Secondary Data Sources

1. Why use secondary data?
2. How to reduce errors
3. Sources of secondary data
4. Value transfer: techniques and steps

Primary data

- Collected for a specific research/policy problem
  - (Field) experimental data
  - Survey data
  - Observational data

Secondary data

- Collected for a different purpose or context, but may be relevant to your policy/research problem
  - Biophysical data
  - Social data
  - Economic data
  - Policy efficacy data
  - …

- Using secondary data requires **benefit** or **value** transfer
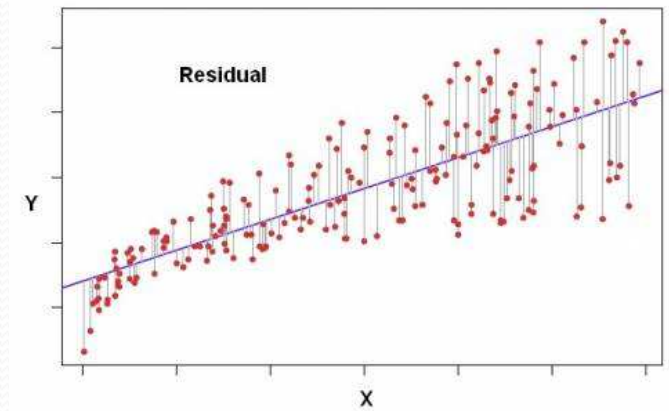
Secondary data - Advantages

- When available
  - fast access
  - cheap

- Complement or enrich primary data
  - Primary data have local focus, but you may need data for regional or national scale

Errors from using secondary data

Secondary data – Error sources

- <u>Measurement error</u> in primary data

- <u>Bias</u> in primary data
  - Only publishable results
  - Researcher interest, network, funding opportunities, …

- <u>Transfer error</u>
  - Inconsistent measurement units, definitions, scenarios/treatments
  - Relevance of primary study to your research/policy problem

Measurement error questions

- Do the studies look trustworthy?
  - Is the study description understandable?
  - Are the units of measurement correct?
  - How were the data collected?
- How do data points compare with the rest of the data?

It is always good to collect multiple primary studies

Example

- Ge et al. 2005 – Grassland ecosystem services in Tibet

- 5 ecosystems * 7 services = 35 observations?

- Quick scan of section III
  - Would you use all, some, or nothing from this study?
  - Why?

Bias questions

- Are there spatial groups in primary studies?
- Are studies only from certain years?
- Do certain survey methods dominate?
- Are certain authors overrepresented?

- Look at and understand your data
- Correct during value transfer

Transfer error questions

- Is the context of the primary study relevant?
- Do the data apply to an appropriate time period?
- Do the data cover the same service?
- Do the data apply to the population of interest?
- Can the units of measurement be made identical?

Understand your data and results

The dream: many, relevant studies

… in reality, finding

just one study can be difficult

- No or uncertain information: which is worse?
  - Depends on your policy environment
  - Test CBA results for your secondary data

Sources of secondary data

Useful secondary data

- Presence and density of invasive species
  - Topology, hydrologic features, temperature, elevation
- Invasive species population growth curves
  - Time of establishment
  - Growth rate
  - Carrying capacity
- Management options
  - Identify the valid options
  - Efficacy of management options
- Human population characteristics
  - Income, education, poverty, urbanisation, infrastructure
  - Willingness to adopt previous programs
- Potentially affected commodities
  - Identify the potential commodities
  - Effects of invasive on the commodity: crop yields, fish kills, etc.

Useful secondary data:
Presence, biology, and management

- Global Invasive Species Database
  - http://www.issg.org/database/welcome
- CABI Invasive Species Compendium
  - http://www.cabi.org/isc/
- USDA collection of Invasive Species databases and contacts
  - http://www.invasivespeciesinfo.org/international/southamer.shtmlg
- Aliens-I mailing list
  - aliens-I-request@list.auckland.ac.nz
- Pestnet (crop protection)
  - http://www.pestnet.org/
- Google scholar
  - http://scholar.google.com/

Useful secondary data: Human populations

- Census data
- Socio-Economic Database for Latin America & Caribbean
  - http://sedlac.econo.unlp.edu.ar/eng/institutional.php
- Google public data (World Bank, IMF, OECD, …)
  - http://www.google.com/publicdata
- UNDP Human Development Index
  - http://hdr.undp.org/en/data
- World Bank World Development Index
  - http://data.worldbank.org/data-catalog/world-development-indicators
- Inter-American Development Bank
  - http://www.iadb.org

Useful secondary data: Contextual variables

- FAO (agriculture, roads)
  - http://data.fao.org/maps
- NASA Earth Observatory (ecological data)
  - http://earthobservatory.nasa.gov/GlobalMaps
- Socio-Economic Data and Applications Center (social)
  - http://sedac.ciesin.columbia.edu/data/sets/browse
- UNEP-WCMC (ecosystems)
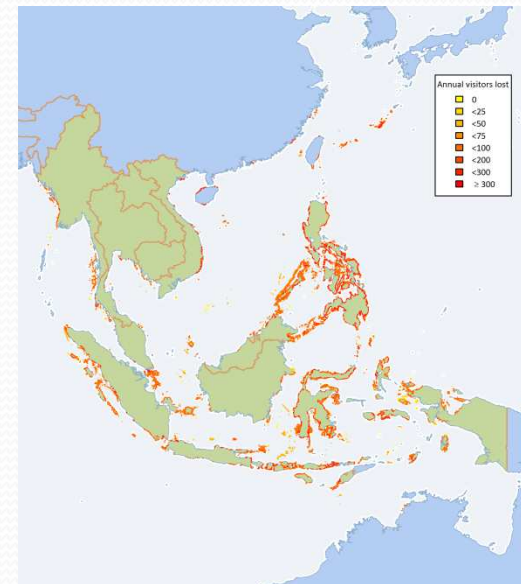 - http://www.unep-wcmc.org/resources-and-data

Researchers may make their maps available to you

Monetary value transfer introduction

Value transfer

- Use primary data from *study site(s)* to create secondary data for your *policy site(s)*

- Not just economic benefits, potentially any measured quantity can be transferred
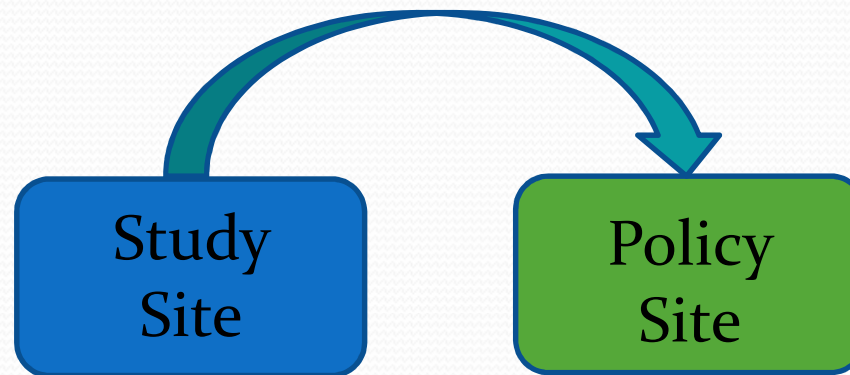 - e.g., coral reef visitors

Value transfer - Advantages

- Can be quick and cheap (compared to primary study)

- Can be applied to large spatial scales

- Can be applied to many sites at once

Value transfer – Unit transfer

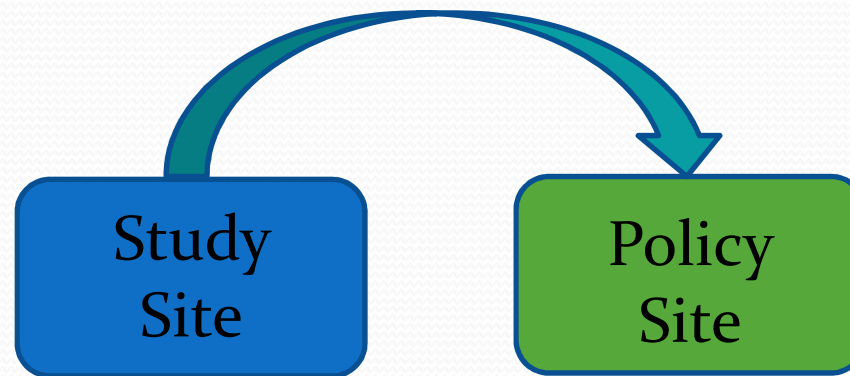- Ecology and socio-economics of study and policy sites should be highly similar

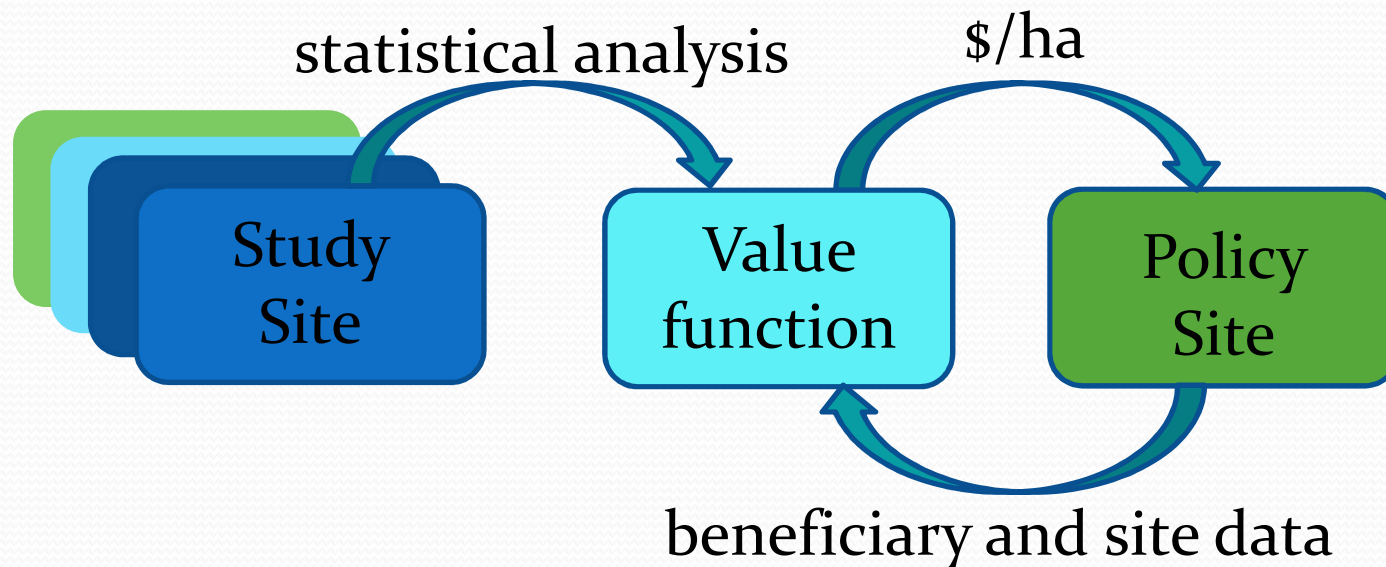$/ha * area policy site

Value transfer – Adjusted unit transfer

- Ecology similar, but different socio-economics

($/ha * income adjustment factor) * area
policy site

Value transfer – Meta-analysis

- Study and policy sites very dissimilar
  - Beneficiaries of policy (income, education, use of resource)
  - Context of study sites (habitat area, fragmentation, access)
  - Primary study characteristics (scenario, technique, ...)

statistical analysis $/ha

Study Site   Value function   Policy Site

beneficiary and site data

Value transfer literature

- Value transfer techniques from simple to challenging

- General guidance:
  - Brander, 2013, Guidance manual on value transfer methods for ecosystem services, UNEP.

- Technical guidance
  - Johnston et al., 2015, Benefit transfer of environmental and resource values: a guide for researchers and practioners, Springer.

Conducting monetary value transfer

Value transfer – Step 1

- Identify and collect relevant primary studies/values

  - Appropriate search terms
  - Academic databases (Web of Knowledge, ScienceDirect etc)
  - Grey literature (Google, Google Scholar)
  - Follow up on references in studies
  - Ask researchers for publications, reports, and data
  - Data sources from previous slides

Value transfer – Step 2

- Determine if you can do a value transfer
  - Do you trust the studies you found?
  - Is their policy context relevant?
    - Loss vs degradation
  - Is their environmental context relevant?
    - Initial quality
    - Availability of substitute sites

- Decide which type of value transfer or correction to use
  - How many studies did you find?
  - How different are the studies you have?
  - What is the variation of variables of interest?

Value transfer – Step 3

- Develop and standardise your database/spreadsheet
  - Total numbers, average numbers, numbers per person or household
- [Example database/spreadsheet]() for meta-analysis
  - Observation identifiers
  - Study characteristics
  - Location characteristics
  - Valued good characteristics
  - Services + beneficiaries
  - Valuation characteristics
  - Standardising values
  - Socio-economic context

This step is difficult and time-consuming

Value transfer – Step 3

Never use value transfer studies

Always make notes of your data choices

Value transfer – Step 4

- Collect necessary data for your problem

- Apply your data and transfer technique

Final thoughts

Value transfer summary

- Value transfer gets you *a* number when you can't get *the* number

- Value transfers are not 100% accurate
  - Measurement error, data biases, transfer error

- How much accuracy do you need?
  - Awareness raising vs specific policy solution

Value transfer summary

- Understand your data and results

- As a rule:
  - No studies: no value transfer
  - Few similar studies: (adjusted) unit value transfer
  - Many dissimilar studies: meta-analysis
  - Few dissimilar studies: test your CBA results

- Same principles apply for transfer of ecological values

Value transfer - Data & inspiration

- Environmental Valuation Reference Inventory
  - https://www.evri.ca
- Ecosystem Valuation dot org
  - http://www.ecosystemvaluation.org/benefit_transfer.htm
- Pacific Invasives Initiative
  - http://www.issg.org/cii/pii/

Value transfer - Data & inspiration

- The Economics of Ecosystem Services and Biodiversity
  - http://www.teebweb.org/resources/case-studies/
- Ecosystem Service Valuation Database
  - http://www.fsd.nl/esp (valuation and more databases)
- ValuES
  - http://www.aboutvalues.net/case_studies/