Dependence of the poor on biodiversity: which poor, what biodiversity?

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Objectives of the review

- Examining the 'state of knowledge' in terms of the degree of dependence of the poor on biodiversity: trying to find robust, empirical evidence (as opposed to generic claims)
- Which groups of the (differentiated) poor, depend, in which types of ways, on different elements of biological diversity?
- Two specific types of dependence:
  - Biodiversity offering a means of subsistence or income
  - Biodiversity offering insurance from risks and shocks

Methods

- Two part review:
  - Dependence as direct contributions to human well-being: subsistence uses and income (BV)
  - Dependence as a source of risk coping and insurance (AK)
- Review strategy
  - Systematic search of peer-reviewed literature, using keyword searches in online databases (Web of Science, JSTOR, Science Direct, Digital Library of the Commons)
  - Web-searches on key organisations (PCLG, Equator Initiative, IIED, UNEP-WCMC, DFID, World Bank, CI, TNC, WWF, CIFOR, MEA)
- Detailed review of literature
  - 200 studies examined in detail
  - 27 with specific empirical evidence on direct contributions
  - 22 with specific empirical evidence on risk coping and insurance

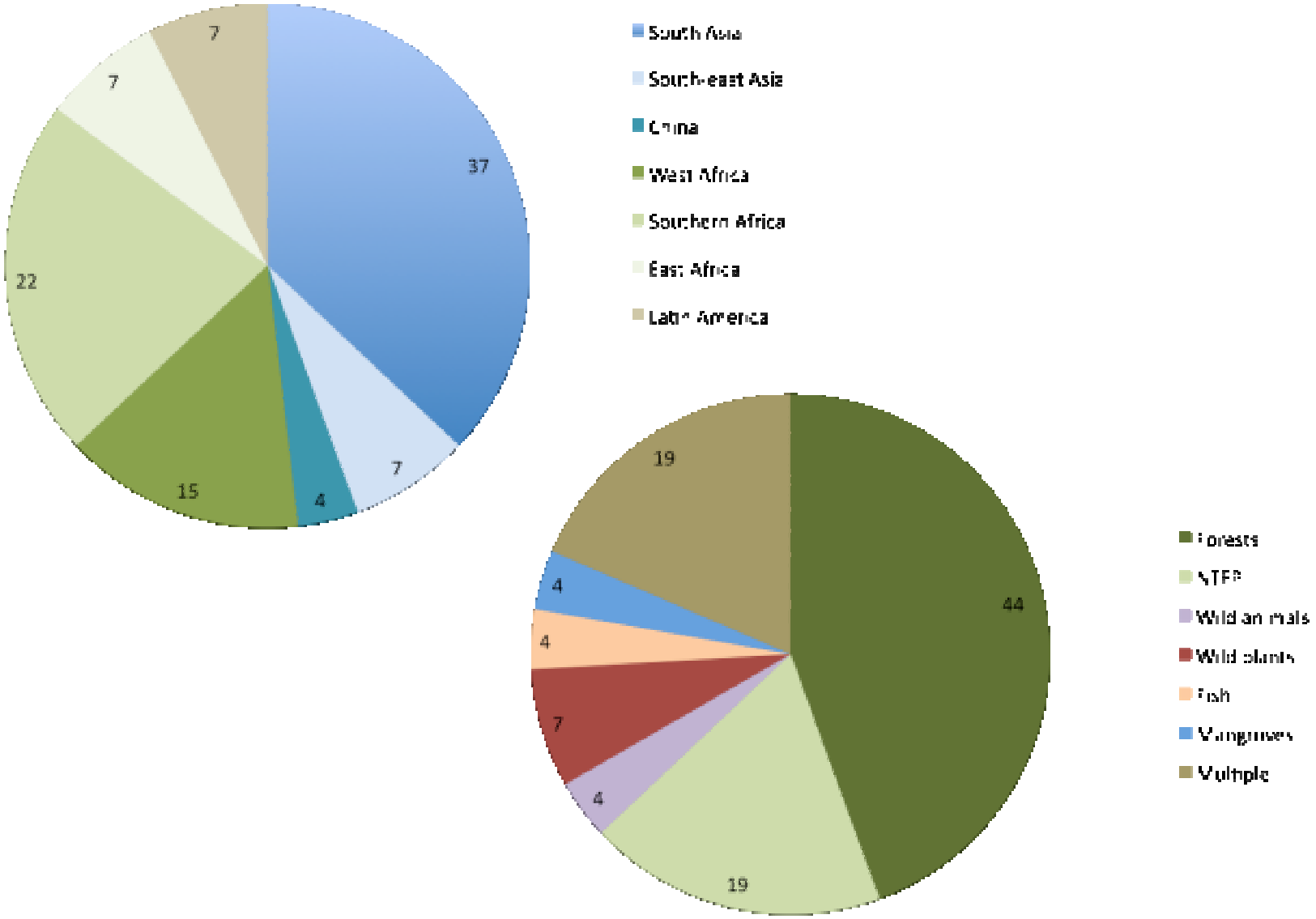
Definitional issues: biodiversity

- Biodiversity: genetic, population/species, community/ecosystem
  - Most studies do not explicitly focus on biodiversity in this sense, especially in terms of 'provisioning' functions … 'nature's resources'?
  - Risk studies tend to focus more on systemic properties/biodiversity (especially work on agro-biodiversity and food security)
  - Specific resources: forests, NTFPs, mangroves, fish, wild animals (bushmeat), wild plants (including medicinal), common pool resources generally (including rangelands/grasslands).
  - Question – is this necessarily evidence for links between 'biodiversity' and the poor? Species abundance may be more valuable than diversity per se …

Definitional issues: poverty

- Poverty: not just lack of income/wealth; multi-dimensional, including material well-being, other needs (education, health, nutrition, food security), political autonomy, choice, social equality
- Need to distinguish between poverty incidence, intensity, extent of inequality, temporality (chronic vs. temporary) and spatiality
- Poverty assessments: both quantitative and qualitiative
- Reviewed literature used a more parsimonious approach:
  - Poverty as lack of material wealth/income (expanded to include flows derived from nature)
  - Some studies included a focus on inequality
- Missed opportunities: e.g.
  - Studies on seasonality of resource use do not assess the temporal volatility of poverty, but use annual flows
  - Empowerment, social exclusion, autonomy may be important mediators of deprivation experienced by the most marginal groups

Evidence: income/subsistence



Evidence: income from biodiversity

- 14 studies: South Asia (4), South-East Asia (2), China (1), West Africa (2), Southern Africa (3), East Africa (1), Latin America (1).
- Considerable variation: between 1.7-12.2% (China, Fu et al 2009), to 90% (poorest fish-dependent groups, Bene et al 2009).
- Dependence often specific to particular sub-groups (e.g. poor fisherfolk, Bene et al 2009)
- Multi-sited studies demonstrate internal variation across sites, depending on locational factors, or historic patterns of access/use (Fu et al 2009, Shaanker et al 2004)
- Some studies report on household consumption/production data
  - de Merode et al 2004: wild foods 10% of hh consn., 31% of hh prodn
  - Bene et al 2009: fish as 20% of consumption for richest, 33% for poorest

Evidence: ‘depth’ of dependence

- Typically, rural populations: studies sometimes distinguish between ‘richest’ and ‘poorest’ income quintiles, but all are at the lower end of the global income distribution!
- 10 detailed studies: South Asia (4), South-east Asia (1), Southern Africa (2), East Africa (1), Latin America (2).
- High dependence across the income spectrum: e.g. Dovie et al 2007 report 98% of hhs use NTFPs, 91% use wild herbs
- Variation when broken down by wealth class:
  - Jodha 1990: 10-19% of rich depend on CPRs, 84-100% of poor
  - But, Narain et al 2008, all income classes depend on collection from CPRs: Q1: 77.5%, Q2: 81.5%, Q3: 72.8%, Q4: 61.4%

Evidence: relative dependence of the poor

- Are the poorest groups more dependent?
- Mixed evidence, 31 resource types, 22 studies:
  - In 21 cases, resource dependence decreases with wealth
  - In 9 cases, resource dependence increases with wealth
  - In 1 case, the relationship is U-shaped, first decreasing, then increasing with wealth
- Equity issues:
  - In 6 studies, inclusion of resource derived incomes lowered income inequality (all studies showing decreased resource dependence as wealth increases)

Evidence: relative dependence of the poor

- Other measures of social inequality:
  - Adhikari et al 2004, lower resource dependence amongst lower castes and female headed households (reflecting lack of access, power & assets)
  - Sapkota and Oden 2008 – lower castes more dependent
  - Bene et al 2009 – less women (69%) sell fish than men (98.6%)
  - Resource dependence high in remote areas (Levang et al 2005, Fu et al 2009)
- Making sense of the data; are the poor more dependent?
  - Yes, because they have few alternatives: inferior goods
  - No, because they lack complementary assets, political power (high value goods)
  - Implications for biodiversity as a tool for addressing poverty
  - Is there a 'poverty trap'?

Biodiversity as insurance

- Literature discusses the following type of risks as being mitigated by biodiversity:
  1. Biodiversity and food security risk
  - *Diversity within crops and livestock species and food security*
  - *Diversity in wild foods and food security*
  - *Biodiversity in agricultural landscapes and food security.*
  2. Biodiversity and natural hazard risks
  3. Biodiversity and health risks
  - *Biodiversity and risk of infectious disease*
  - *Biodiversity and preventive wild medicines*
  4. Biodiversity and resilience reduction risk

Biodiversity as insurance

- Poor depend on biodiversity to cope with risk: biodiversity offers a **cost effective** or in many cases the **only accessible** form of insurance
- What is the **empirical evidence** on degree and depth of this dependence?
- Empirical literature on biodiversity as a means for risk coping is ***considerably smaller*** than that on biodiversity as a source of livelihood
- The **bulk** of this risk coping literature is related to **food security**.
- Methods used are more varied than those on biodiversity as a source of livelihood.
- Most empirical studies provide evidence of how poor rely on natural resources in general (and not biodiversity per se) for insurance.
- Yet, some **studies linking crop agro-biodiversity and food security** do provide a clearer link between **genetic diversity** and dealing with food insecurity
- Many studies concern poor communities that live in or around **tropical forests** and hence biodiversity rich ecosystems. This provides additional indirect support for the link between diversity and risk coping.

Agro-biodiversity and food security

Agro-biodiversity and food security risk

- Agro-biodiversity as insurance against **food supply variation** (mean and variance) of yields from weather and other environmental fluctuations.
- Examples: IFPRI/IPGRI work (e.g. Smale et al 2008; Di Falco and Chavas 2008; Widawsky and Rozelle, 1998).
- Agro-biodiversity as insurance against the **risks of total crop failure** due to exogenous shocks.
- Examples: Di Falco and Chavas 2009

Robust findings:

- **A**gro-biodiversity reduces yield mean and variance.
- **A**gro-biodiversity decreases downside risk exposure (by increasing skewness of the crop yield distribution).
- **Risk benefit** of biodiversity **becomes larger** under less fertile soils
- Biodiversity can aid farmers to cope with harsh climatic conditions especially **in degraded lands.**

Implications:

- Increased agro-biodiversity can provide a **short term buffer against food security risk** and **even reverse** these trends in the longer term.
- **Implications for poorer segments** of the population who tend to use and occupy less fertile, degraded, and marginal lands.

Summary – knowledge gaps?

- Documenting the nature, degree and depth of dependency that the poor have on biodiversity, in all its forms, is vital
- There is a need to use a more expanded understanding of poverty, in all its multiple dimensions
- The evidence on income/subsistence is indicative of dependence, although there is also some evidence that this is primarily for low value goods/services – poverty trap?
- There is robust evidence to show that the poor rely on farm agro-biodiversity to insure against food insecurity/risk
- We still know very little (in empirical terms) of the economic significance of other forms biodiversity as a risk insurance mechanism (namely biodiversity and resilience, biodiversity and health, biodiversity and natural hazards).