No. 70030

Wed, 10:40-12:10

Ishikawadai Building No.4, Room B04/05

Project Evaluation for Sustainable Infrastructure

Hanaoka Shinya

Department of International Development Engineering

Tokyo Tech

hanaoka@ide.titech.ac.jp

Outline

This course aims to provide the methods necessary to undertake project evaluation and cost benefit analysis for sustainable infrastructure. The methods comprise of microeconomics background, cost benefit analysis, valuing market and non-market goods, and other technical issues. Case studies of various infrastructures are also provided.

Grade

Attendance	**10%**
Presentation	**20%**
Report	**20%**
Final Exam	**50%**

Text Book and References

Boardman, A. E., Greenberg, D. H., Vining, A. R. and Weimer, D. L. (2006)

Cost Benefit Analysis: Concepts and Practice (3rd Edition), Prentice Hall College.

UNESCAP (2007)

Sustainable Infrastructure in Asia -Overview and Proceedings-.

Pearce, D., Atkinson, G. and Mourato, S. (2006)

Cost-Benefit Analysis and the Environment: Recent Developments.

Victoria Transport Policy Institute:

Transportation Cost and Benefit Analysis: Techniques, Estimates and Implications, Online TDM Encyclopedia, http://www.vtpi.org/tca/.

Varian, H.R. (2003)

Intermediate Microeconomics: A Modern Approach 6th Edition, W.W.Norton & Company.

United Nations (2003)

Cost Benefit Analysis of Transport Infrastructure Projects.

Aims of Project Evaluation

To evaluate the feasibility of infrastructure investment project under limited budget.

- to be viable or rejected
- to compare alternatives, priority
- to capture the significant impact
- to support decision-making
- to report the result in a consistent (scientific) form
  [Accountability for the public]

What is Cost Benefit Analysis?

Cost Benefit Analysis

- Economic or Social Viewpoint

(Quantifying in monetary terms [Monetizing])

Benefit, *Cost*, *Utility*, *Efficiency*…

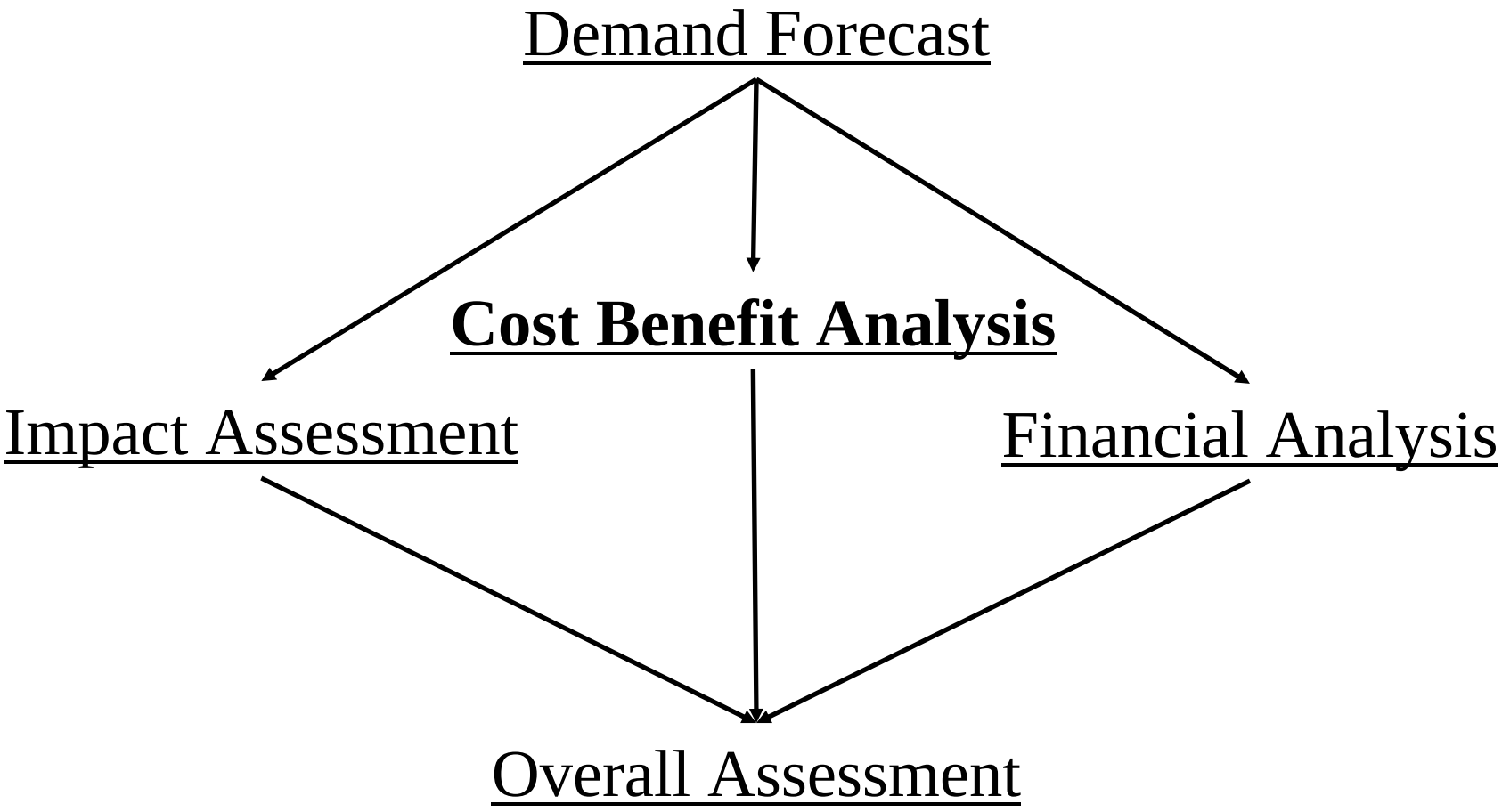
NSB *(Net Social Benefit)* = *B* *(Social Benefit)* – *C* *(Social Cost)*

Financial (Individual) Analysis

- Private Viewpoint

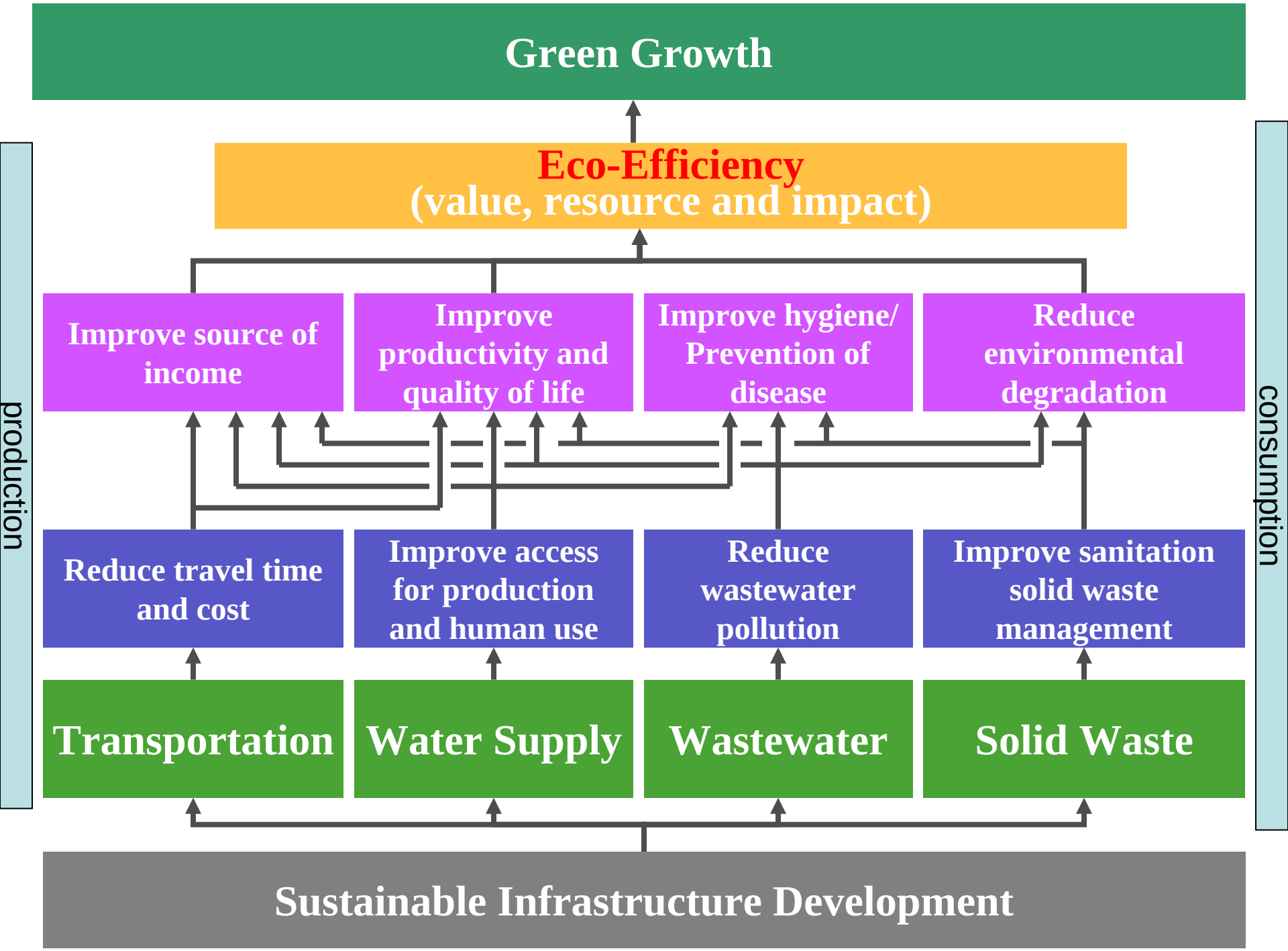
Revenue & Expenditure

Overall Scheme in Transport Infrastructure Projects



Major Steps in CBA

1. Specify the set of alternative projects
2. Decide whose benefits and costs count
3. Catalogue the impacts and select measurement indicators
4. Predicts the impacts quantitatively over the life of the projects
5. Monetize all impacts
6. Discount benefits and costs to obtain present values
7. Compute the net present value of each alternative
8. Perform sensitivity analysis
9. Make a recommendation


Green Growth
Eco-Efficiency
(value, resource and impact)
Improve source of income
Improve productivity and quality of life
Improve hygiene/ Prevention of disease
Reduce environmental degradation
Reduce travel time and cost
Improve access for production and human use
Reduce wastewater pollution
Improve sanitation solid waste management
Transportation
Water Supply
Wastewater
Solid Waste
Sustainable Infrastructure Development
production
consumption

Characteristics of Infrastructure

1. Collective Consumption (Non-rivalness)
   Consuming same goods and services simultaneously by several consumers
2. Non-excludable (Non-excludability)
   Impossible to exclude consumers from use of goods and services.
3. Large-scale investment
   Need huge financial source, Risk of investment
4. Long life span — Long redemption, Generational burden of cost
5. Requisite — Price inelasticity, Monopoly Price
6. External effect — Effect to other market
7. Diminishing cost — Large fixed cost (initial investment cost), Low marginal cost (operation cost)

<u>Infrastructure is a capital which must be insufficient with required level if it is invested by private entities.</u>