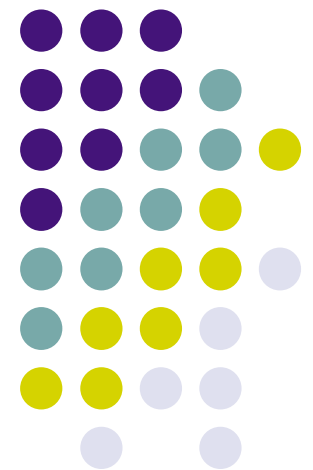
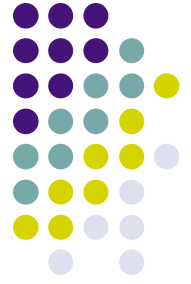


Economic valuation of biodiversity: sense or nonsense?

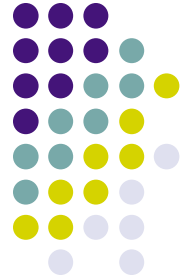
Paulo A.L.D. Nunes,
Jeroen C.J.M. van den Bergh



Biodiversity requires economic attention because:

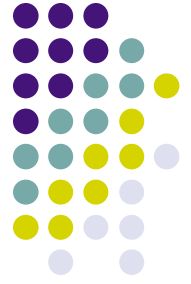


- It provides a wide range of benefits to humans
- Human actions contribute to the loss of biodiversity, which threatens ecosystem stability, and the provision and goods and services

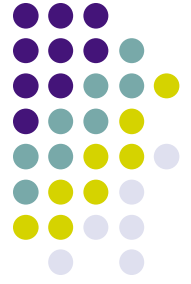


To achieve these results in the best possible manner, this article evaluates notions of assessing the valuation of biodiversity in economic terms

Assigning value to biodiversity is becoming more necessary than ever.



- Monetary values allow comparison between alternate conservation programs
- Aids in cost-benefit analysis
- Necessary component of environmental accounting



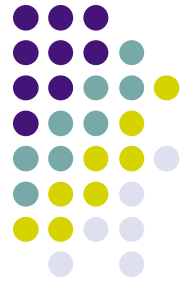
The 4 types of biodiversity

- 1) **genetic**: degree of genetic variability within a species
- 2) **species**: variety of species
- 3) **ecosystem**: the variety of communities of organisms and the physical habitats they live in
- 4) **functional**: an ecosystem's resilience; its capacity to absorb shock and disturbance



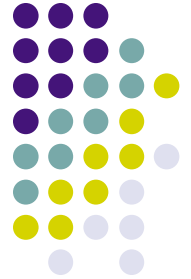
Given these different levels of biodiversity, alternative interpretations of valuation must be considered

The first step is defining and identifying different types of biodiversity

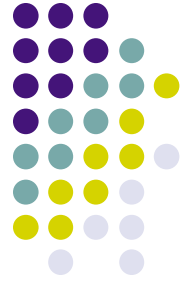


The United Nations Convention on Biological Diversity defines it as **“the variability among living organisms from all sources, including terrestrial, marine, and the ecological complexes of which they are part...”**

Instrumental vs. intrinsic



Should biodiversity be valued for its production and consumption opportunities, or as having value in and of itself?



monetary vs. biological

- Monetary valuation reflects how biodiversity affects human welfare and aids in comparing and ranking different management plans
 - Biological assessment produces species and ecosystem “richness” indicators
- * The two assessments may not point in the same direction**



Direct vs. indirect

- **direct:** human uses of biodiversity in terms of production and consumption
- **indirect:** minimum level of ecosystem infrastructure necessary to provide goods and services

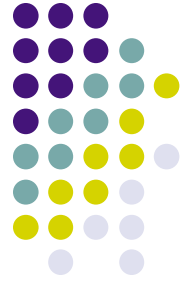
***should be complementary**

Biodiversity vs. biological resources

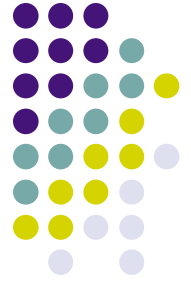


- Biodiversity reflects the collection of biological variety, while biological resources are the manifestations of that variety
- The distinction should be made, since biodiversity is a separate category of value

Value of levels vs. changes of biodiversity



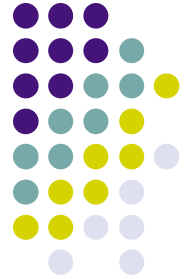
- Valuation should be focused on **changes** in biodiversity, not absolute levels
- Very important because willingness-to-pay studies, which are effective at assigning value to non-market items, are measured by changes in levels of the resource



Local vs. global diversity

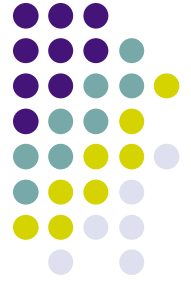
- Defining the spatial frame of analysis is important, since biodiversity levels are relevant from local to global
- Biodiversity loss often described at global levels, but policy solutions and valuation surveys must be at a local or national level

Genetic vs. other life organization levels



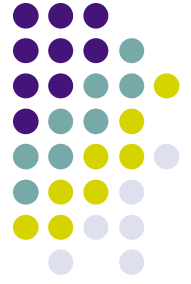
- To avoid double counting, a valuation of biodiversity must focus on one type
 - i.e. an ecosystem as a whole, not the species or genetic information within it

Holistic vs. reductionist approaches



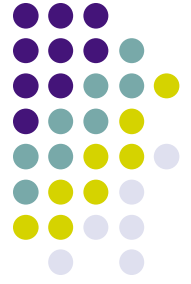
- Biodiversity, as a complex system, is difficult to “disentangle” and measure
- Valuing it at its aggregate parts may not capture reality

Expert vs. general public assessments



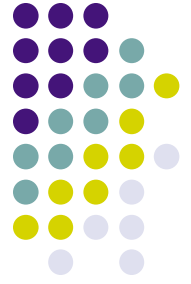
- Can the average citizen make an informed choice about the value of complex biological relationships?
- Should everyone have a share in how this resource is protected?

There are several clearly different value categories of biodiversity



- Certain methods of valuations are more appropriate and applicable than others when addressing different categories of biodiversity value

Common economic valuation methods of biodiversity

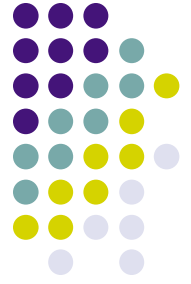


- Revealed preference
 - Based on market data
 - includes travel costs, hedonic price, averting behavior, production functions, and contract values

Valuation methods continued



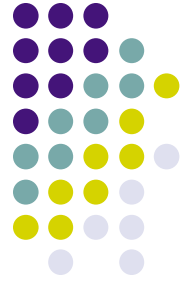
- Stated preference studies
 - Data collected through questionnaires, especially using the contingent valuation method
 - Willingness to Pay (WTP)
 - How study is designed, and how much background information it provides can greatly effect its outcome



How much would you pay to keep an endangered animal from becoming extinct?

Or to maintain watershed functions?

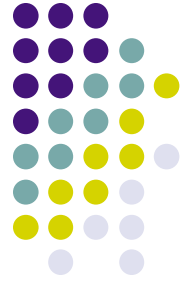
How do you feel about placing these monetary values?



Which valuation method(s) work best for which valuation category?

An empirical review

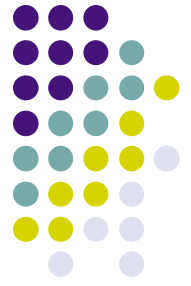
Genetic and species diversity



- Benefits include inputs to the production process
- Good methods for evaluation: contingent valuation, hedonic price, averting behavior, production functions, and contracts

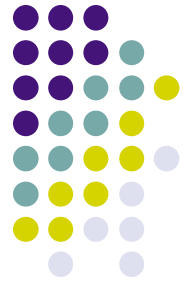
recent trend in bio-prospecting
usually focuses on one species

Natural areas and landscape diversity



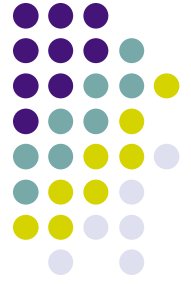
- Benefits include provision of natural habitat, the species and ecosystems it hosts, and protection of wilderness areas
- Good methods: contingent valuation, travel costs, averting behavior, production functions and tourism revenues
- Places placed on conservation of land alone do not have a large enough scope

Ecosystem functions and ecological services protection



- Benefits include flood control, nutrient removal, toxic retention and biodiversity maintenance
- Good methods: hedonic price, averting behavior and production functions
- Valuation done on specific service ie watersheds, preventing soil erosion

Non-use value of biodiversity



- Knowing biodiversity, in its component parts and its whole, exists
- Moral value for future generations, or for damage caused
- Contingent valuation is the best method



So what have we learned?

- Monetary evaluation of biodiversity changes involves important choices in regards to the value category, the most appropriate valuation, and the ultimate end-use of the evaluation
- Making knowledgeable choices leads to the valuation that can best manage the preservation of biodiversity