Metrics for climate change adaptation projects

Quantifying adaptive benefits

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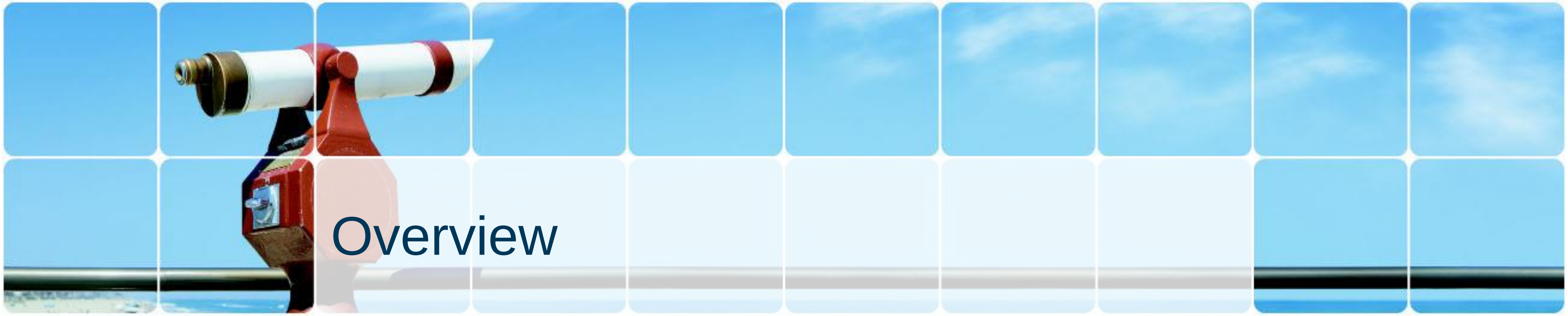


Overview

- **Why universal metrics for CC adaptation?** advantages and drawbacks

- **Metrics used (or not used)** by multilateral adaptation funds

- **3 possible indicators:** saved wealth & saved health + environmental benefit indicator

- **Application** to real world projects: Kenyan Case Study

- **Feedback and discussion**

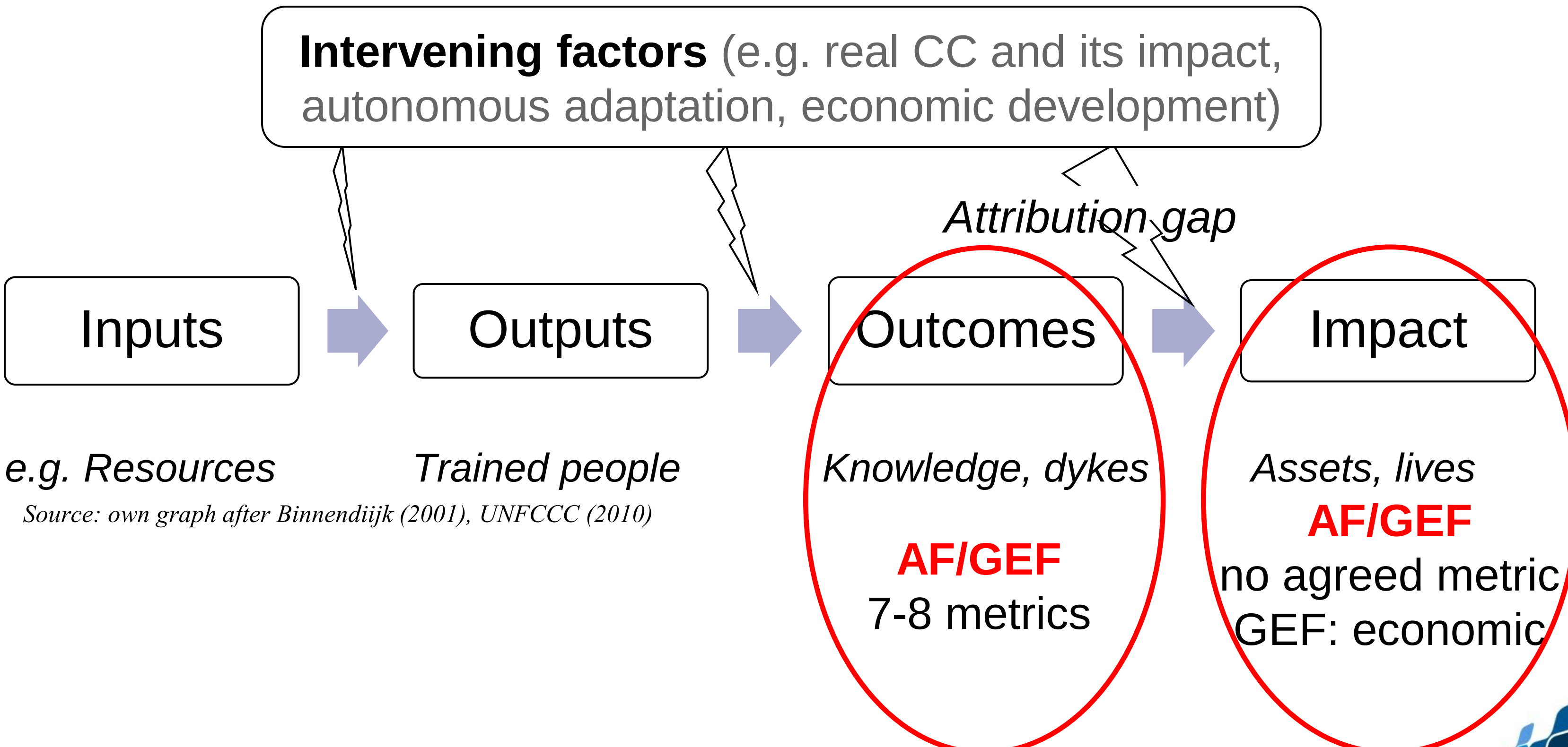
Why universal metrics for CC adaptation?

- **Universal metrics currently missing** (IPCC 2007, UNFCCC 2010, 2012)

- **Advantages**
  - Ex-ante: identification of promising projects (Noble 2008)
  - Ex-post: M&E leading to corrections / adjustments and lessons learned (Hallegate et al. 2011)
- **Drawbacks**
  - Difficulty of political agreement (Hinkel 2008)
  - Value judgements involved (Hinkel 2008, Klein 2009)
  - Uncertainty in measurement (Hinkel 2008, Hallegate et al. 2011)

Metrics used by multilateral adaptation funds

- **Result-based management; result chain**



Source: own graph after Binnendiijk (2001), UNFCCC (2010)

Integrating 3 approaches into 2 possible metrics

Vulnerability assessment

+ Politically accepted

- Multiple tools/metrics

Cost-effectiveness analysis

+ Various metrics

- no comparability

Cost-benefit analysis

+ economic, 1 metric

- value judgments, e.g. health, ecosytems)

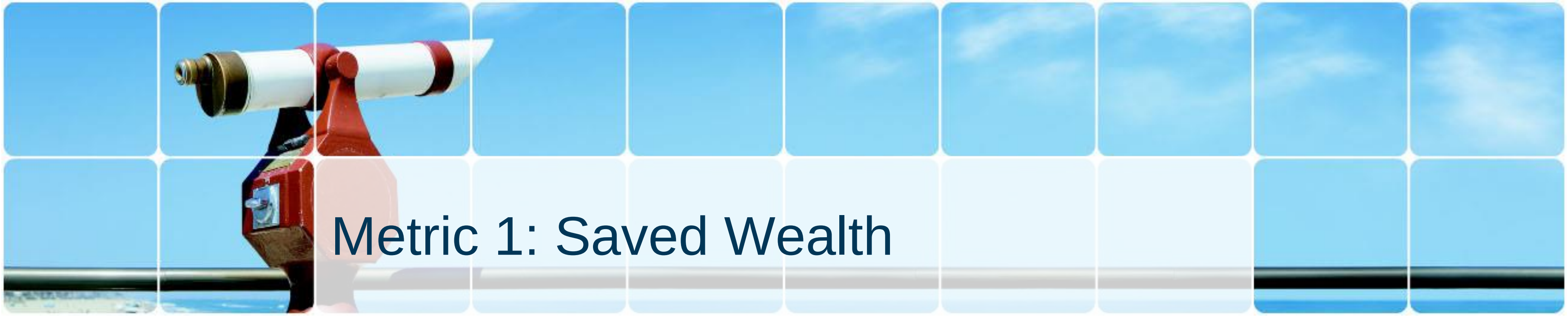
Saved Health

[Disability-adjusted Life Years – DALYs]

Saved Wealth

[$ absolute and/ or relative]

+ Environmental benefit for ecosystems, (cultural assets)



Metric 1: Saved Wealth

- Applied for:
  - Public **infrastructure**
  - Private **property**
- **Natural resources** and services are included in public property
- Frequency distribution of **damage from climate change driven extreme events** taken into account for the baseline

Figure I: Frequency

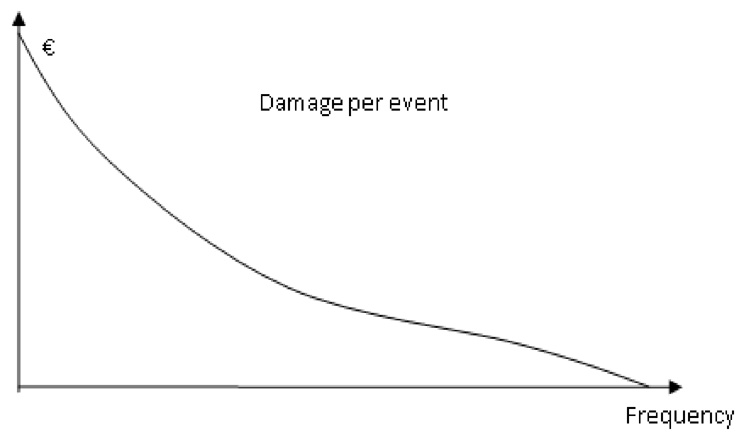
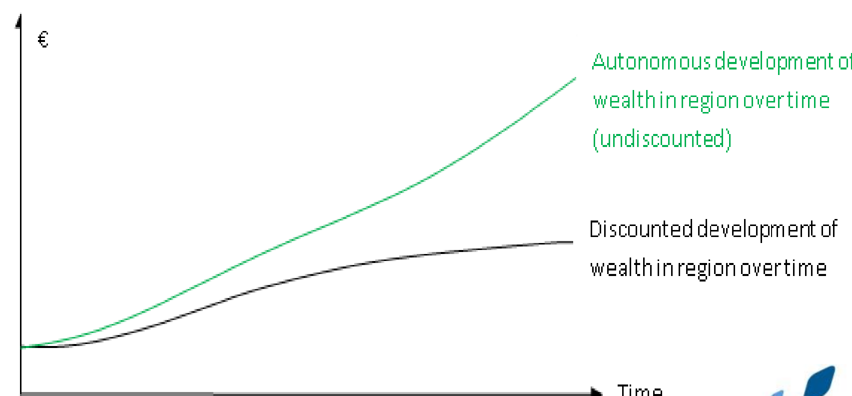


Figure II: change of wealth over time



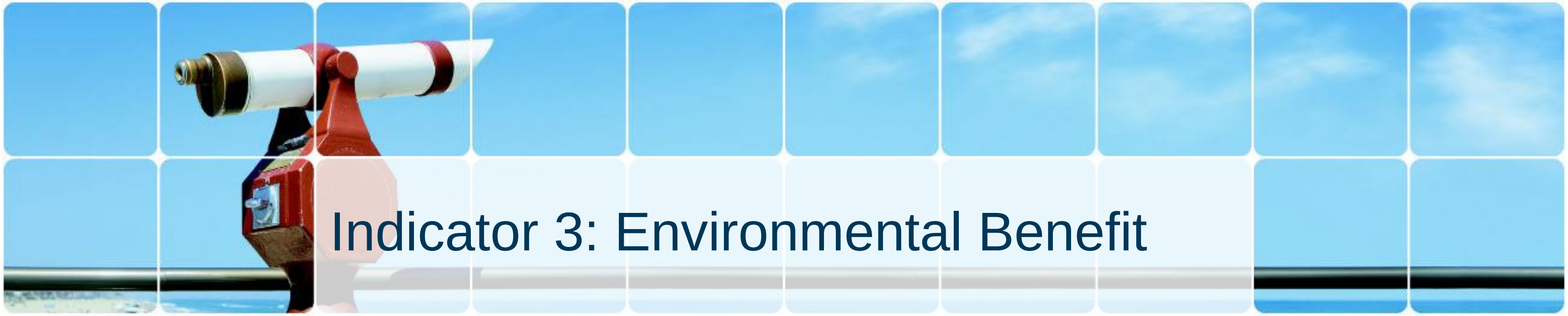
Metric 2: Saved Health

- Valuation of human life is fraught with **ethical challenges**

- Alternative quantification indicator: **DALYs**

$$DALY = N \cdot L + \sum_i I_i \cdot DW_i \cdot D_i$$

- Where:
  - DALY — Disability-adjusted Life Years (Introduced by World Bank (1993); used by the WHO)
  - N — Numbers of deaths
  - L — Standard life expectancy at age of death (in years).
  - I_i — Cases of disease / injury i
  - DW_i — Disability weight of disease / injury i.
  - D_i — Average duration of disease / injury i (years)



Indicator 3: Environmental Benefit

- **Qualitative assessment** considering biodiversity, endangered species, habitat secured, air, water
- **Three options for using EB**
  a) Compensation of damages

  b) Non-eligibility benchmark

  c) Multiplier for SW and SH

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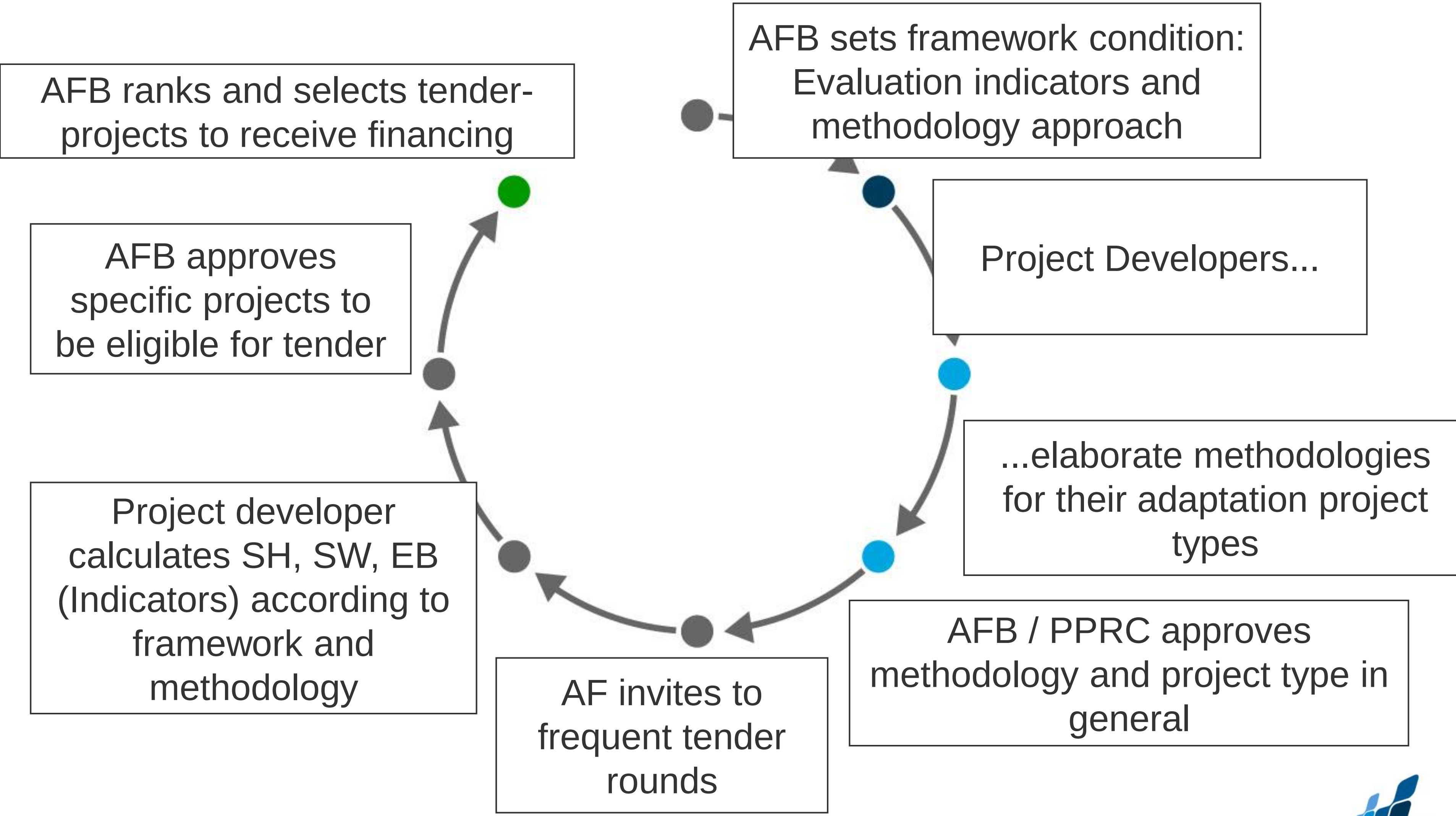
How to use the concept? Overview of approach (Example for Adaptation Fund)



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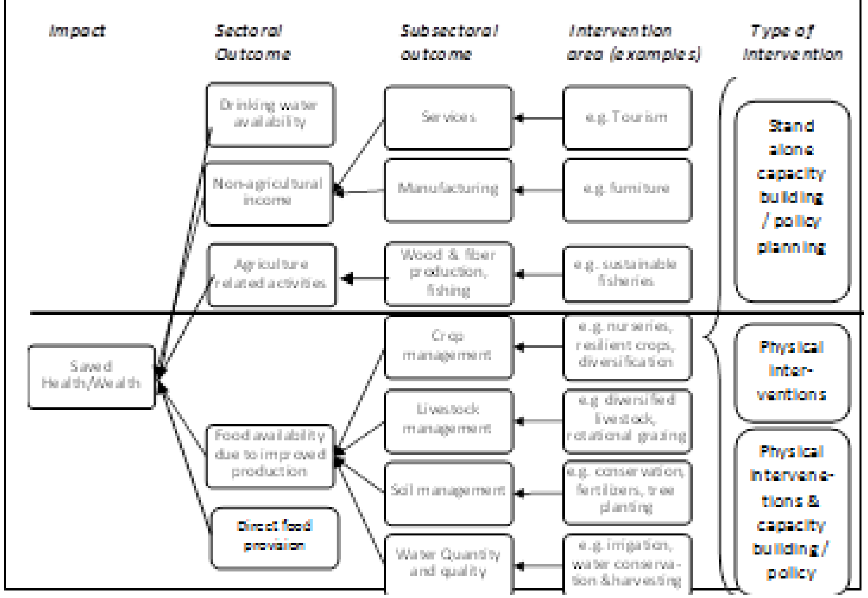
Case Study: Kenya

- Kenyan agriculture project
- Highlands: normally receive adequate rainfall sufficient to raise crops like maize, bananas, cassava
- Lowlands: utilize water from rivers during rainy seasons which allows small-scale irrigation and ranching
- Area was among areas hit worst by the drought in October 2004; an agricultural adaptation project was implemented in 2007 (includes irrigation canals, soil conservation and water retention ditches)
- Overall aim of the project is to guarantee a reliable and sustainable food supply in the context of climate change.

First step: Methodology development

- "Methodology for estimating wealth and health benefits of climate change adaptation projects in the agriculture sector"

Figure IV: Boundary of agriculture methodology



- Methodology defines data requirements and includes relevant formulas for assessing a baseline and project situation
- Locally derived data are preferred; in case they are not available international data can be applied
- Tool includes database containing relevant information

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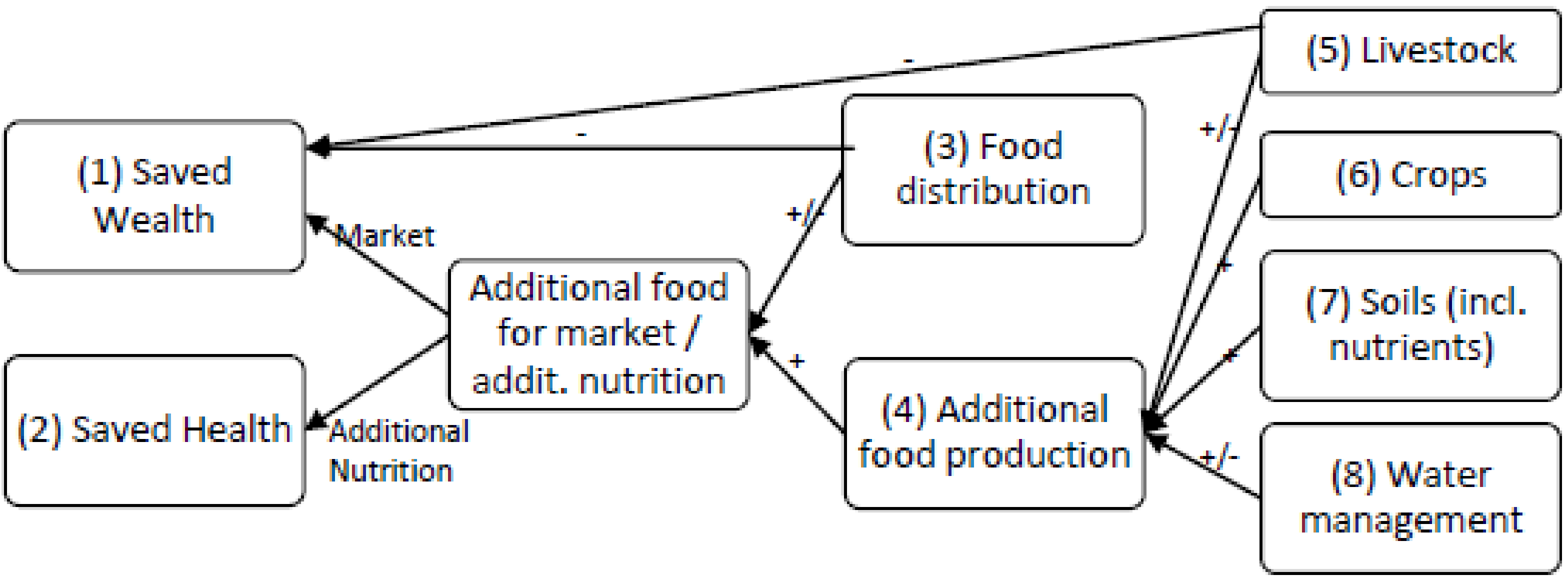
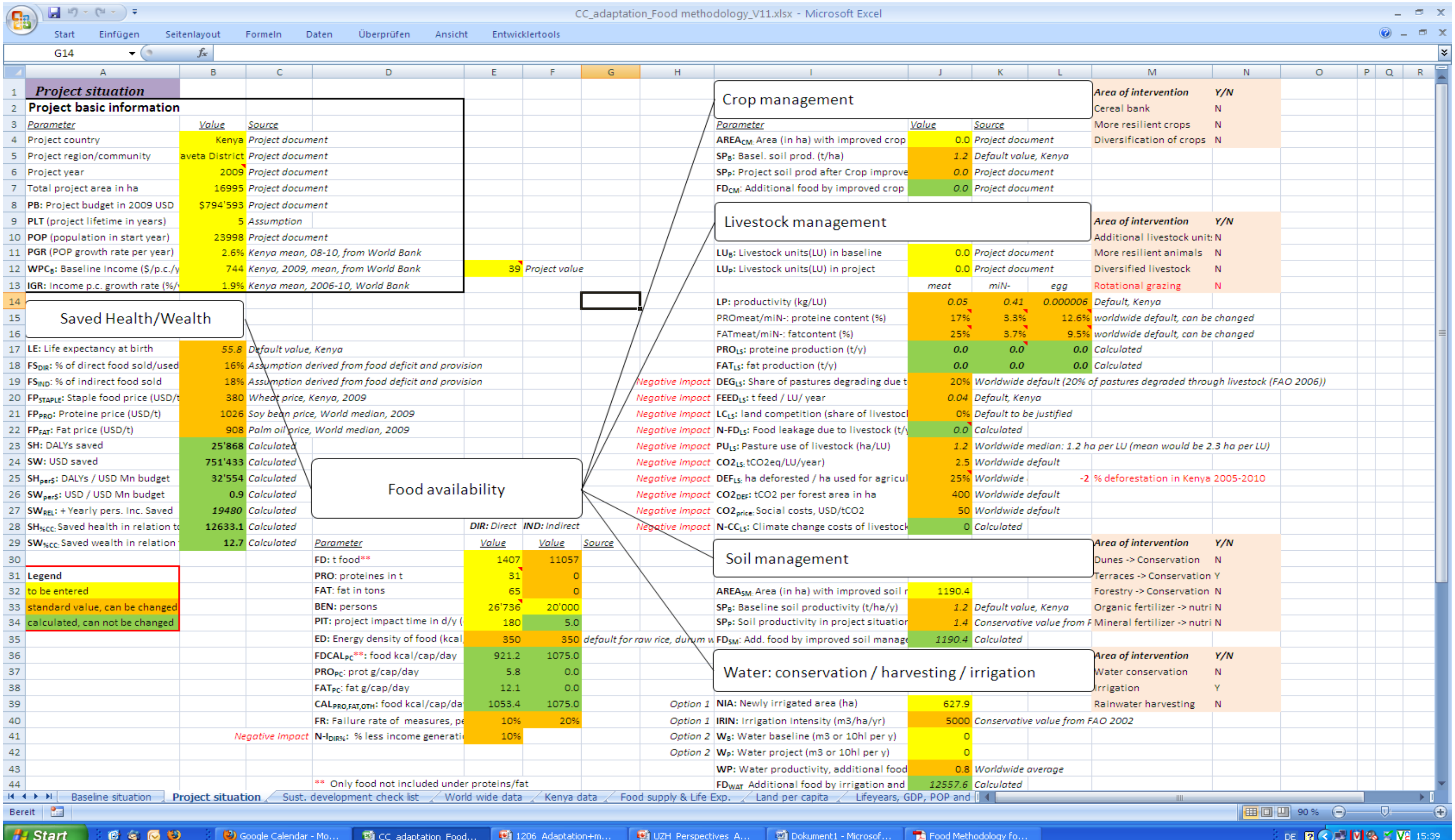
First step: Methodology development

- **Methodology** (22 pages)
  - 8 modules to calculate saved wealth and health



Second step: Applying methodology and quantifying adaptation benefits

- **Calculation tool:** xls, automatic calculations, >30 (national) default values



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Conclusions

- **Universal metrics for CC adaptation**: may enhance learning, accountability and efficiency but inherit equity and uncertainty challenges
- **Proposed metrics:** saved wealth, saved health + environmental benefit
- **Dealing with uncertainty:** Using consistent methodologies and disseminating lessons learned (particularly climate impact forecasts) can avoid maladaptation and subsidizing autonomous adaptation

- **Next steps required**
  - Examine process / indicators
  - Develop methodologies for other sectors (e.g. coastal protection, water) -> identify non-suitable sectors/projects
  - Apply and improve methodologies

Thank you very much for your attention!

Questions & comments?