THE FUTURE OKAVANGO

# Synthesis of information on ecosystem service – experiences from TFO

Prepared for the team
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# General setting of the catchment

- large and remote area with a predominance of subsistence farming
- traditional authorities and laws
- influence of globalization obvious – infrastructure, change in consumption patterns, urbanization..
- low knowledge on basic ecological and social indicators
- transnational cooperation has started
- weak governance

If TFO wants to apply the ESS-approach successfully, the methods and final results have to be **well dokumented**, **easy to understand** and **uncertainties** have to be indicated properly.

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# Ecosystem Services analyzed in TFO

The analysis of 11 ecosystem services (ESS) defined:

- Crop growth
- Vegetable growth
- Livestock growth
- Wildlife growth
- Tree growth
- Thatching grass growth
- Water supply
- Climate regulation
- Hazard regulation
- Wild species diversity
- Environmental settings

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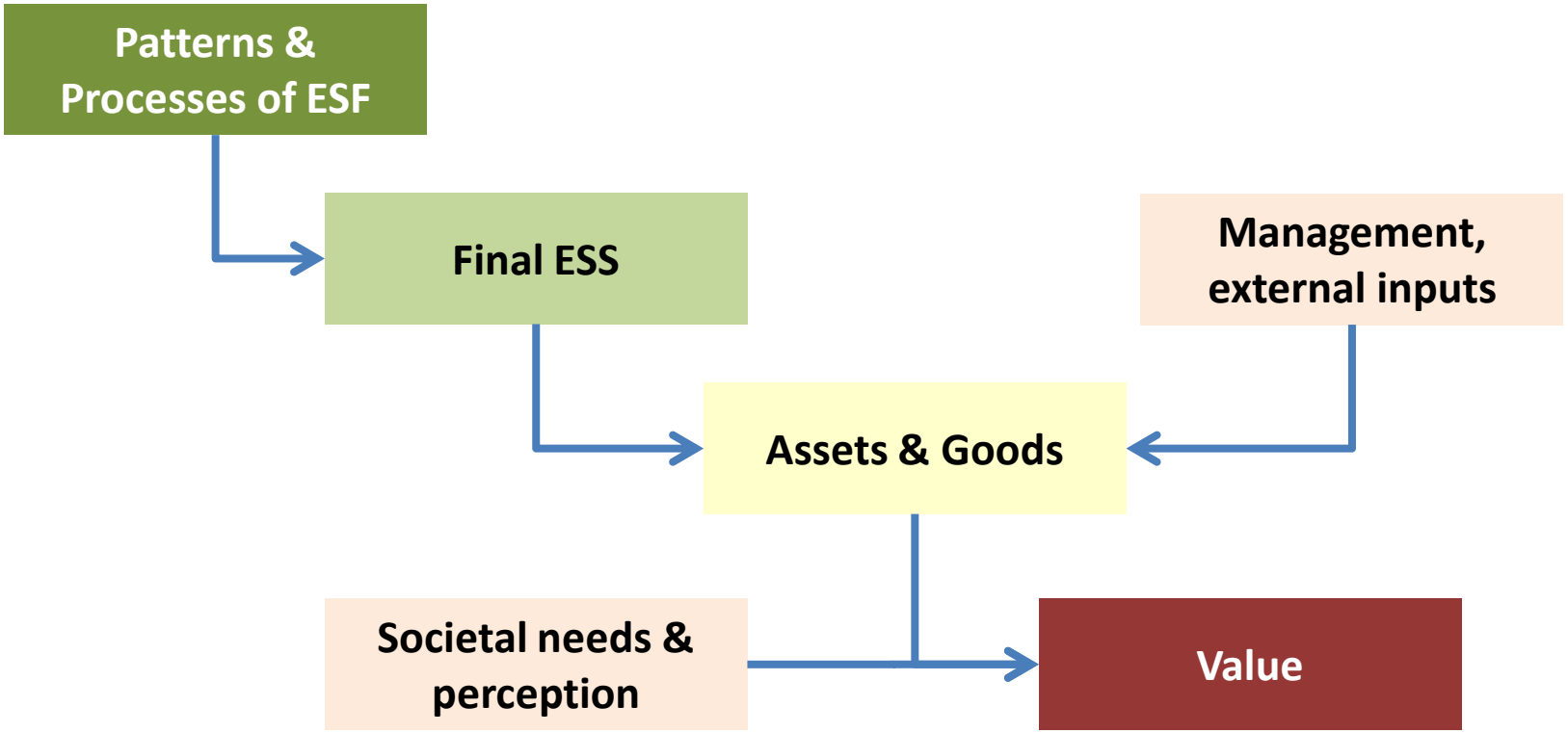
# The information flow from ESF analysis to values of ES goods

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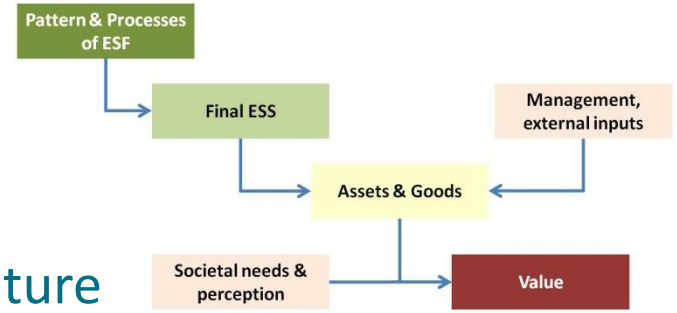
# The information flow from ESF analysis to values of ES goods

- Exemple of raw data:
  - Water gauges
  - Vegetation plots
  - Tree measurements
  - Data on precipitation and temperature
  - Soil analysis
  - Microbiological activities
  - Reults of yield assessments
  - Name of plants used by locals
  - Data on household structure
  - Stakeholder interactions
  - Market prizes
  - …

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# Steps for spatial explicit analysis of ESS

1. Spatial analysis (landscape, land use units & ESS provision)
2. Theoretical and site specific analysis of factors controlling the provisioning of ESS – definition of appropriate indicators and functional relations
3. Valuation – Seperation between nature‘s contribution to ESS from human‘s
4. Analysis of possible temporal changes, (sustainability, resilience, szenarios)

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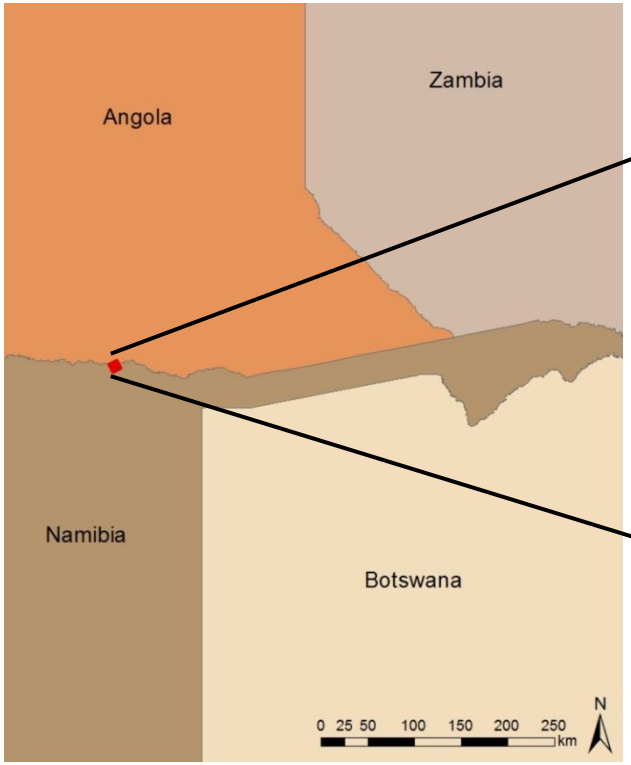
# Step 1: Example Mashare core site (Namibian Kavango)

- Core site: 10 x 10 km





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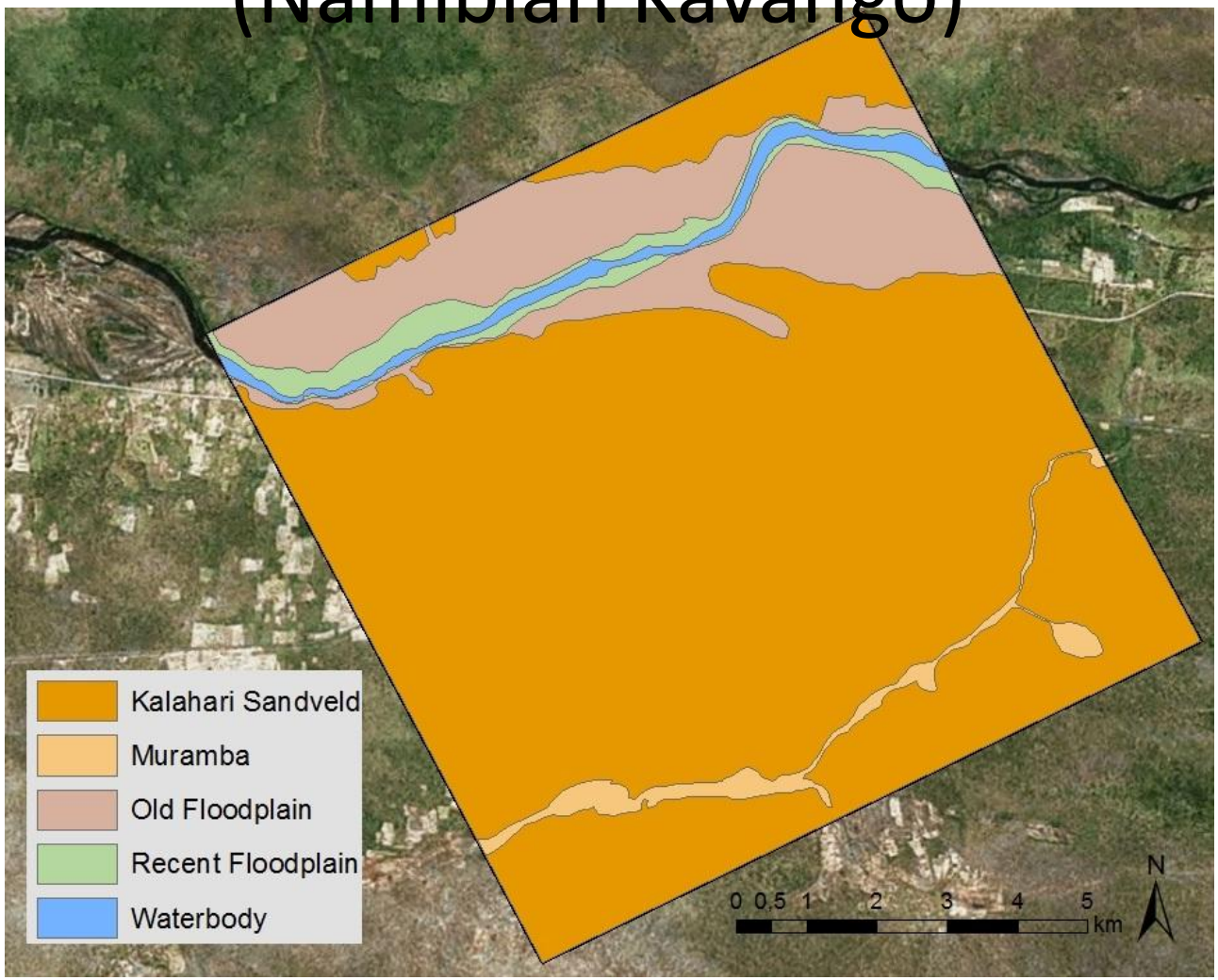


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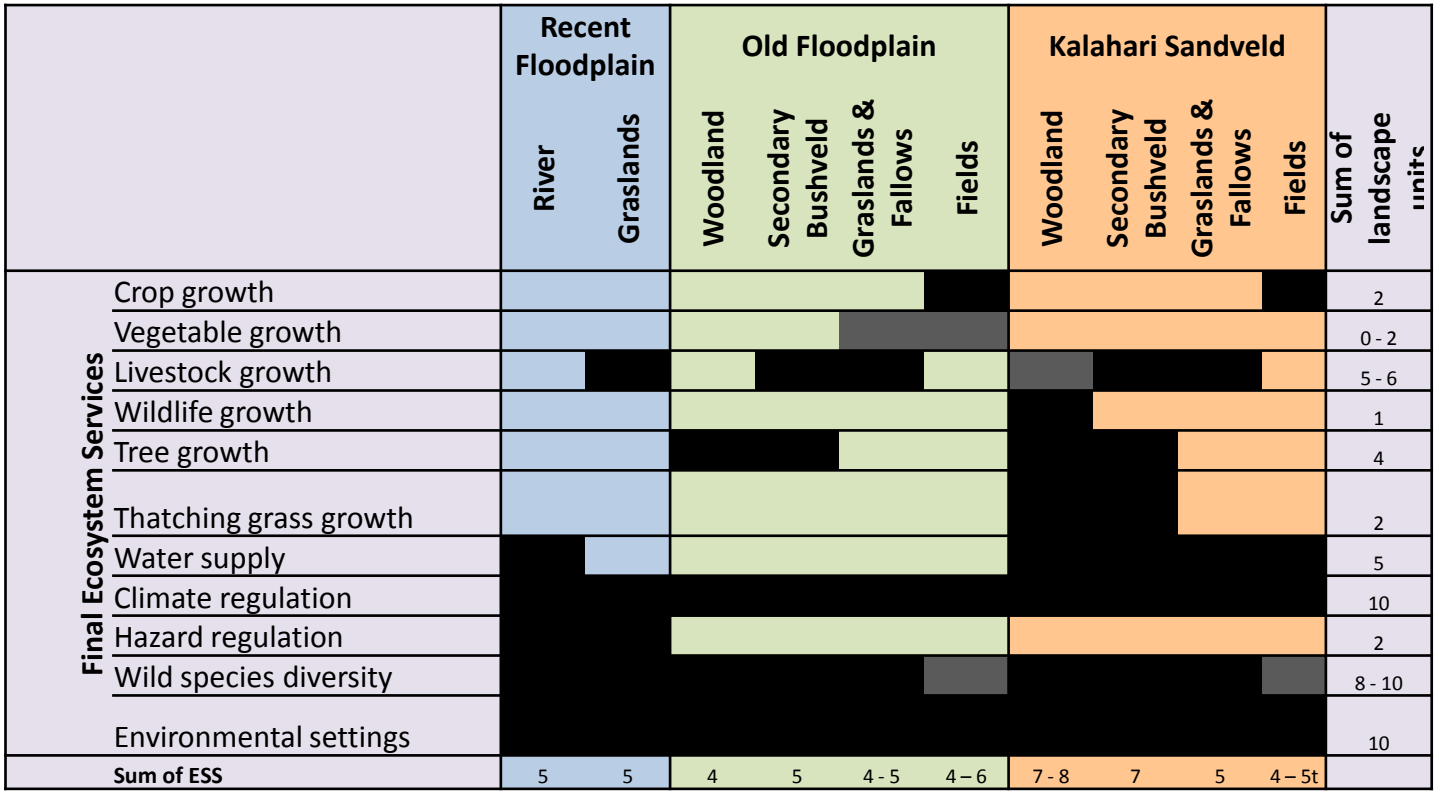
# Step 1: Example Mashare core site (Namibian Kavango)

## Spatial combination of LU units and ESS





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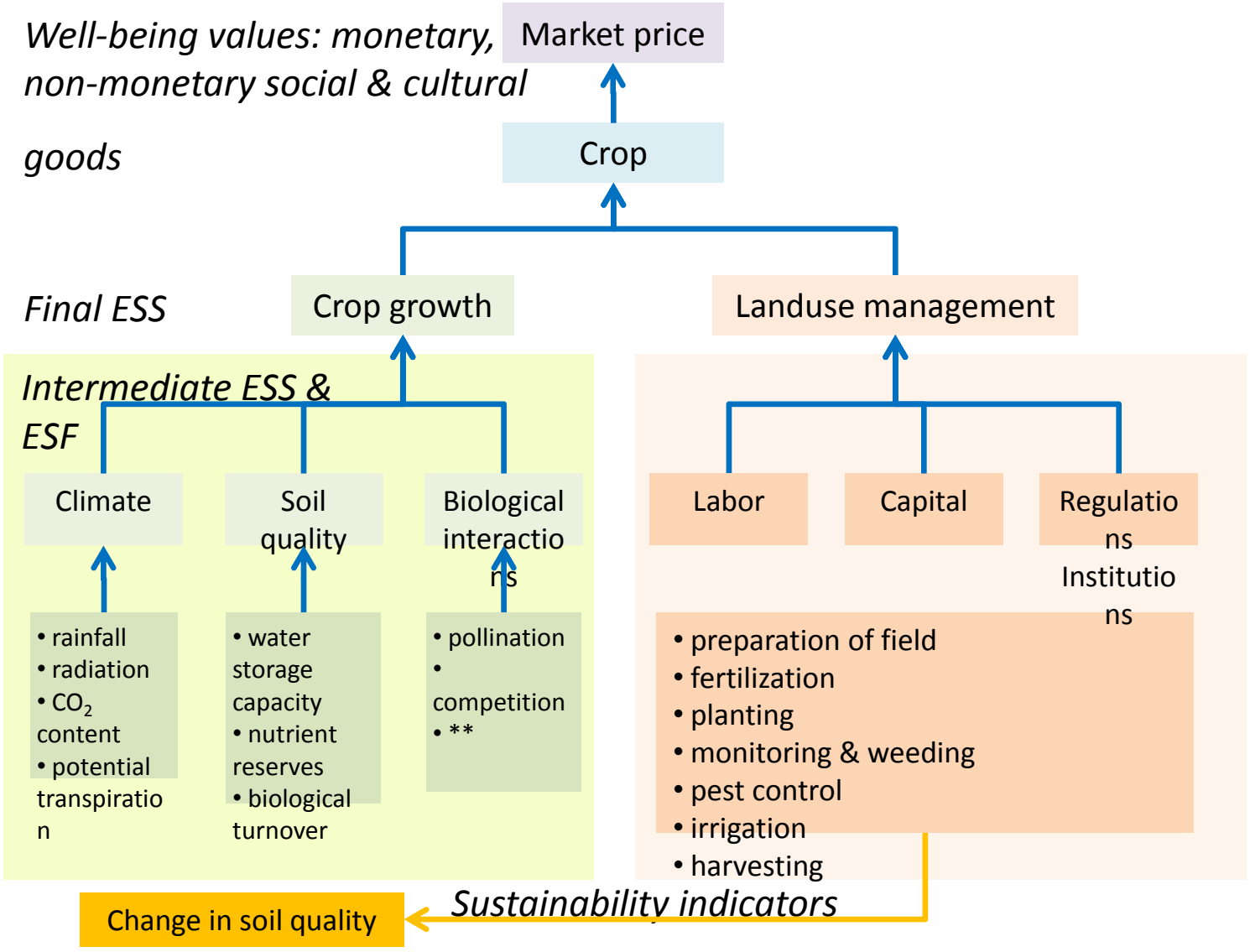
# Step 2: Analysis of controls of crop growth



# Step 2: Analysis of controls of crop growth

General relations of extractable good vs. ESS and human impact:

**Crop yield** = f (climate situation, soil quality, biological interactions, crop potential, management)

for which

**climate situation** = f(rainfall amount & distribution, solar radiation, potential transpiration, carbondioxide concentration)

**soil quality** = f(physical soil quality, chemical soil quality, biological soil quality)

**biological interactions** = f(pollination, competition, pests, **)

**crop potential** = f(crop species & variety)

**management**= f(preparation of acre, fertilization, planting, monitoring & weeding, pest control, irrigation, harvesting)

# Step 2: Analysis of controls of crop growth

**Indicators** used in TFO

1. **Risk of drought and insufficient root aeration (modeling with climate & soil data)**
2. **Availability of N – P – K – Mg**
3. **Microbiel turnover of N and C**

**Crop yield** = f (climate situation, soil quality, biological interactions, crop potential, management)

for which
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**soil quality** = f(physical soil quality, chemical soil quality, biological soil quality)

**biological interactions** = f(pollination, competition, pests, **)

**crop potential** = f(crop species & variety)

# Conclusion and outlook

- The spatial explicit analysis of 11 ESS may become a tremendous task.
- Strong need for concrete and detailed methods on how to derive final ESS and goods from raw data (cooperation within other projects in the LAMA-A-Call helpfull).
- The separation between the natural component of ESS and the management component is not solved, however of strong importance on the results.
- By a new position we will concentrate on the ESS framework and will solve the problems by a stepwise approach in the next 2 years.

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