

Ecosystem Services and their Impact on Peoples' Health: A Needs-Based Approach to Health Assessment

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Background

- ValuES is a GIZ-led project supporting public administrators to make good use of the ecosystem services concept in practice:
 - Methods navigator: www.aboutvalues.net
 - Technical backstopping and trainings
 - Review of policy impact of ES analyses
 - Guidance on policy-oriented ES analyses
- ValuES aims at extending its method inventory on ecosystem services in health assessment.

Overview

Aim: To understand ecosystem services and their impact on peoples' health for local and national policy makers

Leading question: What are the challenges to develop a needs-based approach to health assessment for policy makers?

Argument: To tackle planetary health challenges a health centred environmental governance approach is needed in policy making and sustainable development. To allow policy makers to put this into action, a practical toolbox for health assessment is needed.

Method: Literature review on methods in health assessments in ecosystem services

Why is a Needs-based Approach to Health Assessment for Policy Makers Necessary?

Responding to global change through local sustainable development policies

- Planetary boundaries (Rockström et al., 2009)
- Planetary health (Whitmee et al., 2015)

Central levels of intervention is:

Local, national and regional health centred sustainable environmental governance

Diverse Methodological Approaches

- Ecohealth (Charron, 2012; Lebel, 2003)
- One Health (Lee and Brumme, 2013; McKenzie et al, 2013)
- Planetary Health (Whitmee et al., 2013) (Rockefeller Initiative on Economics of Planetary Health)

Ecohealth approach currently providing most evidence-based methods in applied project and policy process

Ecohealth Approach

Approach:

- Needs-based oriented
- Participatory
- multidisciplinary
- Sustainable
- Gender equity
- Iterative design

Limitations:

- Does not include planetary processes
- No toolbox for policy makers in relation to health assessment and ecosystem services

References: Lebel 2003; Charron, 2012

Health Assessment and Ecosystem Services

Location	Health Assessment	Ecosystem Health	Ecosystem Service	Reference
Rural, Malawi	Child malnutrition	Decline in soil fertility	Food security	Bezner Kerr et al., 2012
Rural, Ecuador	Neurological health	Pesticide, agro-ecosystem contamination		Orozo et al., 2012
Rural, Lebanon and Yemen	Child malnutrition, stunting, obesity, cardiovascular diseases, noncommunicable diseases; iron deficiency	Biodiversity loss, depletion or salinization of groundwater resources, nutrient deficiency		Batal et al., 2012
Rural, Brasil	Neurological health	Land fragmentation		Davée Guimarães et al., 2012
Rural, Ecuador	Neurological health	Pesticide, water contamination	Water	Breihl, 2012
Urban, Lebanon	Gastrointestinal disease	Water contamination		Habib et al., 2012
Urban, Yaoundé	Gastrointestinal disease, children's health	Well and spring pollution (Watershed environmental health)		Ngnikam et al., 2012
Urban, Nepal	Water-borne diseases, echinococcosis, hydatidosis (affecting humans and animals)	Water contamination		Joshi et al., 2012
Rural, India	Overall health	Limited rainfall, water scarcity, low agricultural productivity, land fragmentation, forest degradation	Water, food	Ranjan Raghvesh et al., 2012
Rural, Ecuador	Neurological health	Pollution		Betancourt et al., 2012
Rural, Mexico	Children's health - development delay	Manganese concentration in water, soil, sediments, atmospheric particulate matter	Air, water, food	Riojas-Rodríguez et al., 2012
Rural, Uganda and Tanzania	Infectious disease/vector-borne disease (malaria)	Land-use change	Regulation, climate and disease control	Okello-Onen et al., 2012
Rural, Guatemala	Infectious disease/vector-borne disease (chagas)	Ecosystem health		Monroy et al., 2012
Urban, Cuba	Infectious disease/vector-borne disease (dengue)	Ecosystem health		Diaz et al., 2012
Urban, Indonesia		Ecosystem health		Tana et al., 2012

Methods for Health Assessment

Health Assessment	Ecosystem Health	Ecosystem Service	Methods	Reference
Child malnutrition, stunting, obesity, cardiovascular diseases, noncommunicable diseases; iron deficiency	Biodiversity loss, depletion or salinization of groundwater resources, nutrient deficiency	Food	Multi-disciplinary; complex system analysis; focus groups; in-depth interviews; documentation of scientific data and local knowledge; participatory rural appraisal, surveys, medical consultations, laboratory analysis; production of agro-ecosystem maps; ethnographic work.	Batal et al., 2012
Neurological health	Pesticide, water contamination		Multi-disciplinary; stakeholder participation, gender and social equity; water and soil sampling (quality assurance procedure, chromatography and mass spectroscopy); geographical identifiers-GPS; cluster sample; discussion sessions with leaders and community groups; clinical and socioeconomic data surveys; focus groups; physical examination; clinical tests (urine samples, solid phase extraction); neurobehavioural impact assessment with blood and urine tests; basic battery test; acetylcholinesterase (AChE) test; computer assisted Neurobehavioural Evaluation System (NES2).	Breihl, 2012
Gastrointestinal disease	Water contamination	Water	Multi-disciplinary (health sciences, environmental engineering, agricultural sciences, and social policy); community participation; demographic survey; mapping of water sources; focus-group; household-survey; monitoring of water sources for microbiological contamination; more in-depth survey; cross-sectional survey.	Habib et al., 2012
Gastrointestinal disease, children's health	Well and spring pollution (Watershed environmental health)		Multi-disciplinary (civil engineering, hydrogeology, geography, sociology, economics, paediatrics, epidemiology, and statistics); community participation; geographic information system (GIS) for spatial-temporal analysis; survey of water sources; collection of water samples; water-quality tests; mapping of potential places of pollution; direct observation studies of water collection behaviour; 2 year longitudinal study; monthly health monitoring; health indicator measurements (nutritional anthropometric measurements, diarrhoeal episodes, prevalence of intestinal helminthiases); follow up-2 year study; health data collection from census; monitoring health of children; water samples from home; stool samples.	Ngnikam et al., 2012
Children's health - development delay	Manganese concentration in water, soil, sediments, atmospheric particular matter	Air, water, food	Multi-disciplinary (toxicology, epidemiology, neuropsychology, geology, chemistry, sociology, anthropology) multistakeholder consultation; water and soil analysis, sediment concentration analysis, atmospheric PM through gravimetric method, PIXE method (Protons induced X-Ray Emissions); air measurements and dispersion analysis; GIS for map relevant data; blood tests; neurobehavioural test (motor tests); cross-sectional design; battery of neuropsychological tests	Riojas-Rodriguez et al., 2012
Infectious disease/vector-borne disease (chagas)	Ecosystem health	Regulation, climate and disease control	Multi-disciplinary; community participation; Entomological and socio-anthropological survey; on housing condition and T.dimidiata infestation; entomological survey; interviews; serological assessment in children (under 15); workshops.	Monroy et al., 2012

One example, case study from Yaoundé

Health Assessment	Ecosystem Health	Ecosystem Service	Methods	Reference
Gastrointestinal disease, children's health	Well and spring pollution (Watershed, environmental health)	Water	Multi-disciplinary (civil engineering, hydrogeology, geography, sociology, economics, paediatrics, epidemiology, and statistics); community participation; geographic information system (GIS) for spatial-temporal analysis; survey of water sources; collection of water samples; water-quality tests; mapping of potential places of pollution; direct observation studies of water collection behaviour; 2 year longitudinal study; monthly health monitoring; health indicator measurements (nutritional anthropometric measurements; diarrhoeal episodes, prevalence of intestinal helminthiases); follow up-2 year study; health data collection; monitoring health of children; water samples from home; stool samples.	Ngnikam et al., 2012

Challenges of an Ecohealth Approach

Strength	Challenges
Transdisciplinary approach and multi-disciplinary team.	Complex in terms of collaboration and contexts.
Participatory approaches allow for sustainable development of research design and research results.	Participatory approaches can be challenging as they involve all stakeholders from the onset of developing an adequate research design, research process and up to the final policy development and implementation.
Incorporates animal health as an indicator for human health.	No toolbox exists for all contexts and health assessments in relation to ecosystem services.
Relates human health to the realm of planetary health,	No toolbox exists for methods to assess human health within planetary health..
All-encompassing to provide guidance for local, national and international policies.	Research might be more costly as it involves multidisciplinary experts and diverse methodological resources.
Analyses of the interrelationship between ecosystem services and human health	Every design needs to be developed based on a particular research question, context and disciplinary experts involved.
Sustainable, long-term engagement with all stakeholders and their environment	time consuming economic resources

Thoughts for a method toolbox				
Research/Policy Areas	Ecosystem Services	Health Indicators	Methods	References
ecosystem quality	water	gastrointestinal diseases; water-borne diseases		
	air			
	food	Child malnutrition, stunting, obesity, cardiovascular diseases, noncommunicable diseases; Iron deficiency; neurological deficiency;	Multi-disciplinary; case-control longitudinal study; in-depth interviews; focus groups; surveys; anthropometric measurement of children; weighing crops harvests; assessment of residue practices on farms; participatory workshops neurobehavioural performance (DigitSpan). environmental mercury measurement; community-based research on health and social representations; soil studies; biomarkers of mercury in humans; sequential mercury analysis along human hair strands; repeated fish sampling at different phases of the food cycle; analysis of nitrogen-isotopic ratios in fish; neuropsychological analysis: manual dexterity, motor speed and accuracy, colour discrimination, and near visual functions; regional epidemiological studies.	Bezner Kerr et al., 2012; Orozco et al., 2012; Batal et al., 2012; Davée Guimãres et al., 2012
	climate regulation	vector-borne diseases	Multi-disciplinary (agronomy, agribusiness, agricultural extension and education, sociology, public health, epidemiology, disease ecology, parasitology and entomology, GIS, environment and biometrics); participatory approach; entomological analysis (sampling of larvae and adult vectors, determining breeding sites for vectors, sporozoite rates); malariometric (prevalence and incidence of malaria); sociological surveys; community diagnosis workshops; georeferencing through Global Positioning System (GPS); geographic information system (GIS) and maps.	Diaz et al., 2012; Okello-Onen et al., 2012; Monroy et al., 2012; Tana et al., 2012

Thank you for your attention!

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