Integrating Ecosystem-based Adaptation and Mitigation in Africa: Policy and Practice

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Ecosystem-based Adaptation (EbA)

- “The use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate change” (CBD, 2009)

- A human centered approach

(located in the diagram)
Ecosystem-based Adaptation (EbA): how does it relate to this conference?
**Climate-smart ecosystem management**

1. Ecosystems help people adapt (buffers and filters): EbA
2. Ecosystems mitigate climate change (carbon)
3. Management improves ecosystem resilience
Ecosystem-based Adaptation (EbA)

- What scientific evidence?
  - We need this evidence to move EbA from concepts to action

- Literature review
  - Peer-reviewed papers on forests or trees and human vulnerability to climate variations

- Six major stories emerged

(Pramova et al., 2012. WIREs Clim Change 3(6))
1. Ecosystem products and the adaptation of local communities

- Diversified products
  - Safety nets for communities (for coping with climate shocks)
  - Livelihood diversification (anticipatory strategy)

- Example
  - Tanzania: Forest products for consumption or additional incomes during dry spells (Enfors, 2008); diversification with firewood, charcoal, timber or fruits as adaptive strategy (Paavola, 2008).

- Issue
  - Poverty trap?
2. Trees in agriculture
   and farmers’ adaptation

- **Trees in agriculture**
  - Maintain production under climate variability
  - Shade cover, soil fertility & moisture, wind breaks

- **Example**
  - Malawi: agroforestry with Faidherbia & Gliricidia. At least modest grain yields during drought (Garrity et al., 2010)

- **Issue**
  - Trade-offs production vs. resilience
3. Watersheds and adaptation

- Soil and vegetation
  - Regulate base flows (dry seasons) or peak flows (intense rainfall), stabilize soil (landslide risks)

- Example
  - Kenya: Watershed management for adaptation to climate change (van de Sand, 2014)

- Issue
  - Controversies (e.g. floods and forests)
4. Coastal adaptation

- Mangroves and other coastal ecosystems
  - Absorb and dissipate wave energy, stabilize coastal land
  - Protect from tropical storms, sea level rise

- Example
  - Zanzibar (Tanzania): Coastal vegetation restoration proposed for reducing vulnerability of coastal communities to climatic events and erosion (Mustelin et al., 2010)

- Issue
  - What level of protection from extremes?
5. Urban adaptation

- Urban forests & trees
  - Regulate temperature and water for resilient urban settlements
  - Reduced effects of heat waves on population

- Example
  - Niger: trees minimize adverse climate impacts in cities (Herz, 1998)

- Issue
  - Opportunity costs
6. Regional climate

- Forests can influence regional climate:
  - Cooling effect through increased evaporation and cloud cover
  - Rainfall recycling & atmospheric water pumping
  - Distant connections

- Example
  - Congo basin: major source of moisture for rainfall in the Sahel (van der Ent, 2010)

- Issue
  - Complexity
Ecosystem-based Adaptation: Six stories

1. Product diversity
   - Provisioning services
   - Regulating services
   - 1. Trees in agriculture
   - 2. Watershed regulation
   - 3. Coastal protection
   - 4. Urban microclimate
   - 5. Regional climate

2. Trees in agriculture
3. Watershed regulation
4. Coastal protection
5. Urban microclimate
6. Regional climate

Local adaptation
Meso-level adaptation
Regional adaptation

Scales
- Local
- Meso-level
- Regional

Evidence
- Little
- Large
EbA in policies in Africa

- National Adaptation Programmes of Action (NAPAs)
  - 68% of NAPAs make reference to ecosystem services
    - Ex. in Lesotho: "Forest resources play a critical role in the vulnerable zones; in particular for fuel wood, prevention of soil erosion, income generation, scenery for tourists attraction, building material, forage and shelter."
  - 16% of proposed projects are EbA
    - Ecosystem-based projects usually combine ecosystem measures with non-ecosystem measures
    - Regulating services (soil, water, hazards...) considered more frequently than other services

(Pramova et al., 2012. Clim Policy 12(4))
Example: Lake Faguibine in Mali

- **Context:**
  - Drastic ecological transformation after the lake dried
  - New forest (Acacia and Prosopis)
  - Livelihoods shifted from agriculture or fishing to forest and livestock

(Brockhaus et al. 2013 Env Sci Pol 25; Djoudi et al. 2013 Reg Env Change 13)
Adaptation in Lake Faguibine

Different views on possible adaptation options

- From local communities:
  - Local committees for resource management, institutions and rights, livelihood diversification
- From national and subnat. stakeholders:
  - Technology and infrastructure (e.g. clearing the canals, refilling the lake)
**Adaptation in Lake Faguibine**

- **Adaptation options**
  - EbA (improved forest management) *versus* infrastructure (dam and canals for refilling the lake)
  - **Issues:**
    - For EbA: Forest resource sustainability, rights, livelihoods
    - For infrastructure: water supply sustainability under future climate, equity and power

- Uncertainties (e.g. future water availability)?
- Multiple stressors (e.g. conflicts)?
- Tipping point, regime shift: what indicators (e.g. migration)?
- Equity: who wins, who loses?
Example: Farmer managed natural regeneration in Niger

- Transformative process
  - Role of land and resource rights
  - EbA should provide immediate and long-term solutions
  - Interventions at different scales and levels needed

No one-size-fits-all!

Comparison of EbA vs other adaptations

- Even though EbA can complement other adaptations (infrastructure or technology)

- Advantages of Ecosystem-based Adaptation
  - Often builds on existing local strategies
  - Flexibility
    - Ecological adaptability to climate changes (unlike technofix)
  - Co-benefits
  - Lower costs
    - Biodiversity
    - Mitigation
Ecosystem-based Adaptation and Mitigation

1. Product diversity
2. Trees in agriculture
3. Watershed regulation
4. Coastal protection
5. Urban microclimate
6. Regional climate

Provisioning services
Regulating services

Local adaptation
Meso-level adaptation
Regional adaptation
Global mitigation

Scales
Evidence

Local
Large
Global
Little
Large
Managing ecosystems for both adaptation and mitigation benefits

- A lot of common drivers:
  - Rights and tenure, institutional strengthening, incentives, etc.
- Always win-win?
  - No: A lot a trade-offs!
  - Example:
    - Reforesting for carbon sequestration with species that consume a lot of water => more vulnerability of downstream population to water scarcity

Need to understand, accept and manage these trade-offs. Need to learn from previous experience with transformative adaptation and from current climate change initiatives.
Thank you!
Further reading

Pour en savoir plus


  http://goo.gl/lcvTZ

- Locatelli, B., Kanninen, M., Brockhaus, M., Colfer, C.J.P., Murdiyarso, D. and Santoso, H. 2009. Face à un avenir incertain : comment les forêts et les populations peuvent s'adapter au changement climatique
Para saber más

