



University of Dar es Salaam

**Communities engaging in research to
inform planning and adaptation for
sustainable fisheries utilization**

Connecting Knowledge Systems

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Shortcomings of Ecosystem-based management (EBM)

Fisheries Management:

Conventionally: “top-down” dealing with or controlling resources or people.

- **Missing connectivity** among ecological concepts and the human dimension.
- **Reductionist** and does not appreciate the complexities of human–ecosystem interactions (Khan & Neis 2010; Berkes 2012)
- Need for **multiple disciplines and multiple objectives** to address the difficult problems that are inherent in a reductionist approach to complex adaptive systems Berkes (2012)
- Move from management to the broader frame of governance, **an interdisciplinary approach** (social-ecological systems) rather than merely ecosystem (Ommer et al. 2012)



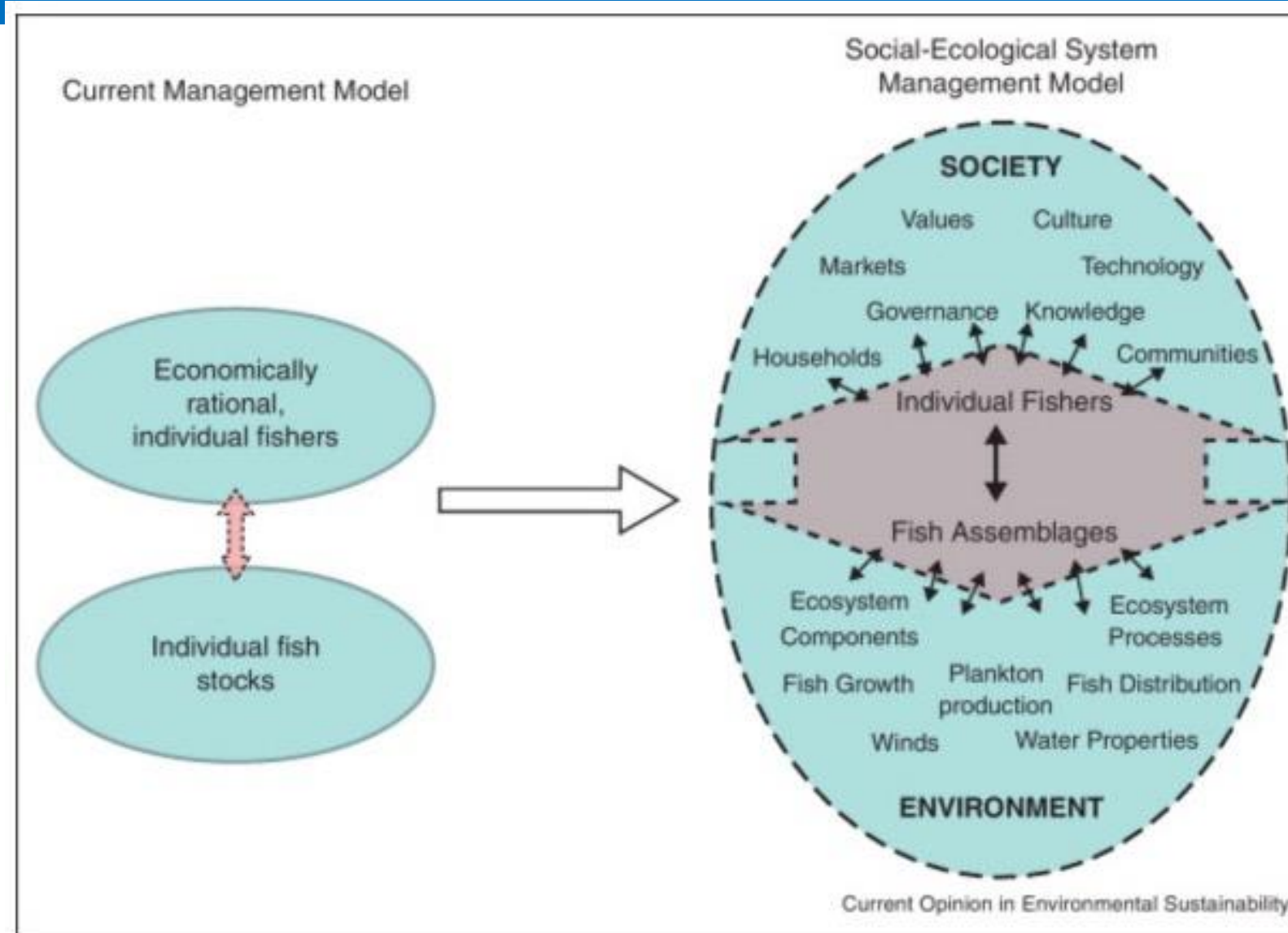
Fisheries Management (EBM)

Perry et al. (2010: 356) say that

- Natural scientists see people as **external agents** who stress fisheries systems (by for example fishing or altering habitats).
- Social scientists see people as **recipients of management policies** and practices that have been developed in response to changes in marine ecosystems.
- This artificial dichotomy fails to recognize that marine ecosystems and human societies are actually two interrelated parts of one marine **social-ecological system**'.



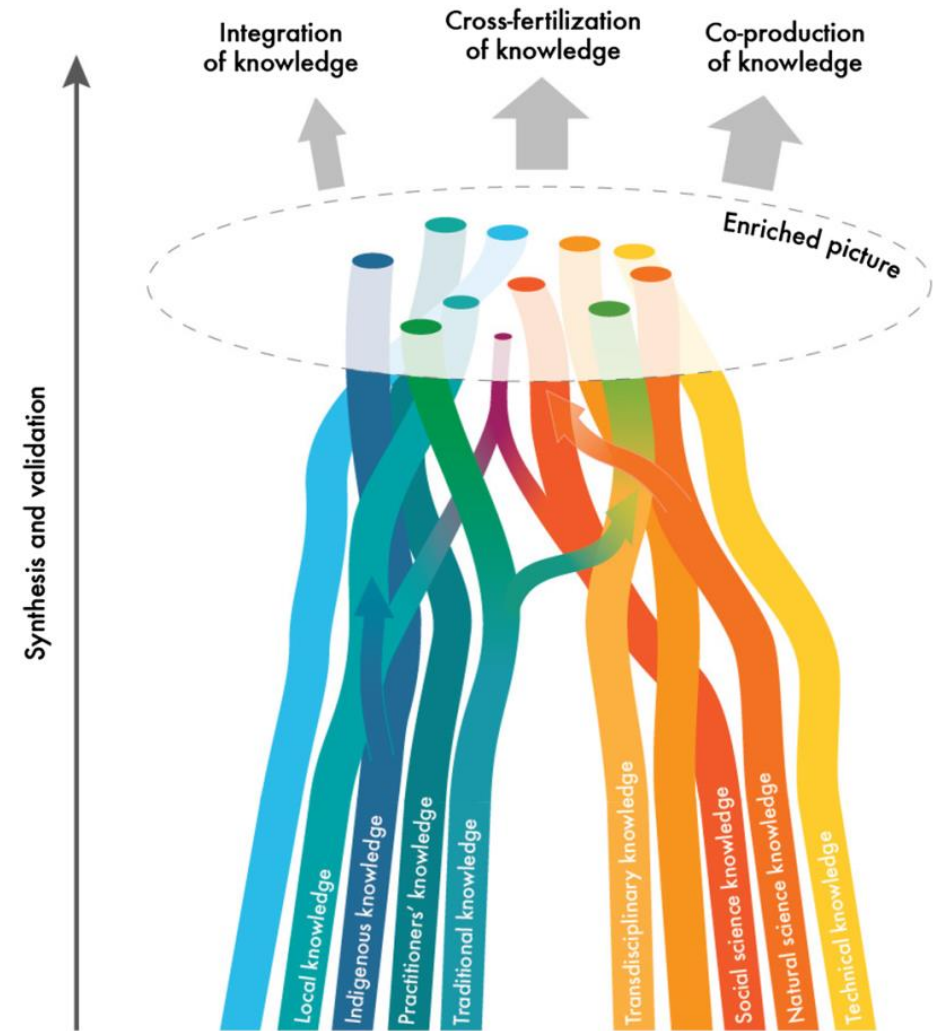
Social-Ecological linkages





SES linkages

- A need in fisheries management for **awareness of human–fish assemblage interactivity**
- To manage and govern the ecosystems on which we depend successfully we must **seek insights and information from multiple knowledge systems**
- It increases **trust** and avoids the arrogance of a single “right approach” commonly represented by conventional science



Diverse knowledge systems
Multiple Evidence Base approach (MEBA) (Tengo et al. 2014)



Connecting Knowledge Systems

Indigenous/Local/Traditional knowledge means

different things to different people

"People's **shared system of knowledge** or other expression about **the environment and ecosystem relationships** that is developed through **direct experience** within a specific physical setting and transmitted **intergenerationally**" Owuor 2007; Davis and Ruddle 2010

Conventional scientific knowledge

Knowledge from observations by fishery scientists and managers using more conventional 'hard' data derived from scientific studies and theoretical interpretations (Mackinson, 2001).

➤ **Enhance our understanding** of how to care for biodiversity and ecosystems for human well-being

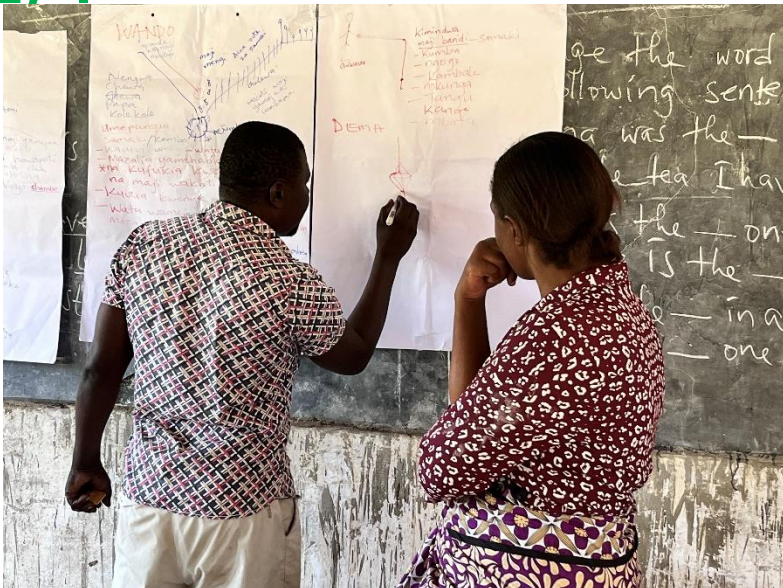
➤ **Contribute new evidence** and also improve the capacity to interpret conditions, change, responses

➤ **Lead to innovation** and the identification of desirable trajectories or pathways into the future.



Example : BIOEELS-TZ Project

“Assessing the biodiversity of eels (Anguillidae and Congridae) of Tanzania: Promoting Sustainable Fisheries and Habitat Protection through Environmental Monitoring and Capacity Building (BIOEELS-TZ)”.



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Knowledge Co-production

Co-production = mutual processes of knowledge generation at all stages of knowledge generation, such as for example an assessment, including validation

- Mapping critical habitats
- Recording environmental variables
- Documenting fish species at each location
- Recording catch trends
- Documenting fishing practices
- Documenting environmental changes





Complementarity and synergy building

- Each knowledge should be treated as **valid and practical in its own right**, and neither should be treated as inferior to the other
- The recognition that learning and knowledge may relate **to spiritual belief systems** (thus a more caring attitude towards the environment).
- The challenge is collating and validating more **implicit and tacit forms of local and experiential knowledge** for which there is no observational support.





Governance approaches: Co-management.

➤ **Empowered and respectful partnerships** are a constructive starting point to investigate and identify solutions for environmental change and sustainable development (Lyver et al. 2009; Rist et al. 2011)

Example

Collaborative Fisheries management areas

(CFMAs) – Tanga region jointly managed by neighbouring BMUs who share fishing grounds.

Beach Management Units (BMUs) –
Coastal Tanzania



The many possible roles of bridging organizations in co-management.



Challenges

- Tropical developing countries have **limited resources and capacity** for fisheries management.
- Many scientists and government managers do not **trust local knowledge**.
- When indigenous groups are involved, local knowledge often arises from a different worldview than does CSK and has different starting points, assumptions and rules (Berkes, 2008).
- **Power issues involved** when connecting different branches of science with locally based knowledge systems
- Issues of intellectual property (**Protective and positive protection**)



Adaptive co-management

- “A process by which institutional arrangements and ecological knowledge are tested and revised in a dynamic, ongoing, self-organized process of learning-by-doing,”
- It brings **local knowledge** directly into decision-making by recognizing the importance of both **vertical linkages** and the consideration of science and management together
- Adaptive-co-management approach aims to **seriously enhance both status of natural resources and human well-being.**



Adaptive co-management

- Under the adaptive co-management approach, **participation of all stakeholders** (including marginalized groups such as women) in decision making, planning, implementation and monitoring and evaluation is crucial
- Adaptive co-management is characterized by deliberate efforts by groups to **communicate, negotiate and seek opportunities to learn together and adapt management practice**
- However, no guarantee of **fairness or equity in resource sharing, learning does not necessarily lead to adaptation** Berkes, (2009); Armitage et al. (2009)



Thank you