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FROM THE AMERICAN PEOPLE



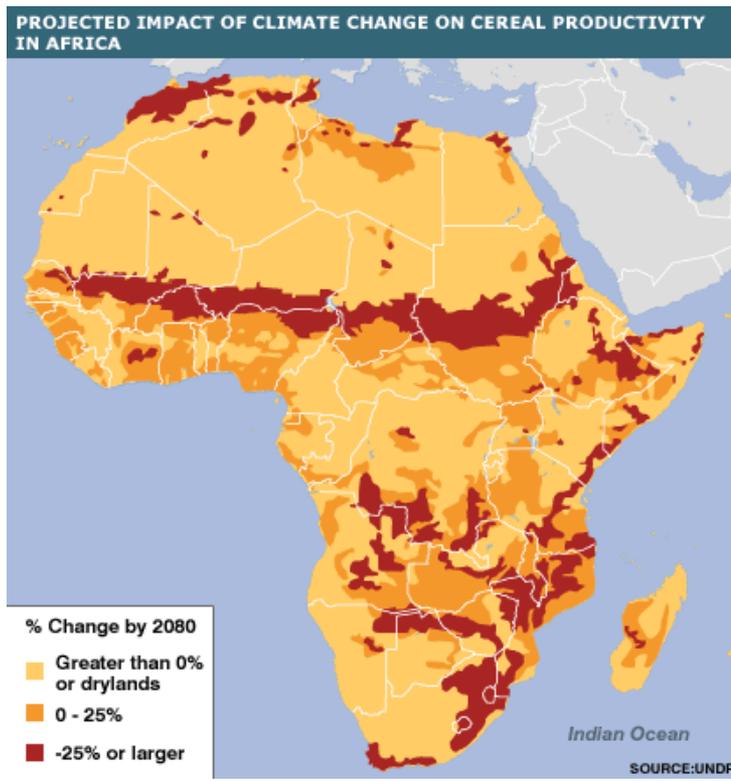
# **Session 9: “Impact Assessment 201”**

# Session Objectives:

Introduce key “beyond the basics” topics in impact assessment in 5 mini-sessions

- ✓ *Cumulative impacts*
- ✓ *Indirect impacts*
- ✓ *Ecosystem services*
- ✓ *Social impacts*
- ✓ *Addressing GCC in Impact Assessment*

These topics will be explored further in the integrative case study.



*Climate change:  
cumulative impact  
on a grand scale*

# Cumulative Impacts

impacts that result from the successive, incremental, and/or combined effects of an action, project, or activity when added to other existing, planned, and/or reasonably anticipated future ones.

# Key points

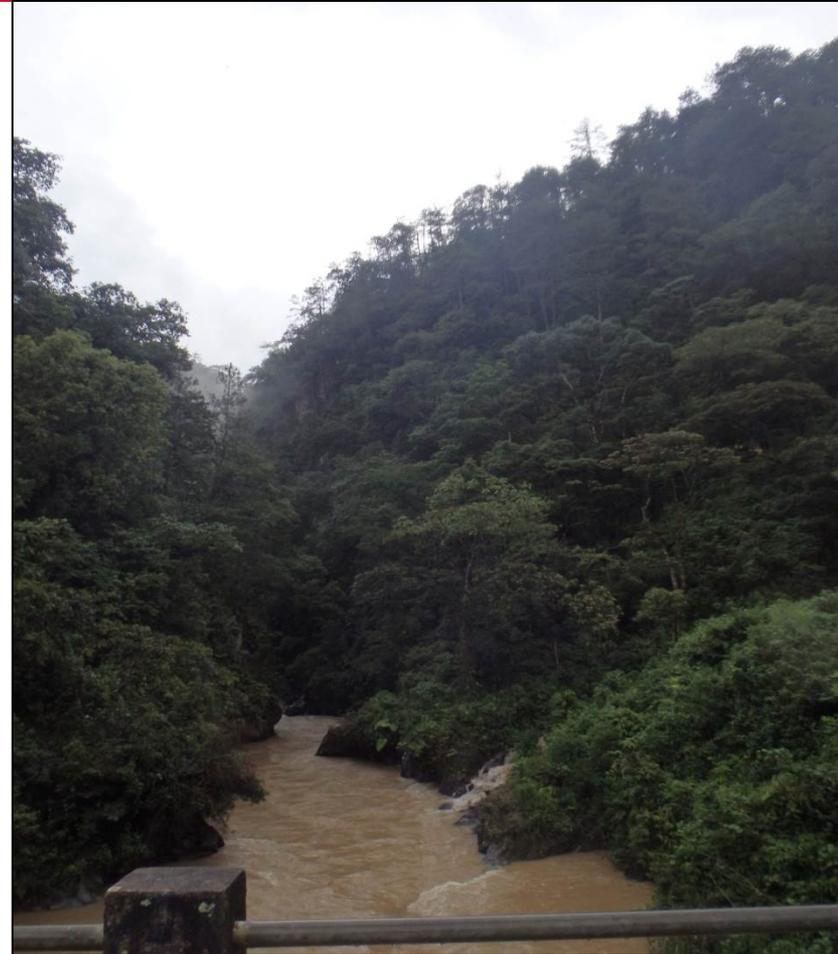


- **Combined, incremental effects of human activity (spatial or temporal)**
- **Accumulate over time from one or more sources**
- **May be beneficial or adverse**

*\*Individual minor actions that are insignificant on their own can collectively result in significant impacts over a period of time.*

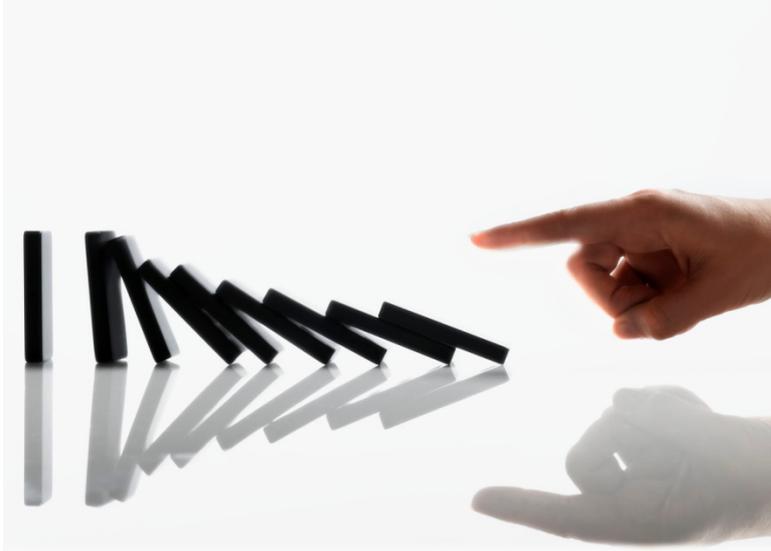
# Examples of Cumulative Impacts

- Use of agro-chemicals on multiple small farms →  
Increases in pollutant concentrations in a surface water & sediments
- Multiple withdrawals from small irrigation schemes →  
Reduction of water flow in a watershed due to multiple withdrawals.
- Many instances of similar land use changes on small parcels of private land →  
Increases in sediment loads on a watershed and/or interference with migratory routes or wildlife movement
- Multiple logging concessions →  
Deforestation, habitat loss, increase in erosion and sediment loads in a watershed



Adapted from IFC Good Practice Handbook  
*Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets (August 2013)*

# Types of Cumulative Impacts



## **Additive:**

**Equal to the sum of individual impacts**

## **Interactive :**

**Greater than the sum of individual impacts**

- **Magnification**
- **Synergistic**

# Why consider cumulative impacts?

- **Required under US NEPA**
  - *And thus in 22 CFR 216 documents*
- **Required element of MDB ESIA studies**
- **Required under most host country ESIA laws and regulations**
- **Well-established element of ESIA good practice**
- **Not doing so can lead to serious failures of development**  
*even at small scales*

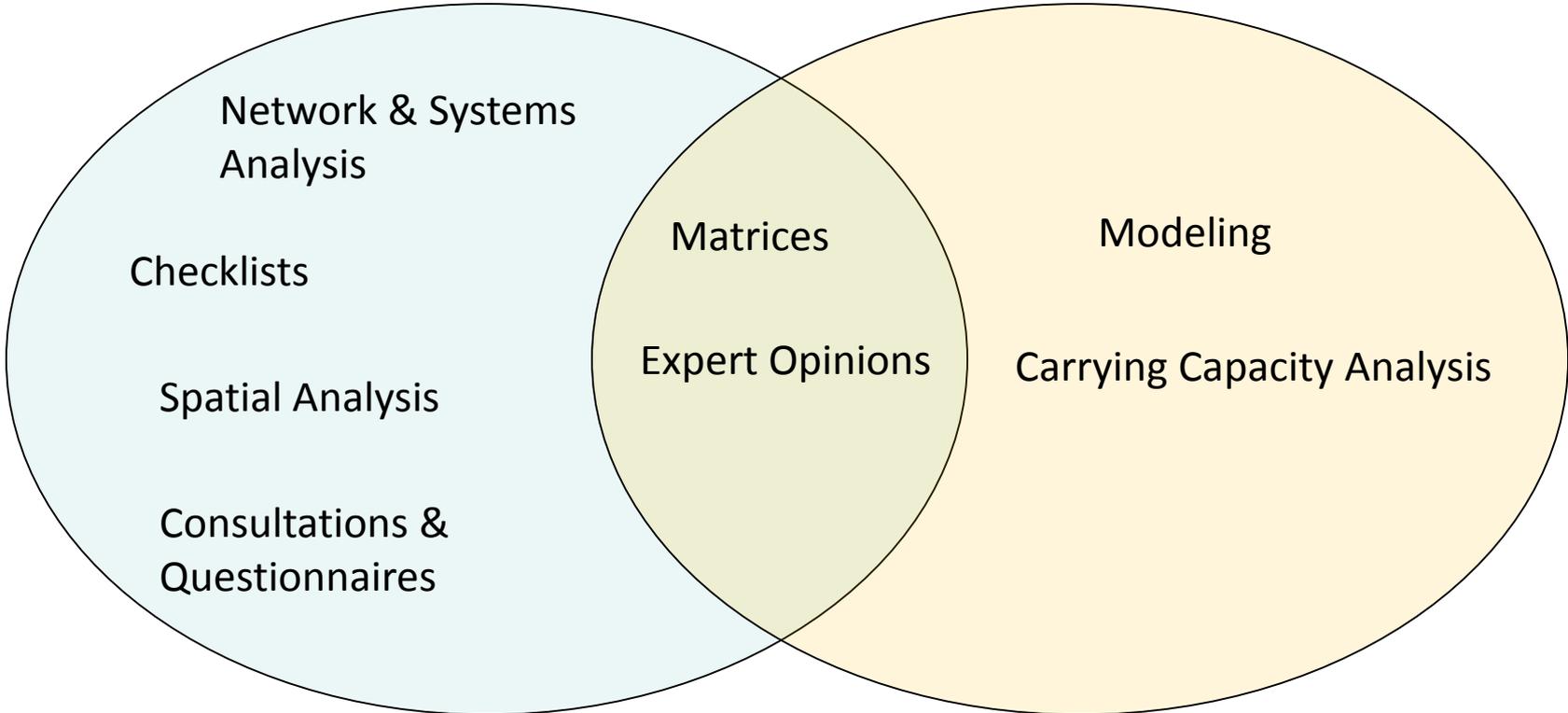


Source: FAO: duckweed treatment of biodegradable effluent

# What tools do we use in cumulative impact assessment?

## SCOPING & IMPACTS IDENTIFICATION

## EVALUATION TECHNIQUES



Adapted from European Commission, 1999

# Uncertainties in Cumulative Impact Assessment

- ❖ **Boundaries**
- ❖ **Timeframe**
- ❖ **CIA procedure**
- ❖ **Methods**
- ❖ **Tools**
- ❖ **Data requirements**
- ❖ **Complexity of the analysis**
- ❖ **Temporal and geographic boundaries**
- ❖ **Predictive abilities**

# Summary

- ✓ **Cumulative impacts are the additive AND interactive impacts of various projects and activities on environmental and social systems, temporally and geographically**
- ✓ **Limited information or knowledge is a major challenge in cumulative impact assessment**
- ✓ **Cumulative impacts assessment should be adapted to the context.**
- ✓ **Uncertainty is part of the process.**



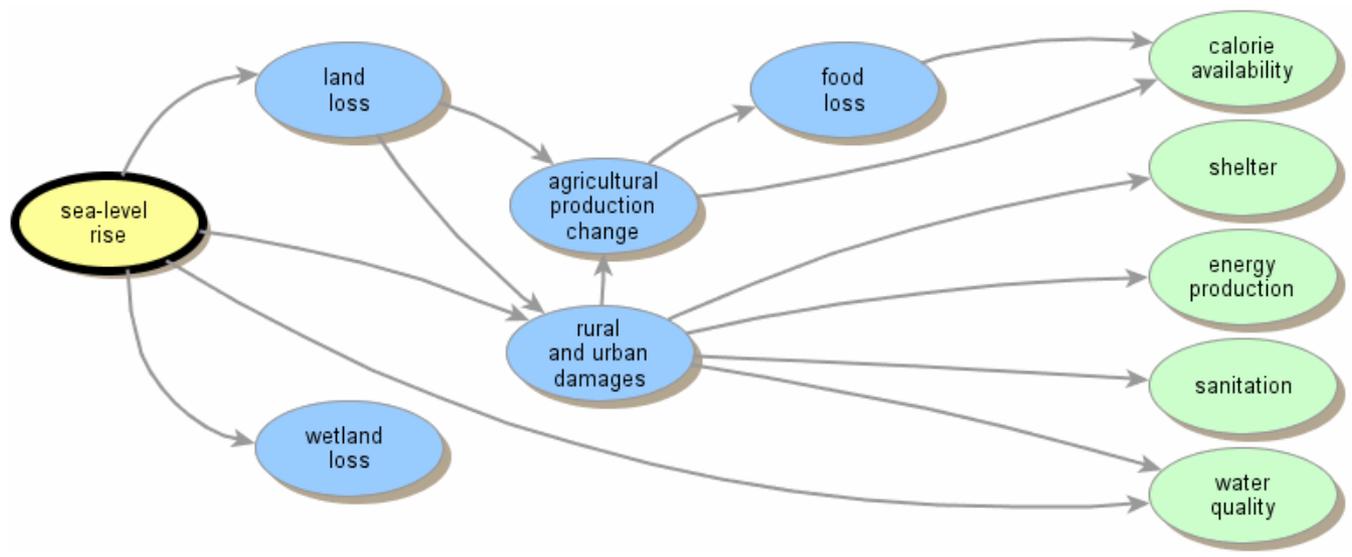
## Indirect Impacts

impacts that result in whole or in part from the chain of causation caused by an activity, but are not the first link in that chain.

*Market access  
road rehabilitation →  
increased illegal  
charcoal extraction*

# What do we mean by a “chain of causation”?

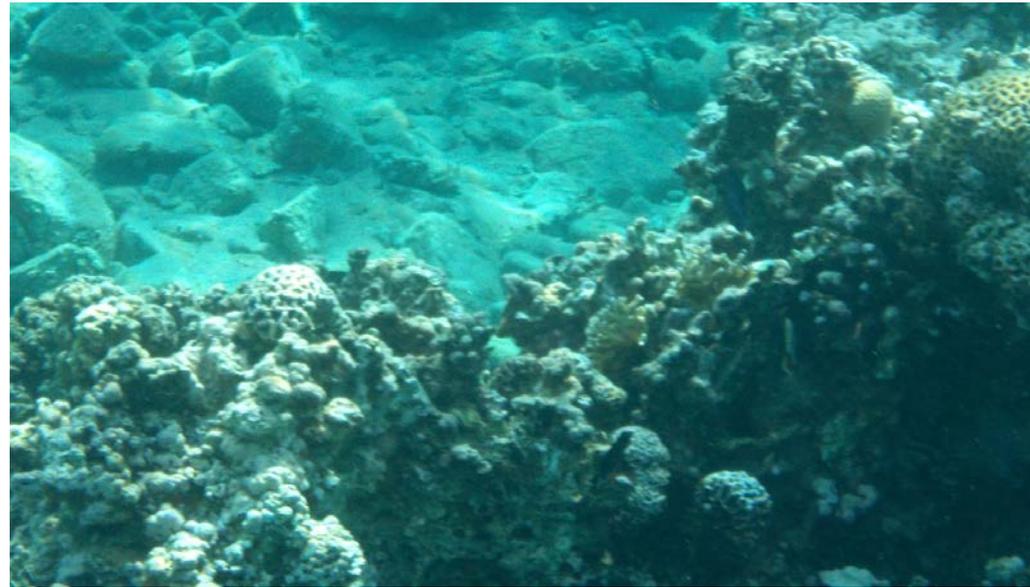
Chain of causation:  
climate change → sea-level rise → ???



Source: ci:grasp Climate Information Service. Ci:grasp 2.0 module demonstrator. <http://www.pik-potsdam.de>

# Indirect Impacts: Key points

- ❖ path of cause and effect (“chain of causation”) may be complex
- ❖ May be “later in time or farther in distance”
- ❖ May have other contributing causes
- ❖ Criteria for including indirect impacts in analysis is that they be reasonably foreseeable given an expert understanding of the affected environmental, social and economic systems



Coral in the Red Sea.

# Examples of indirect impacts

- ❖ Improving women's education → lower birthrates
- ❖ Regulatory and policy changes to facilitate investment in the power sector →  
(1) higher economic growth, and  
(2) toxic levels of mercury in surface waters
- ❖ Creation of reservoirs for hydropower/irrigation → higher local rates of malaria
- ❖ Investment in cold stores/cold chain → higher rates of illegal fishing
- ❖ Market access roads rehabilitation → increased forest conversion & illegal extraction of timber, charcoal & bushmeat.

The “development hypothesis” behind many programs is based on beneficial indirect impacts.

# Why consider indirect impacts?

- **Required under US NEPA,**
  - *And thus in 22 CFR 216 documents.*  
*Specifically required for EAs by 22CFR216 .6*
- **Required element of MDB ESIA studies**
- **Required under most host country ESIA laws and regulations**
- **Well-established element of ESIA good practice**
- **Not doing so can lead to serious failures of development**  
*even at small scales*



# Ecosystem Services

**Any positive benefit that wildlife or ecosystems provides to people. These benefits can be direct or indirect – small or large**

# Ecosystem Services: 4 Main Categories

provisioning services

regulating services

cultural services, &

supporting services

**Provisioning Services:**

**benefits provided by the physical extraction or harvesting of a resource**

**E.g., food, drinking water, timber, fuel wood, plants that can be made into textiles or pharmaceuticals.**



# REGULATING SERVICES

**Benefits provided by ecosystem processes that moderate natural phenomena.**

**e.g., water purification;  
erosion and flood control;  
carbon storage and climate  
regulation**



Mangroves & coral reefs provide important regulating services: protection of coastlines, dissipation of storm surge.

# CULTURAL SERVICES

**“A non-material benefit that contributes to the development and cultural advancement of people including,**

- *Roles of ecosystems in local, national and global cultures;*
- *Building of knowledge and spreading of ideas;*
- *Creativity born from interactions with nature (music, art, architecture, etc.)*
- *Recreation*

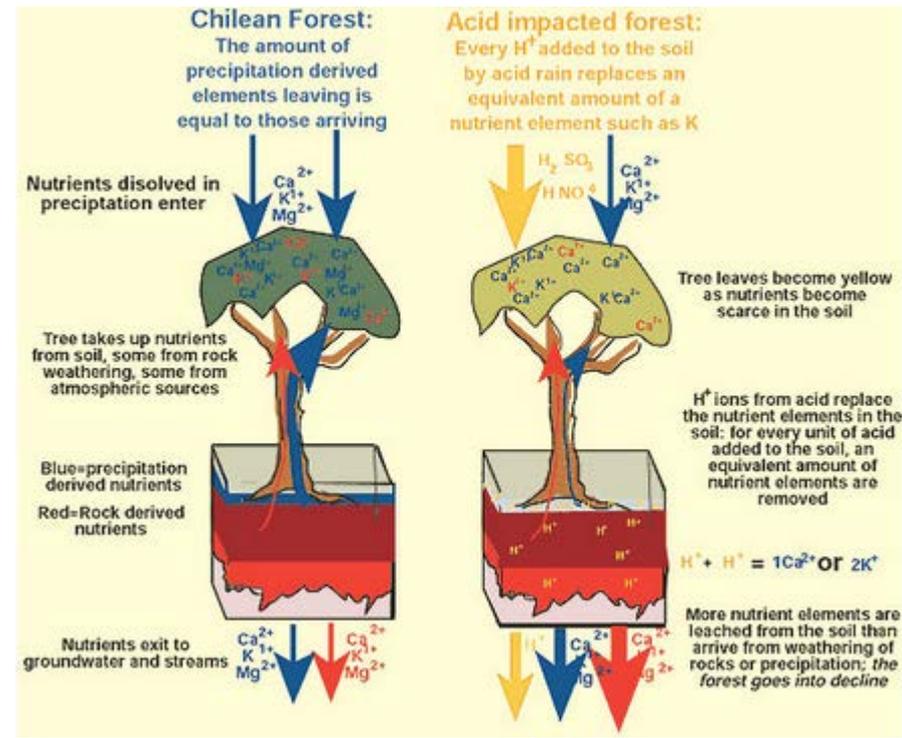


# SUPPORTING SERVICES

Ecosystems themselves could not be sustained without the existence and integrity of underlying natural processes, such as photosynthesis, nutrient cycling, soil creation, and the water cycle.

With these **supporting services**, provisional, regulating, and cultural services cannot exist!

**Human actions can disrupt and degrade supporting services.**



[www.learner.org/Annenberg](http://www.learner.org/Annenberg) Foundation

# Wetlands: Multiple, Critical Ecosystem Services

- ❖ Many important food fish spend at least part of their lifecycle in wetlands
- ❖ Wetlands retain and control flood waters
- ❖ Wetland plants absorb nutrients and chemicals from water and act as a natural filtration system
- ❖ Wetland soils store large amounts of carbon, that, if released will contribute to global climate change.
- ❖ Vital habitat for migratory species.



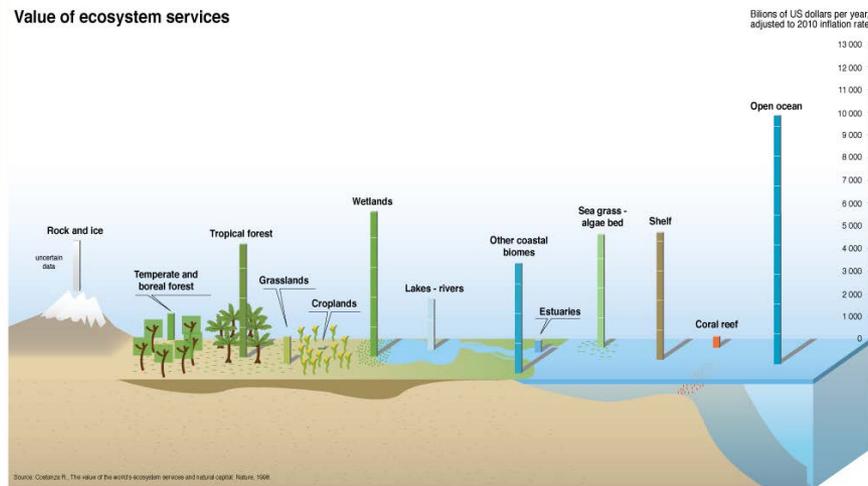
# Ecosystem services, impact assessment & valuation

In any IA process, adverse impacts on ecosystem services must be identified and assessed.

At the full EIA study level, requires VALUATION.

Many approaches for valuation of ecosystem services. Often based on an ecological-economic model

Results are used to evaluate potential losses/gains of ecosystem services relative to a proposed project



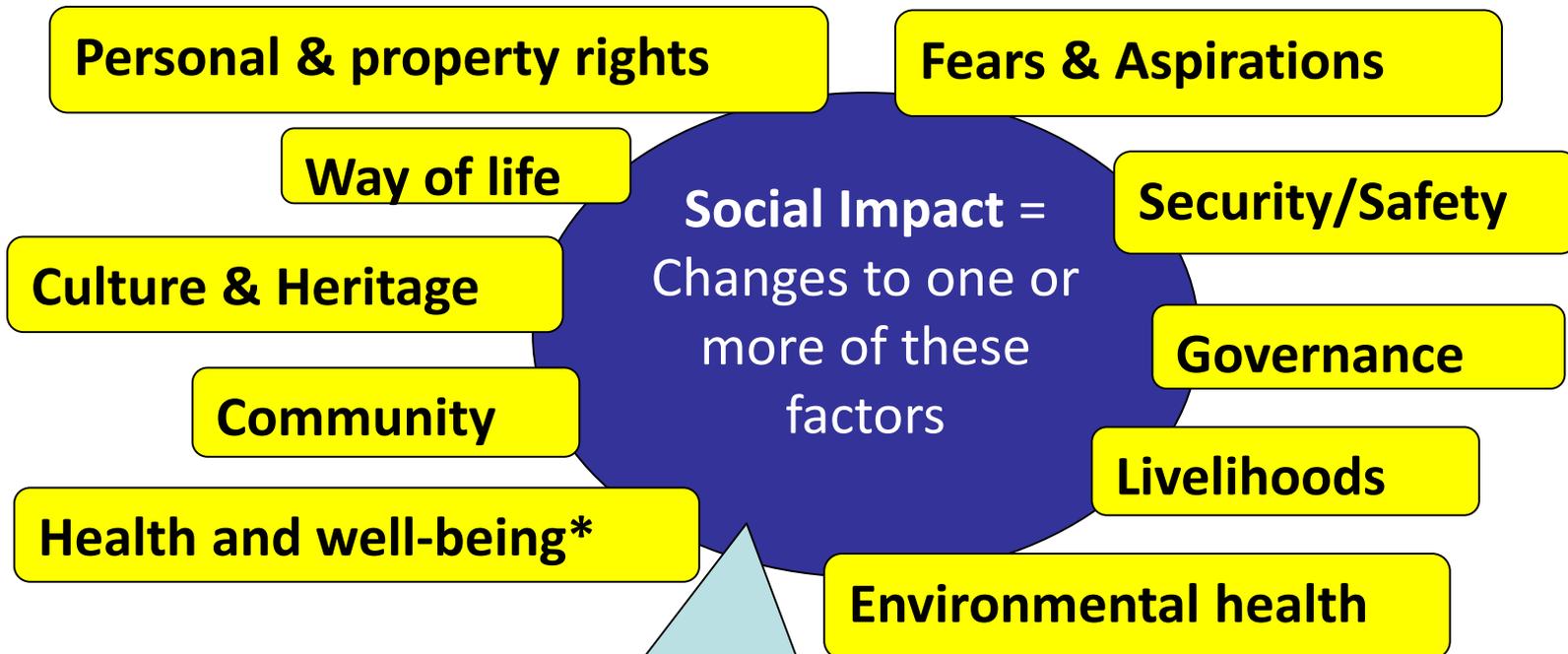


## Social Impacts

The effect of an activity on the social fabric of affected communities and the well-being, economic and otherwise, of individuals and families.

*Forced relocation is a significant social impact, no matter the cause*

# Types of Social Impacts



With particular attention to how a factor changes for groups/communities who are often disadvantaged: indigenous peoples, women and children, minority groups, etc.

•Including Worker and Community Health & Safety; safety from crime, etc.

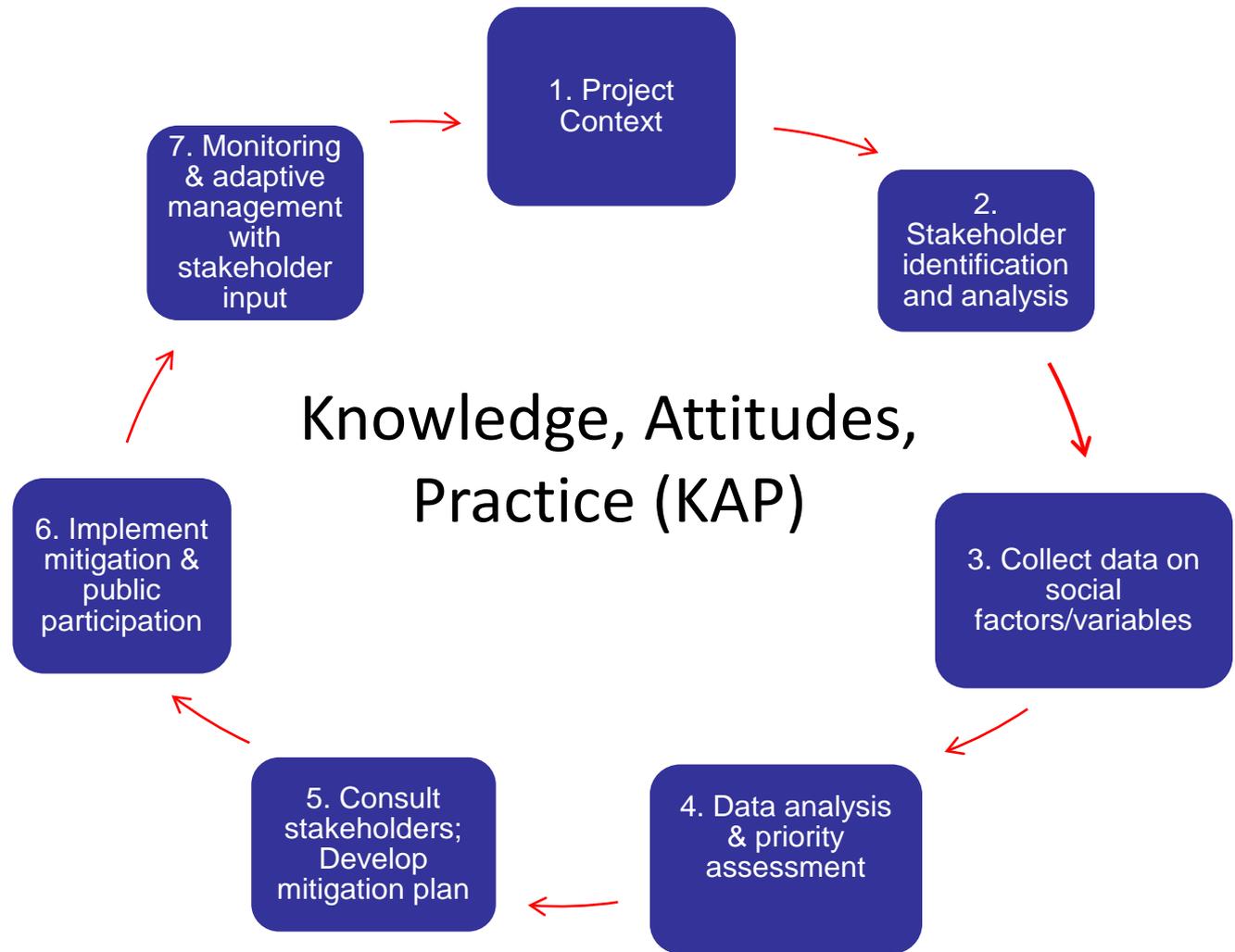
# What is social impact assessment?



A framework to assess or estimate, in advance, the social impacts (both beneficial and adverse) likely to result from projects, programs, policies or activities.

May be integrated with EIA (ESIA) or a distinct exercise

# Social Impact Assessment Process



# Why social impact assessment?

- ❖ **Assessment of social impacts required under US NEPA**
- ❖ **Most host country procedures require that both social and (biophysical) environmental impacts be assessed**
- ❖ **MDB requirements are for fully integrated ESIAs**
- ❖ **USAID requirements**
  - *22 CFR 216.6(a) Environmental Assessments s (“urban quality, historic & cultural resources and the design of the built environment.”)*
  - *22 CFR 216.7(b)(i) Pesticide Procedures (health risks)*
  - *ADS 201 Integrating Gender into Health Programs*
  - *ADS 205 Integrating Gender Equality and Female Empowerment in USAID’s Program Cycle*

**Gender analysis is  
one dimension of  
SIA**



## **Climate Change & (E)IA**

**Climate change = change in  
baseline conditions.**

# Key points

Very few projects will produce or prevent GHG emissions that make a significant change to global totals.

## However, sound IA practice requires:

- **Factoring likely GCC-driven changes into future baseline conditions**
- **Evaluating the significance of impacts in light of these changes**
  - *E.g. watershed withdrawals by an irrigation scheme may be sustainable now --- but what if GCC is expected to reduce water availability?*
- **Identifying opportunities for GHG mitigation, consistent with activity objectives**
  - *Quantify GHG emissions & reductions if above threshold.*
- **Considering whether the proposed actions/ design choices are robust to anticipated changes in baseline conditions—and identifying measures to make them **more so**.**
  - *Why? Because environmentally driven project failure will be an adverse social impact.*

# Illustration: pumped irrigation w/ groundwater



## **CC now being observed:**

**slightly hotter temperatures;  
slightly more variable and less overall rainfall**

## **IA should identify:**

**Irrigation needs will increase. With project withdrawals, negative synergistic effects on groundwater recharge will likely occur.**

## **CC 20-50 years out:**

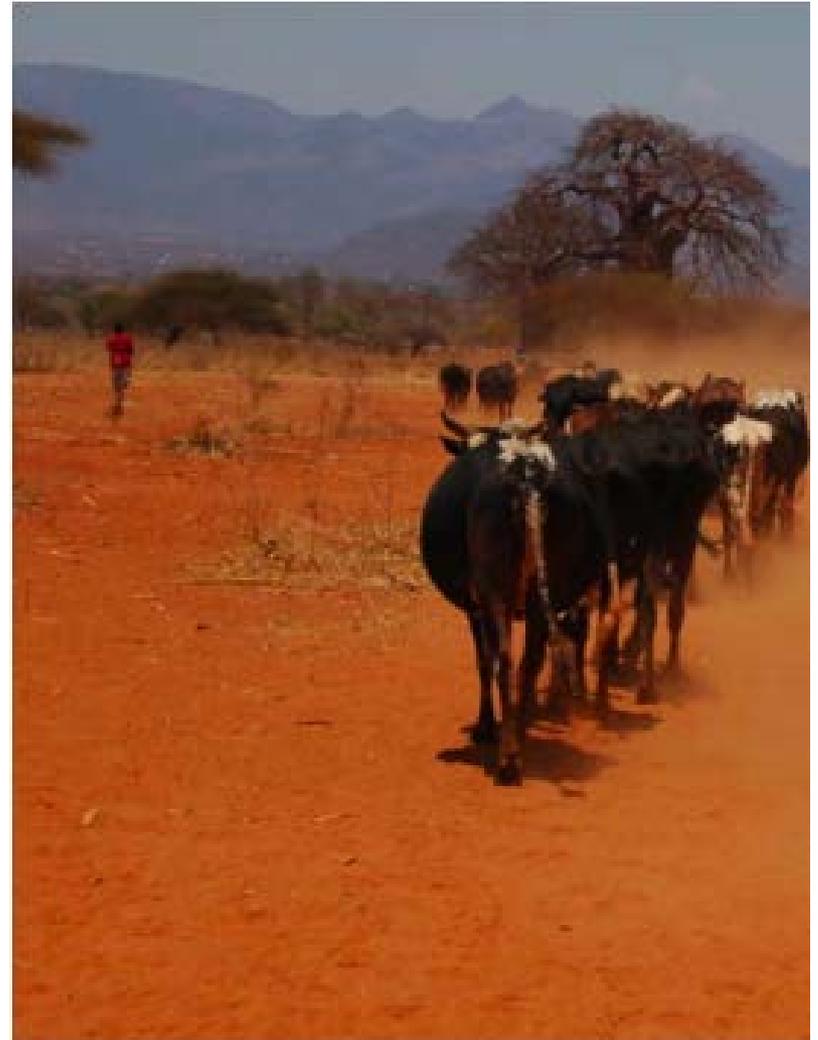
**much hotter temperatures,  
highly variable and less rainfall**

## **IA should identify:**

**Higher capacity irrigation system needed but groundwater not always available. Target crop no longer suitable for climate zone.**

# Sound IA practice with respect to GCC has multiple benefits

- Quantify emissions and reductions: achieve climate objectives
- Compliance with applicable laws, regulations & mandates
- Better assure design for resilience of projects to a changing climate
- Better assure projects are contributing to low or no emissions development and making people less vulnerable to climate change.



# Resources: Cumulative impacts

- ❖ IFC, Good Practice Handbook: Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets, August 2013  
[http://www.ifc.org/wps/wcm/connect/3aebf50041c11f8383ba8700caa2aa08/IFC\\_GoodPracticeHandbook\\_CumulativeImpactAssessment.pdf?MOD=AJPERES](http://www.ifc.org/wps/wcm/connect/3aebf50041c11f8383ba8700caa2aa08/IFC_GoodPracticeHandbook_CumulativeImpactAssessment.pdf?MOD=AJPERES)
- ❖ U.S. Council on Environmental Quality  
<http://ceq.hss.doe.gov/NEPA/ccenepa/ccenepa.htm>
- ❖ The World Bank  
<http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/0,,contentMDK:20742999~pagePK:148956~piPK:216618~theSitePK:244381,00.html>
- ❖ IAIA CEA Wiki <http://www.iaia.org/iaia/wiki/cea.ashx>
- ❖ Cumulative Effects Assessment Practitioners Guide (Canada)  
[https://www.ceaa-acee.gc.ca/Content/4/3/9/43952694-0363-4B1E-B2B3-47365FAF1ED7/Cumulative\\_Effects\\_Assessment\\_Practitioners\\_Guide.pdf](https://www.ceaa-acee.gc.ca/Content/4/3/9/43952694-0363-4B1E-B2B3-47365FAF1ED7/Cumulative_Effects_Assessment_Practitioners_Guide.pdf)

# Resources: Ecosystem Services

- ❖ Costanza R et al. 1997. The value of the world's ecosystem services and natural capital.  
[http://www.esd.ornl.gov/benefits\\_conference/nature\\_paper.pdf](http://www.esd.ornl.gov/benefits_conference/nature_paper.pdf)
- ❖ Costanza R. 2014. Changes in the global value of ecosystem services.  
<http://www.sciencedirect.com/science/article/pii/S0959378014000685>
- ❖ USAID. 2007. Payment for Ecosystem Services Handbook.  
<http://www.oired.vt.edu/sanremcrsp/wp-content/uploads/2013/11/PES.Sourcebook.pdf>
- ❖ USDA Valuing Ecosystem Services 2015  
<http://www.fs.fed.us/ecosystemservices/>
- ❖ US EPA. 2014. Ecosystems Research: Ecosystem Services  
<http://www2.epa.gov/eco-research/ecosystems-services>
- ❖ UNEP. Ecosystem Services Economics. 2012.  
<http://www.unep.org/ecosystemmanagement/UNEPsWork/EcosystemServicesandEconomics/tabid/514/Default.aspx>
- ❖ WAVES. 2015. Wealth Accounting and Valuation of Ecosystem Services.  
<http://www.wavespartnership.org/en/about-us>

# Resources: Social Impacts & SIA

- ❖ **World Bank Environmental Assessment Sourcebook**  
<http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/EXTENVAASS/0,,contentMDK:20282864~pagePK:148956~piPK:216618~theSitePK:407988,00.html>
- ❖ **Guide to Social Impact Assessment**  
<http://unpan1.un.org/intradoc/groups/public/documents/cgg/unpan026197.pdf>
- ❖ **Guidelines and Principles for Social Impact Assessment**  
[http://www.nmfs.noaa.gov/sfa/social\\_impact\\_guide.htm](http://www.nmfs.noaa.gov/sfa/social_impact_guide.htm)
- ❖ **UNEP Social Impact Assessment Tools and Methods**  
[http://www.unep.ch/etu/publications/EIA\\_2ed/EIA\\_E\\_top13\\_hd1.PDF](http://www.unep.ch/etu/publications/EIA_2ed/EIA_E_top13_hd1.PDF)
- ❖ **IAIA Social Impact Assessment**  
<http://www.iaia.org/iaia/wiki/sia.ashx?HL=social,impact>
- ❖ **World Bank**  
<http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTPSIA/0,,contentMDK:20415258~pagePK:210058~piPK:210062~theSitePK:490130,00.html>
- ❖ **USAID Gender Analysis**  
[http://www.usaid.gov/sites/default/files/documents/1865/201\\_sac.pdf](http://www.usaid.gov/sites/default/files/documents/1865/201_sac.pdf)