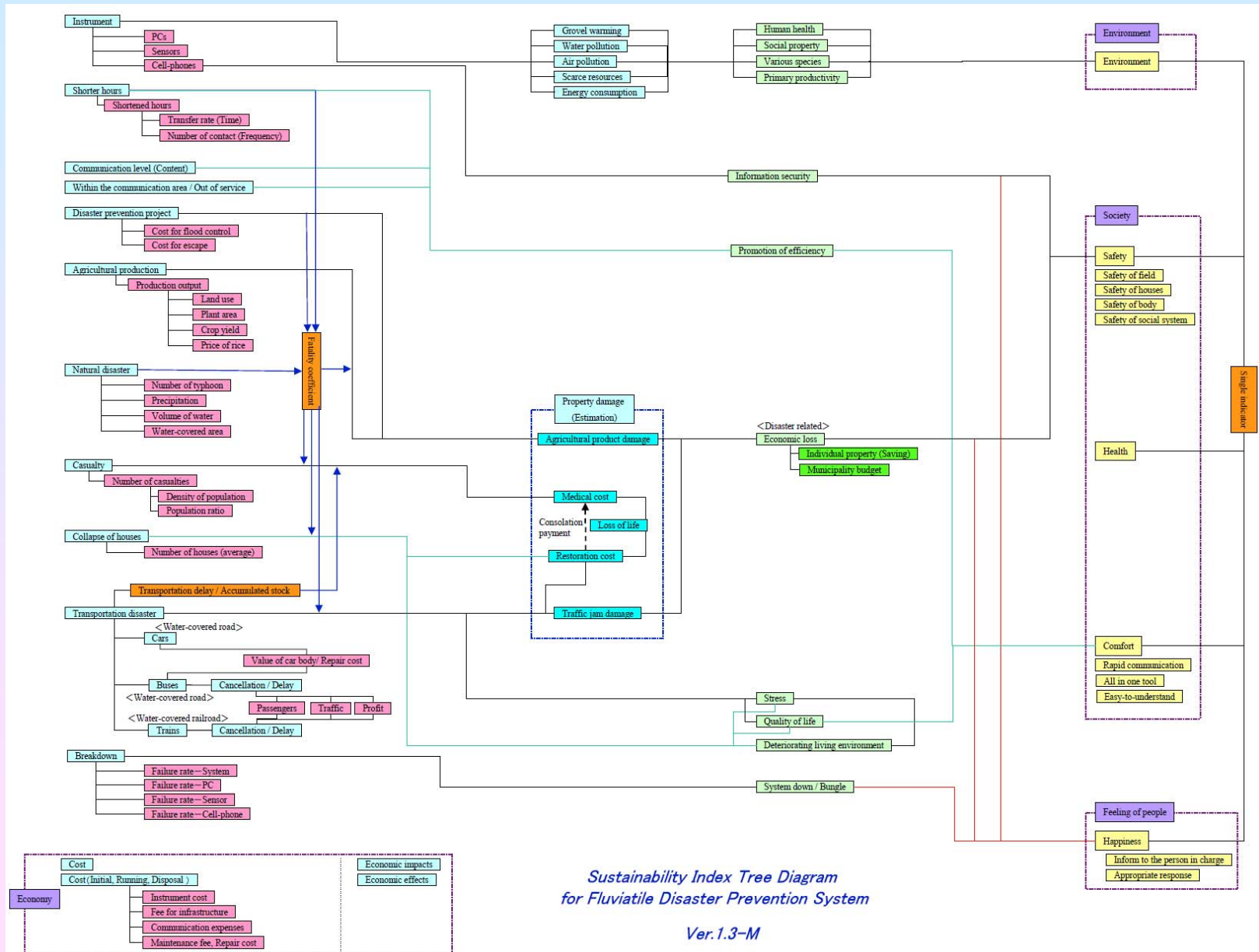
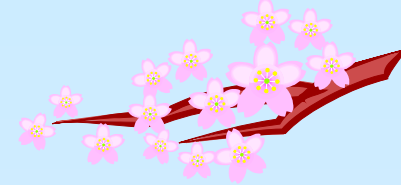
▶ **Interview**



▶ **Conjoint analysis**

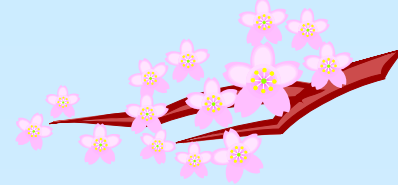
▶ **CVM (contingent valuation method)**

# Tree Diagram



Sustainability Index Tree Diagram  
for Fluvial Disaster Prevention System

# Summary and Next Step



## ***Gross Social Feel-good (GSF) Index***

*< Environment, Safety, Health, Comfort, Economy, Happiness >*

- ▶ **Indicate contribution of ICT services to realization of sustainable society**
- ▶ **Include evaluation of people's feelings, based on triple bottom line**

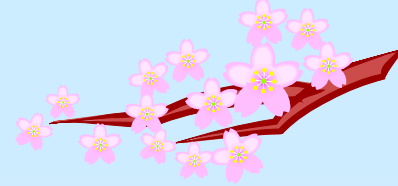


### **Case study with demonstration experiment (in operation)**

- ▶ **Indicate contribution of ICT services to realization of sustainable society**
- ▶ **Quantitative and comparable common measure**
- ▶ **Applicable to service design**

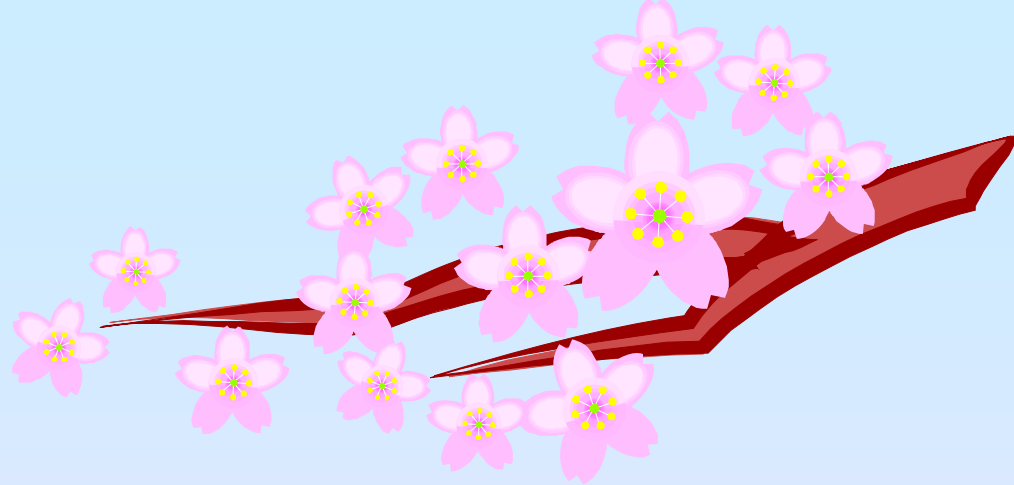
# *Acknowledgement*

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**This study was sponsored by RISTEX of JST**

**RISTEX = The Research Institute of Science and Technology for Society  
JST = The Japan Science and Technology Agency**



*Thank you*



*NTT Energy &  
Environment*