The use of **VGT4AFRICA** products - some CGIAR examples

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Outline

- CGIAR
- ILRI's targeting and innovation theme
- Examples of VGT4Africa data use
  - ✓ Current activities
  - ✓ Ideas for the future
- Concluding remarks

CGIAR

- Consultative Group on International Agricultural Research
- Research for Development / Poverty Alleviation
  - ✓ Sustainable production (of crops, livestock, fisheries, forests and natural resources)
  - ✓ Enhancing National Agricultural Research Systems
  - ✓ Germplasm Improvement
  - ✓ Germplasm Collection
  - ✓ Policy

- 15 centres world wide:
  - e.g. CIP, IFPRI, ILRI, IWMI

ILRI

- Livestock Research
- Poverty alleviation of the livestock dependent poor (rangelands and mixed crop-livestock systems)
- Global Mandate

- 4 themes:
  - ✓ Targeting and Innovation
  - ✓ Markets
  - ✓ Biotechnology
  - ✓ People, Livestock and Environment

Targeting and Innovation

- ✓ Strategic guidance to priority setting
- ✓ Strategic guidance to targeting
- ✓ Supporting policy making
- ✓ Influencing the broader livestock development agenda

→ Supporting role

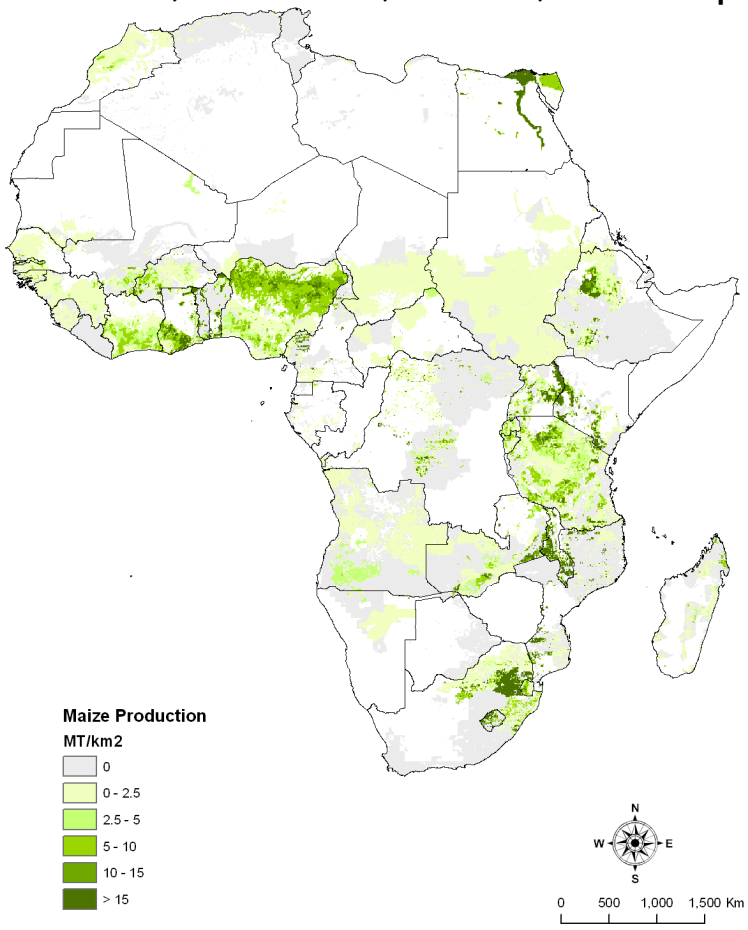
→ Looking for answers to What? Where? How? + the dynamic nature of all this

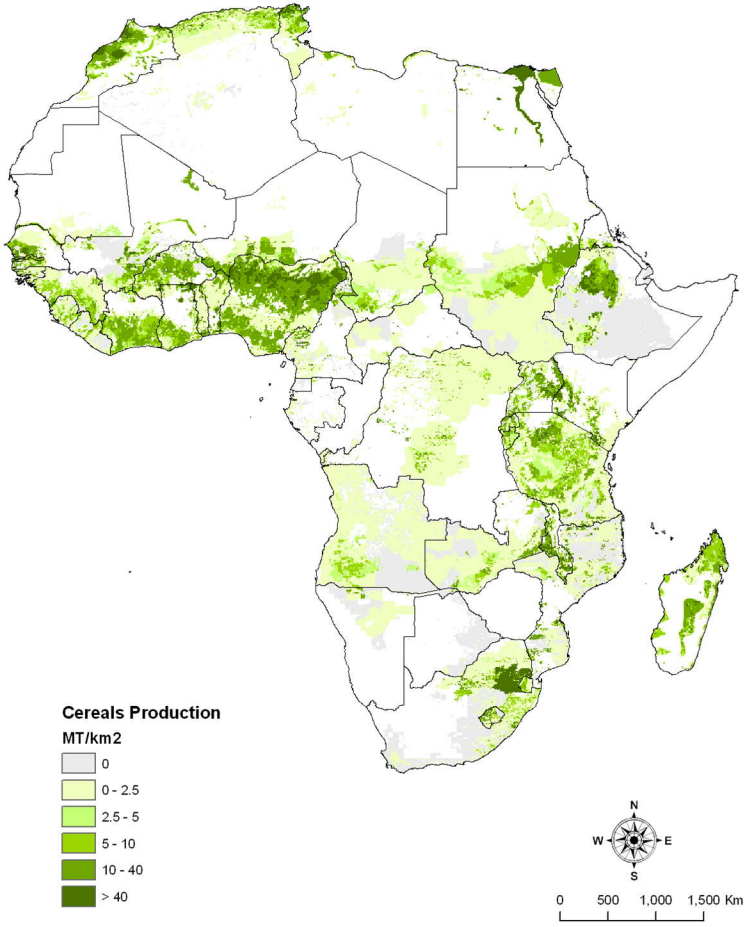
➔ A lot of "macro-level GIS" (backed up with higher resolution in the case-study sites)

← *Global, continental, regional datasets*

You and Wood (IFPRI) global crop allocation

rice, wheat, maize, sorghum, millet, barley, groundnuts, cowpeas, soybeans, beans, cassava, potato, sweet potato, coffee, sugar cane, cotton, bananas, cocoa, and oil palm





← *GLC, MODIS and Kassel / crop statistics / FAO suitability layers*

You and Wood (IFPRI) global crop allocation

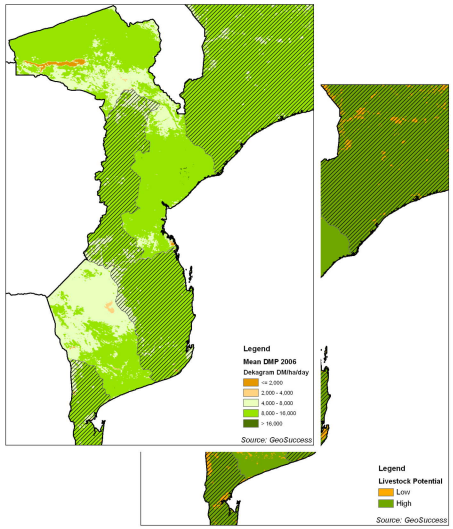
- Would really benefit from well-defined crop mask
- Need for validation!!!
  - ✓ Comparison with HH surveys
  - ✓ *Comparison with DMP/NPP/…?*

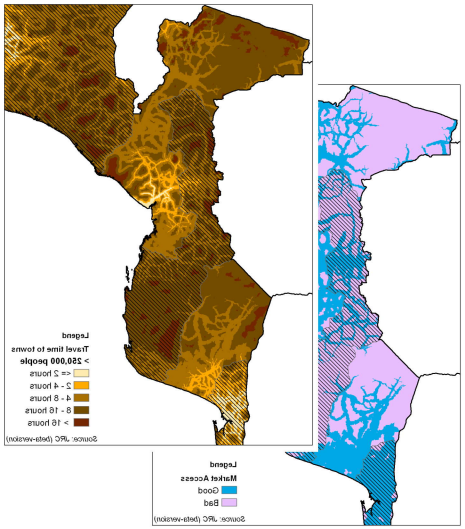
Current activities that use or plan to use VGT4AFRICA products

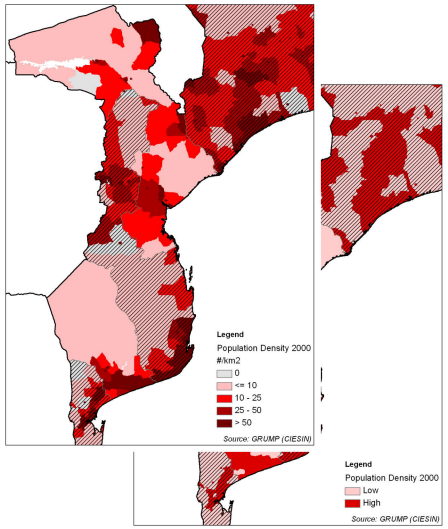
- Development Domains as sampling framework in Mozambique, Namibia, Zimbabwe
- Erosion Risk Mapping (Nile Basin + SSA)
- Livestock Water Productivity in the Nile Basin

1. Development Domains for targeting research

(increased market participation of poor livestock keepers)







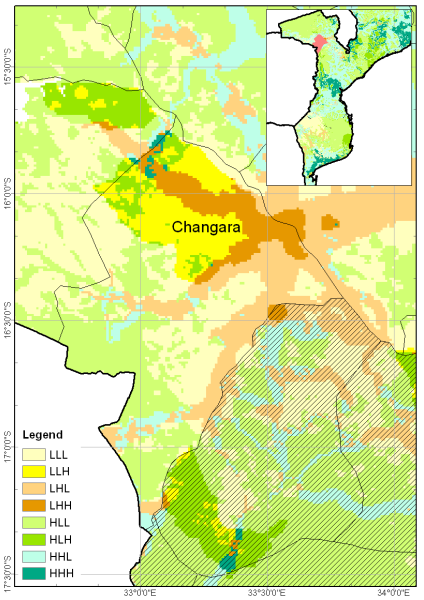
The interplay of:

- *agro-ecological potential (← DMP)*
- *market access*
- *population density*

roughly determines:

- *opportunities for the type of agricultural enterprises*
- *development pathways*

encountered in rural communities



2. Erosion Risk Mapping

The Universal Soil Loss Equation (USLE) (Wischmeier and Smith, 1978):

$$A = R * K * LS * C * P$$

A: Mean Annual Soil Loss	t ha-1yr-1 (quantitative in original eq.)
R: Rainfall Erosivity	max monthly rainfall^2 / annual rainfall
K: Soil Erodibility	From Soil Texture and Organic matter from SOTER / ISRIC-WISE database
LS: Slope Length factor	Slope and contributing area, based on Digital Elevation Model (90m res.)
C: Vegetation Cover factor	Minimum GLOBCARBON LAI
P: Erosion Control Practice factor	-

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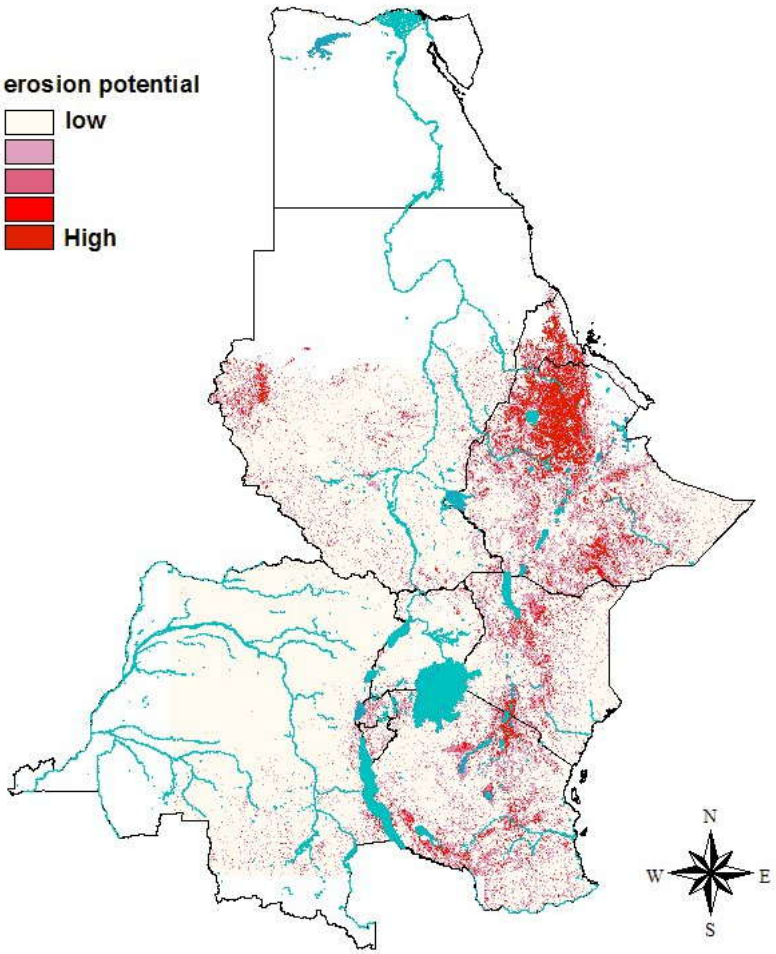
2. Erosion Risk Mapping



Limitations and assumptions:

- USLE factors 'standardized' → relative risk score (against mean value)
- USLE only includes water erosion (by surface runoff/overland flow), no gully/wind/landslide erosion etc.
- USLE doesn't take sedimentation into account (detachment limited)
- Minimal LAI → 'worst case scenario' (seasonal differences)
- LAI in cropland and natural vegetation treated equally

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Qualitative erosion risk classes instead of quantitative soil loss

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p5 * But, availability of monthly LAI and rainfall data layers makes it possible to identify when erosion risk is highest.

* Multiple years of LAI and rainfall data are useful to look at trends while predictions of future rainfall can be used in predictive and scenario analyses (any work being done on LAI trend analyses?)

pbreugel, 11/16/2007

2. Erosion Risk Mapping

- Targeting of “food security crops” ~ sweet potato and cassava
- What are the linkages land degradation – livestock – poverty?

- Currently: this erosion risk mapping
- Opportunity: *NDVI/DMP/… + rainfall* ?

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3. Livestock Water productivity

A Challenge Program on Water and Food

- CGIAR + partners (governments, NGOs, advanced research centers, and River Basin Authorities)
- Global program (activities in 10 basins)

- GOAL:
  better agricultural water planning, development and management

↓

environmentally sustainable and equitable
poverty reduction and food security

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IWMI
International Water Management Institute

3. Livestock Water productivity

- ILRI + partners (IWMI, Ethiopian Institute for Agricultural Research, Sudan's Ministry of Science and Technology, and Makerere University)
- Nile Basin

- Understand how livestock and water interact
  → increased water productivity of livestock

- Development of methodologies to identify priority areas for integrated livestock and agricultural development

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p8 Just to reiterate, the CPWF does not only look at livestock. Our work on livestock water productivity can therefore also seen as part in a larger work on agricultural water productivity. Knowing how much water each sector is using will help to identify e.g., problem sectors and competitive pressure. At national or regional level such information might help to influence the political agenda on research, development, investements.

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3. Livestock Water productivity

Livestock water productivity framework

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- "water accounting" approach
- Preliminary results suggests that in Sub-Saharan Africa current levels of animal production can be maintained while reducing water loss by at least 50% through different pathways

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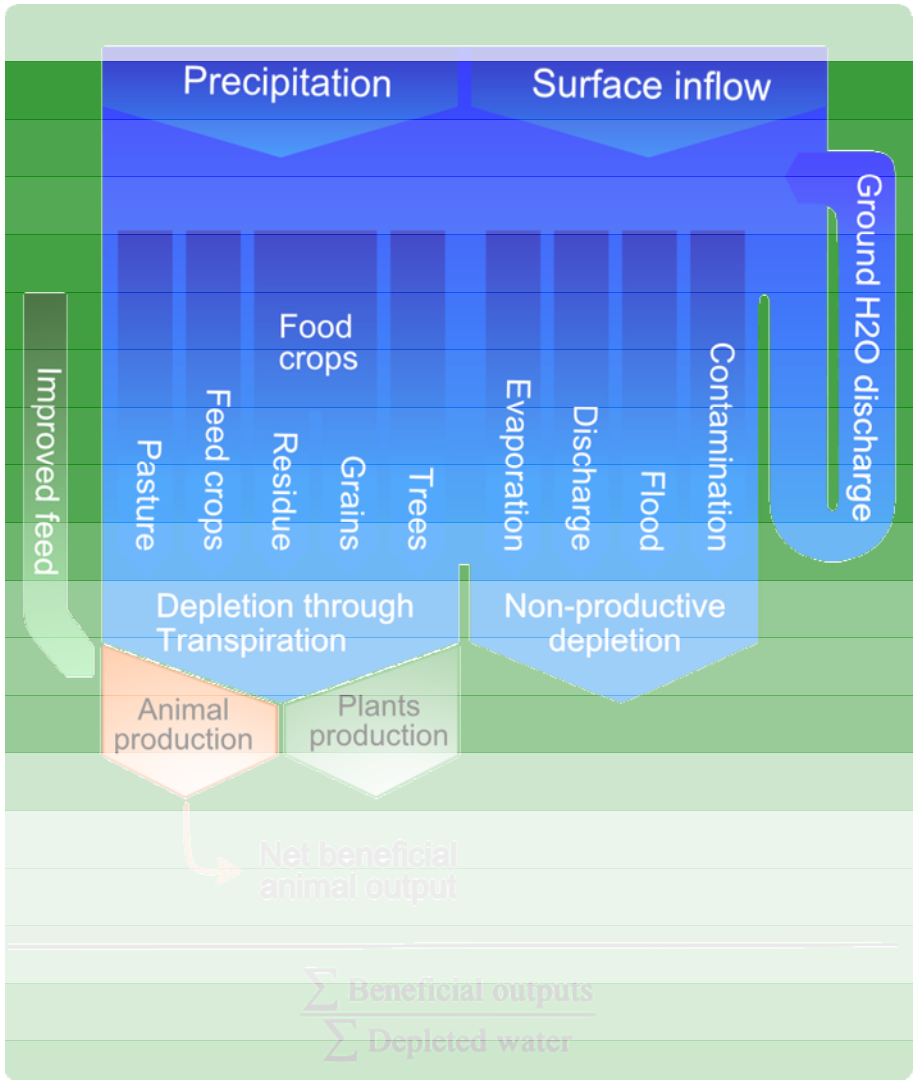

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p9 See my answer on your question in earlier e-mail. On second though I would leave the text as it is.

Loss can also mean that feed, and thus the water used to produce it, is not used, i.e., lost for the production system. Making drinking water strategically available will make it possible to use that water...

Btw, how much the productivity increases will depend on the gain in production compared to the costs for making that extra drinking water available.

If distribution of drinking water access points results in a feed demand larger than feed supply in a given area, degradation may follow. This will likely influence the LWP negatively by increasing non-productive depletion and decreasing production.
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p10 Note that this whole WP concept is highly scale sensitive! The framework presented may represent a small water shed or the whole Nile basin.
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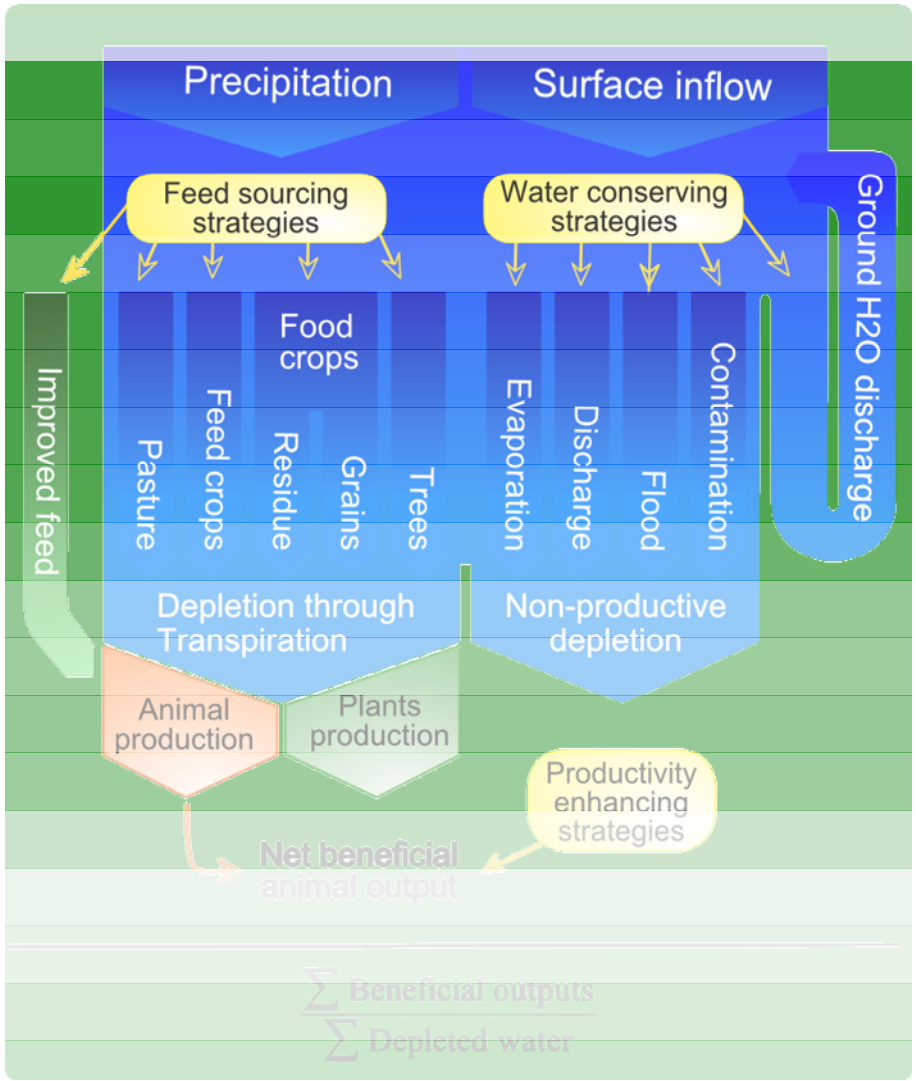
3. Livestock Water productivity

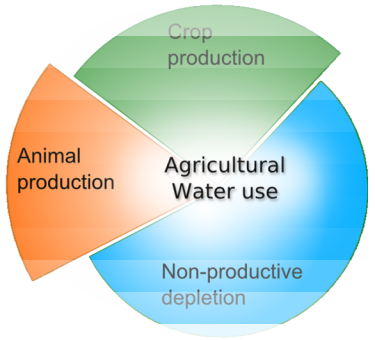
Livestock water productivity framework

- "water accounting" approach
- Preliminary results suggests that in Sub-Saharan Africa current levels of animal production can be maintained while reducing water loss by at least 50% through different pathways:
  - ✓ Feed sourcing strategies
  - ✓ Water conservation strategies
  - ✓ Strategic development and distribution of drinking water reserves.
  - ✓ Improving animal production



Feed & water demand for Livestock production in the Nile Basin

- Livestock drinking water demand
  - ✓ How much drinking water is required at a basin level scale?
  - ✓ How is water demand distributed within the Nile basin?
  - ✓ What is the drinking water supply (incl. reliability / inter- and intra-annual variability)
    - → No data on distribution water points. What about small water bodies data layer
  - ✓ How will be the situation in the near future?
- Water demand for livestock feed production
  - ✓ What is the demand for feed and how much water is needed to produce this?
  - ✓ How is feed & water demand distributed within the Nile basin?
  - ✓ How does this compare to the feed and water supply?
  - ✓ How will be the situation in the near future?



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p7 Klein figuur om te illustreren dat werk on feed en water demand uiteindelijk ook als input moet dienen voor vergelijkend onderzoek naar water gebruik voor en door livestock t.o.v. andere gebruiken (binnen agriculture dus met name crop production) en non-productive depletion.

Het kan dus als input in / tool voor priority setting en hotspot analyses.

Een ander gebruik is als tool in scenario analyses – change in Livestock production systems, Population densities, Livestock densities, Climate, Land use / management changes on water use by livestock production systems.

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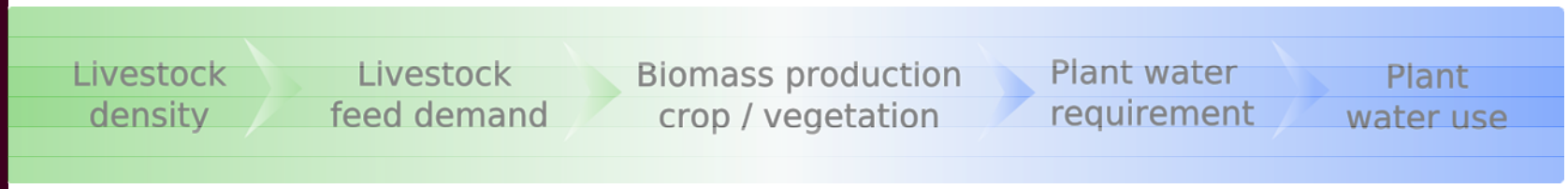
Water for Livestock feed requirements



Putting Livestock feed demand into perspective: DMP / NPP data layers

Start of growing season: Phenology / Vegetation Growth Cycle Parameters

Land cover: Leaf Area Index

Concluding remarks

- Cross-country data ideal for broad-brush geographical targeting
- Resolution high enough to enable zooming in with consistent data sets

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- Processed data = major time / resource saver
- Interaction with producers and other users interesting/necessary for correct/sound use of data

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p6 Often the end-users do not have the expertise / resources to produce / derive required information from the wealth of raw data (satelite imagery) available. Projects like AVG4AFRICA thus can and do help advance the agenda's of development and research organizations in Africa.

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Thank you

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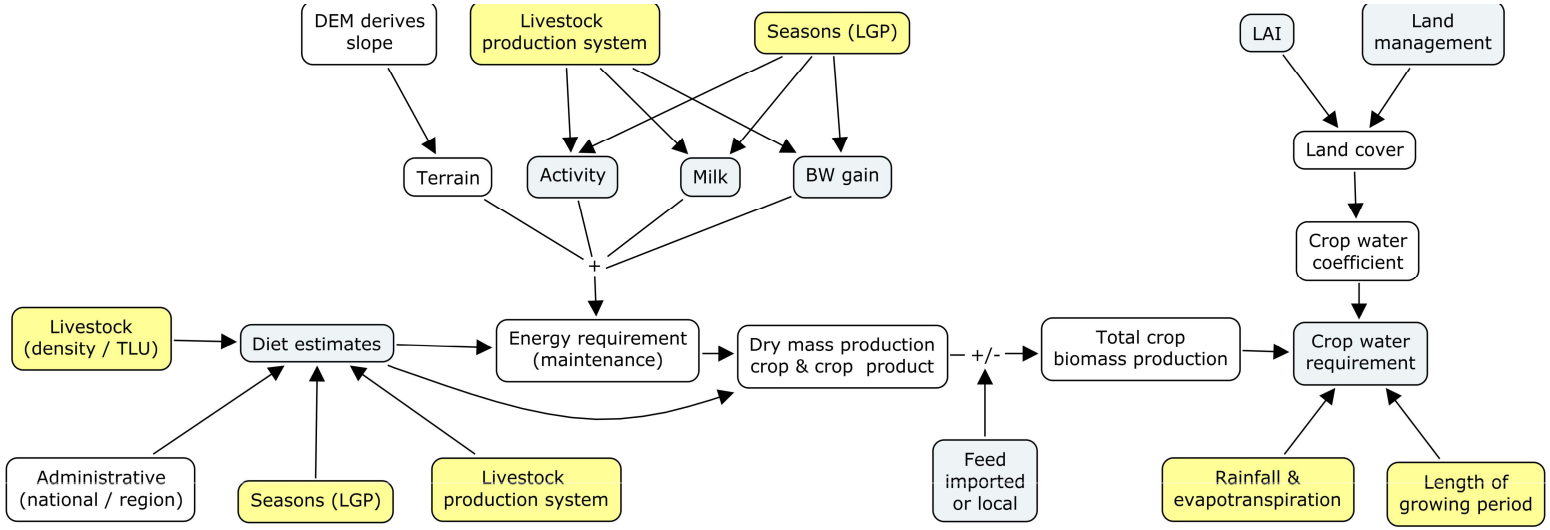
Calculating feed demand



Questions:

- Which pattens are important at the basin scale?
- Which elements have an important temporal component (e.g., migration)?
- Which heterogeneity we can or cannot be ignored at this scale (and if not, do we have proxy variables or should we do this analysis on smaller scale)?