

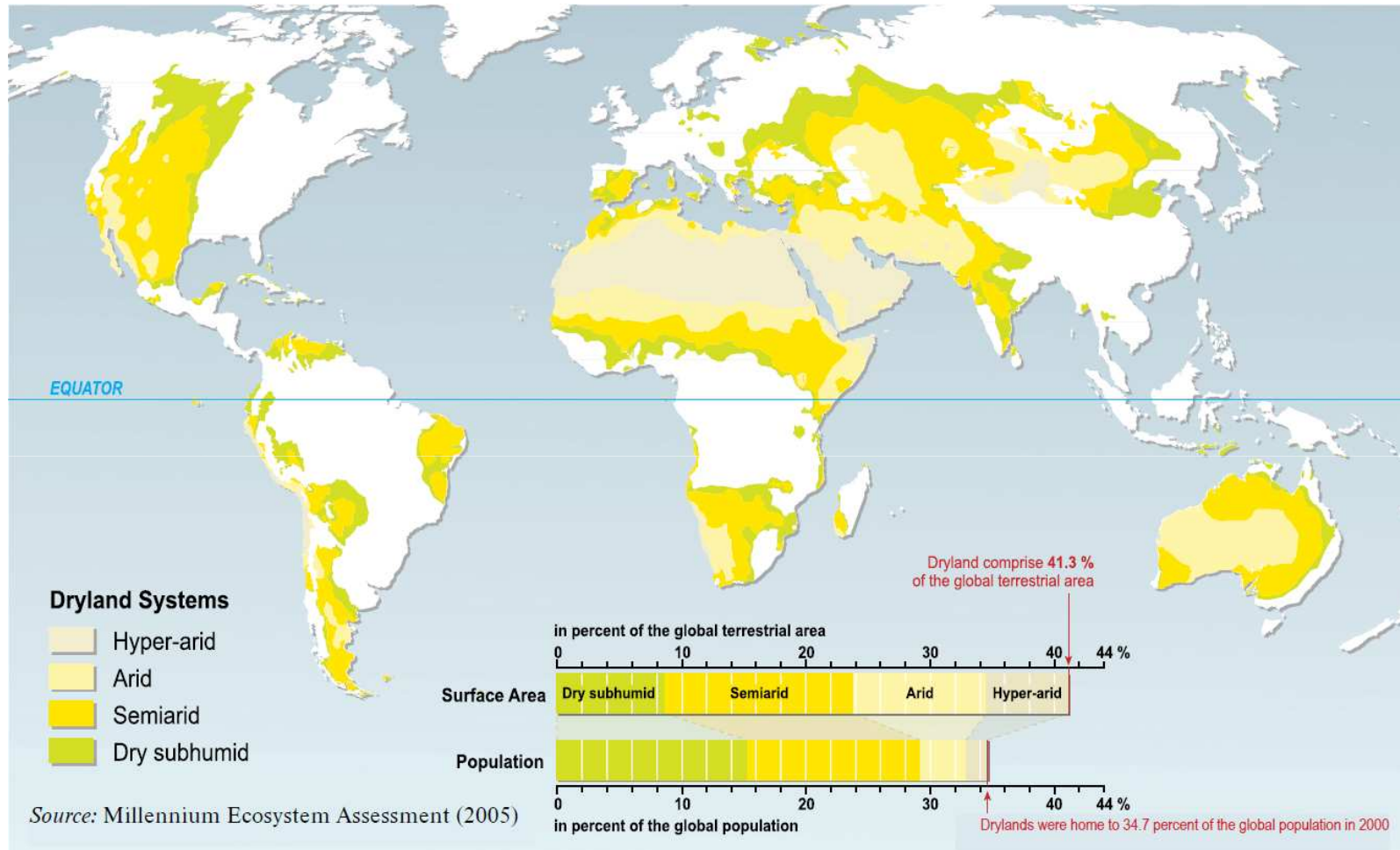
# Eco-systems of agricultural landscapes and sustainable land use: Livestock systems

## 04 – Livestock Farming Systems-2 Extensive pastoral production systems

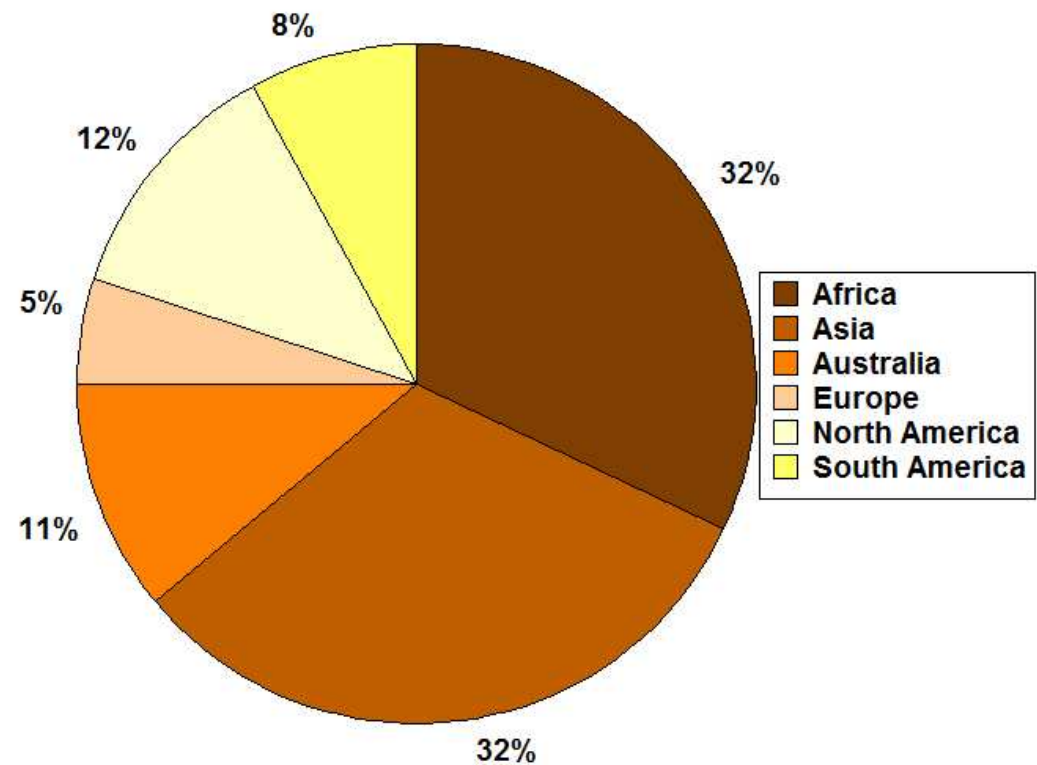




# The world's drylands



# The world's drylands by continent



# The world's drylands in numbers (1)

Sub-type	Aridity Index	Global Area [%]	Global Population [%]	Pastures [%]	Cultivated [%]	All other land* [%]
Hyper-arid	< 0.05	6.6	1.7	97	0.6	3
Arid	0.05-0.2	10.6	4.1	87	7	6
Semi-arid	0.2-0.5	15.2	14.4	54	35	10
Dry Subhumid	0.5-0.65	8.7	13.3	34	47	20
Total		41.3	35.5	65	25	10

\* Includes urban areas

The aridity index is the ration of precipitation to potential evapo-transpiration

Source: Safriel et al., 2005.

<http://data.iucn.org/dbtw-wpd/edocs/2009-033.pdf>



# The world's drylands in numbers (2)

Drylands are defined by their aridity. They cover four zones: hyper-arid (desert); arid; semi-arid; and dry sub-humid.

Drylands cover 41% of the earth's land surface and are home to more than 2 billion people, 90% of them in developing countries.

30% of all cultivated plants came from drylands.

46% of global carbon is stored in drylands.

Drylands soils contain 53% of global soil carbon, and dryland plants 14 % of global biotic carbon.

More than 50% of the world's productive land is dryland.

50% of the world's livestock is supported by dry rangelands.

[http://www.iucn.org/knowledge/news/focus/saving\\_our\\_drylands/facts\\_and\\_figures/](http://www.iucn.org/knowledge/news/focus/saving_our_drylands/facts_and_figures/)



## Eco-climatic zones in tropical Africa and their potential for livestock production

Eco-climatic Zone	Climate Type	Rainfall [mm/year]	Months without rainfall	Characteristic natural vegetation
I	Humid	> 1500	0	Rain forest
II	Sub-humid	1000 -1500	2	Dry forest, evergreen bush
III	Dry sub-humid	800 - 1200	3 – 5	Deciduous bush, thin woodlands
IV	Semi-arid	500 - 800	4 – 6	Deciduous thin woodlands
V	Arid	200 – 500	6 – 9	Deciduous thorn-bush
VI	Very arid	200	8 - 11	Dwarf shrubs or halophytic species



# Eco-climatic zones in tropical Africa and their potential for livestock production

Eco-climatic zone	Land use type
I	Only limited potential for livestock production, mainly forests
II	Intensive milk and meat production with pure bred exotic cattle; wool and mutton production with pure bred exotic sheep; goat milk production [stocking rate 1 SSU/1.5 ha]
III	Intensive ranching with crossbred and pure bred exotic cattle, also dairy ranching; wool and mutton production with pure bred exotic sheep; goat milk production [stocking rate 1 SSU/2.5 ha]
IV	Extensive beef ranching with crossbred and indigenous cattle; meat production with crossbred and indigenous sheep and goats; goat milk production [stocking rate 1 SSU/4 ha]
V	Extensive ranching with indigenous cattle, sheep and goats; semi-sedentary pastoralism with cattle, sheep, goats and dromedaries [stocking rate 1 SSU/15 ha]
VI	Migratory subsistence pastoralism with cattle, sheep, goats, dromedaries; sales of immature cattle for fattening and sheep and goats for slaughter; sales of hides and skins [stocking rate 1 SSU/40 ha]



# Livestock production systems in the Tropics

- 1) **Pastoralism** (traditional extensive systems) in which availability of grazing dictates the herd movements;
  - a. Nomadism—random movements with the herder's family;
  - b. Transhumance—seasonal movements following precise routes;
- 2) **Ranching** (private or State owned) in which meat production or breed development is carried out on an enclosed area of land;
- 3) **Agro-pastoralism** in which livestock are reared extensively and crops are also produced;
- 4) **Landless systems** that use animal feed such as cultivated fodder and agro-industrial by-products, and are typically found on the outskirts of towns and expand with urbanization, focusing mainly on poultry, pig and milk production;
- 5) **Unconventional livestock**, including the rearing of cane rats, snails, rabbits and fish.





# Traditional pastoral production systems

Production system	Description of land use type
Agro pastoralism Zone III & IV	combining crop production and grazing of domestic stock on individually owned and on communal land in the immediate vicinity of permanent homesteads for subsistence and marketing
Sedentary pastoralism Zone IV	grazing individually owned domestic stock on communal land in the vicinity of permanent homesteads throughout the year
Semi-sedentary pastoralism Zone IV & V	grazing individually owned domestic stock on communal land in the vicinity of a permanent homestead for part of the year and long distance movement of the herds during the wet season or growing period
Migratory pastoralism Zone V & VI	grazing individually owned domestic stock on communal land and moving herds and homesteads as seasonal forage supply dictates

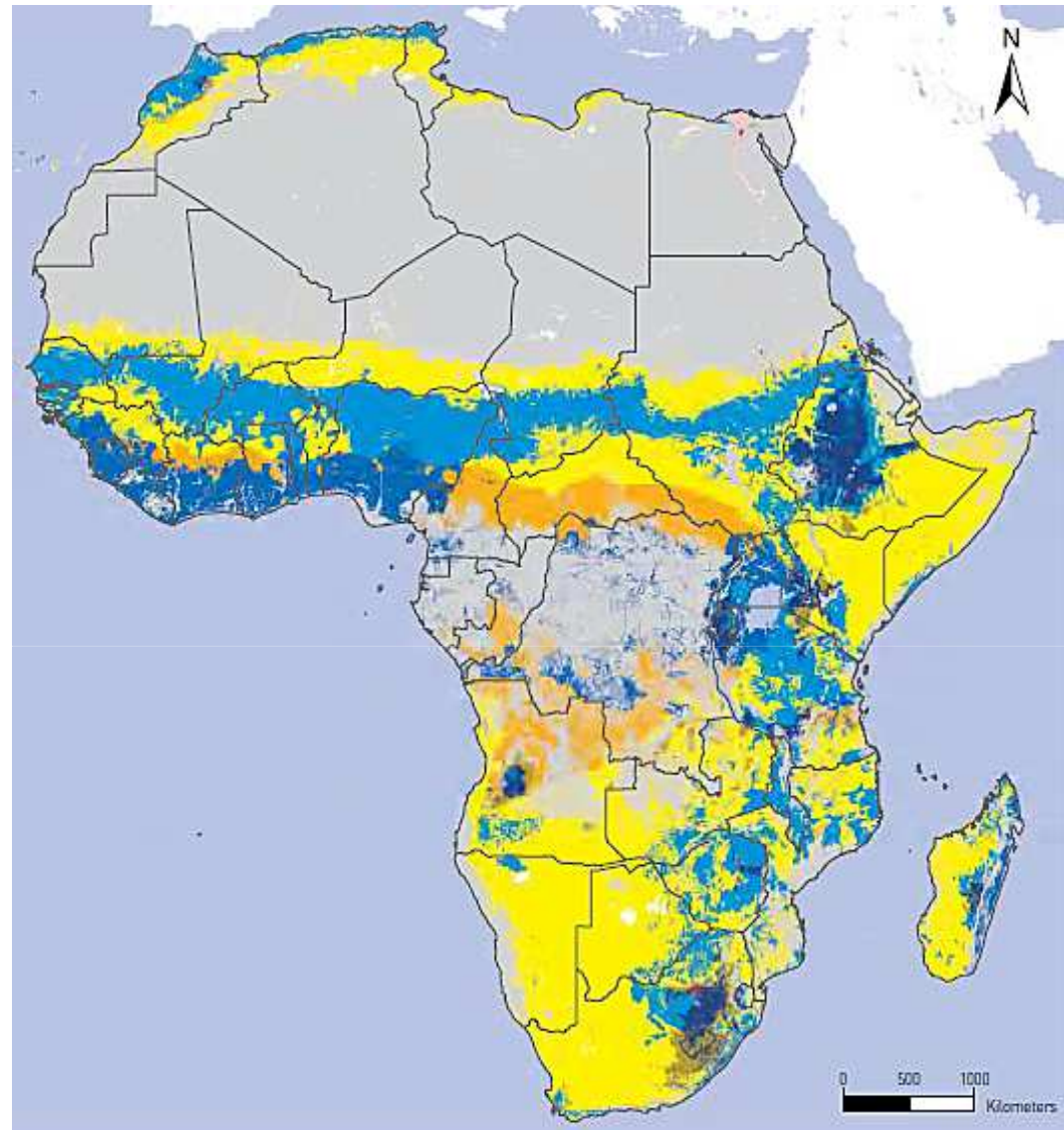


# Modern pastoral production systems

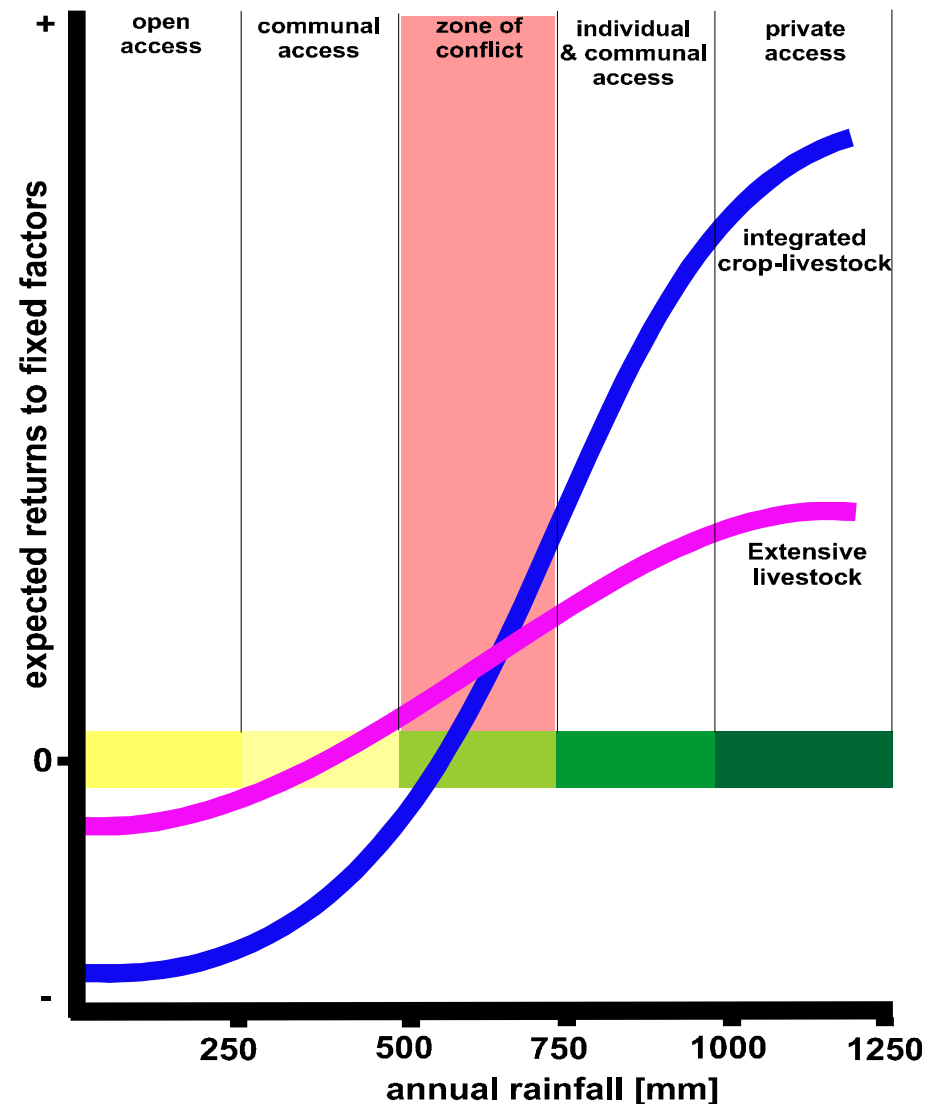
Production system	Description of land use type
Commercial ranching	grazing domestic stock on individually owned land for subsistence and marketing
Group ranching	grazing domestic stock on group owned land for subsistence and marketing
Contract grazing	grazing individually owned domestic stock on contracted land



# Livestock Production Systems in Africa



# Common land tenure systems in different agro-ecological zones in Africa



H.J.Schwartz 2005

Source: modified after Swallow, 1993



# Economic contribution of pastoralism in East Africa

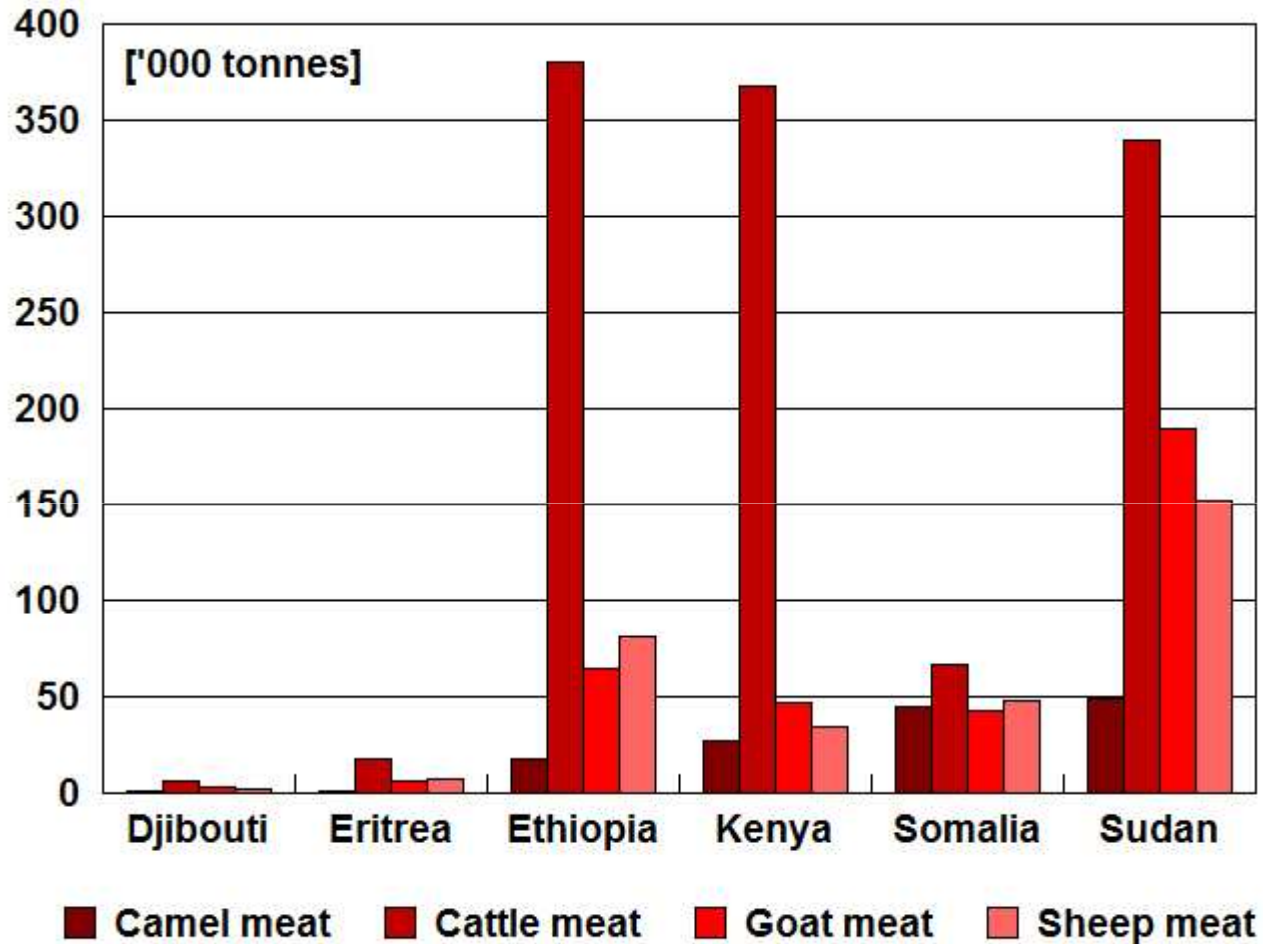
- Over 90% of meat consumed in East Africa comes from pastoral herds
- In Ethiopia the livestock sector is 2nd to coffee in generating foreign exchange, mostly from pastoral herds
- In Somalia 80% of foreign exchange earnings comes from livestock trade out of pastoral herds, even without functioning government.



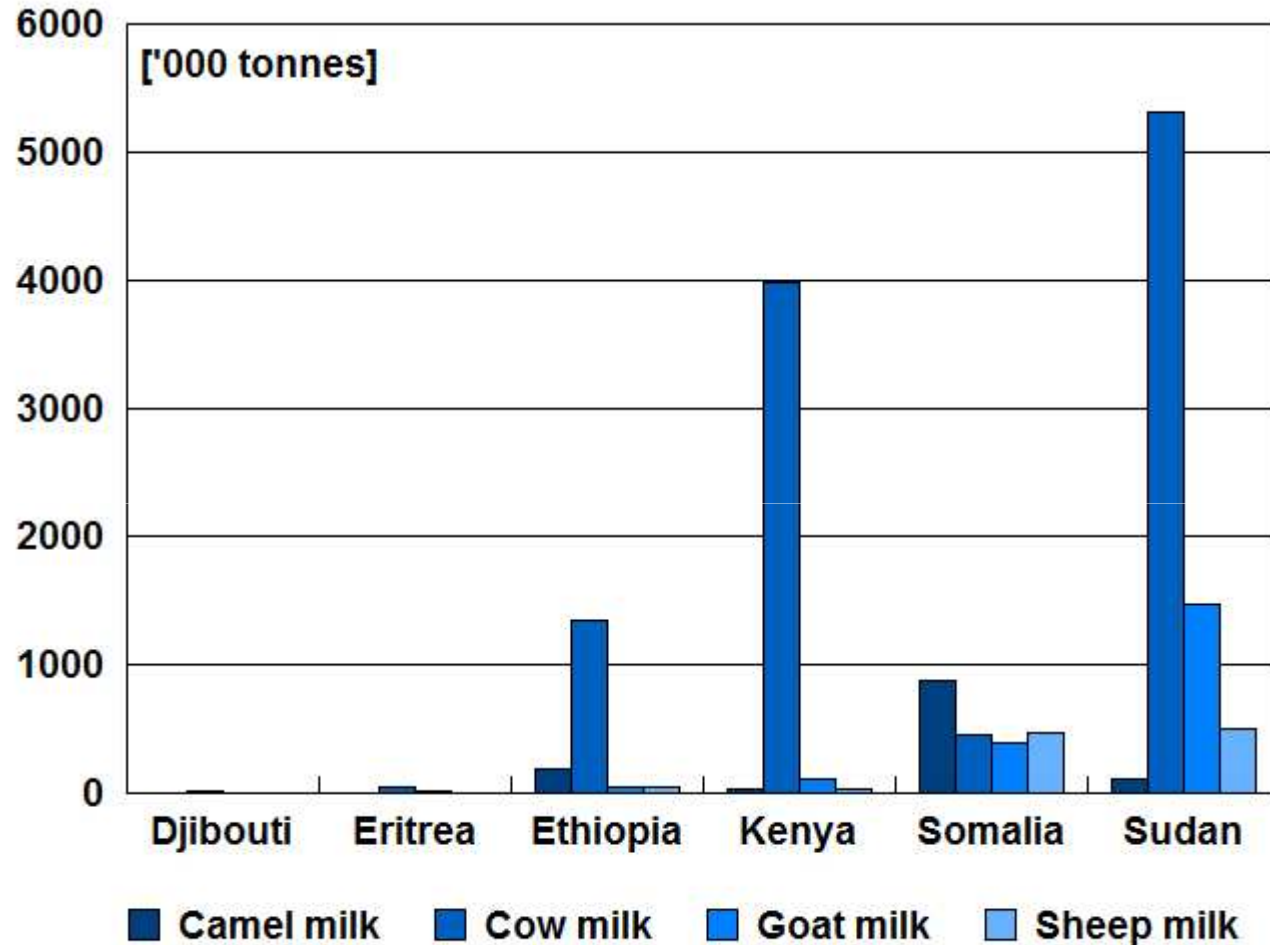




# Meat production from pastoral herds in East Africa (2008)



## Milk production from pastoral herds in East Africa (2008)



# Economic contribution of pastoralism in East Africa

- Over 90% of meat consumed in East Africa comes from pastoral herds
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**BUT there is an increasing disparity between rich and poor**

- While some pastoralists operate highly commercialised and are getting richer, others are struggling to survive
- More families become very poor & vulnerable, lack power and means to grasp new opportunities, depend heavily on food aid







Image © 2011 DigitalGlobe  
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Bildaufnahmedatum: 1/25/2008

2°00'36.73"N 37°29'48.73"O Höhe 550 m

Sichthöhe 972 m





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Image ©2011 GeoEye

Bildaufnahmedatum: 10/10/2010

1°59'09.93" N 37°55'04.34" O Höhe 463 m

Sichthöhe 775 m

# Objectives for pastoral livestock production

## Pastoralists

Maximising output of subsistence products (milk, meat, blood, skins, work)

Meeting social obligations (bride price, stock alliances)

Providing disaster insurance (drought, epidemics, raids)

Marketing surplus products to cover cash requirements

## National Governments

Promote national self sufficiency of food production (milk, meat)

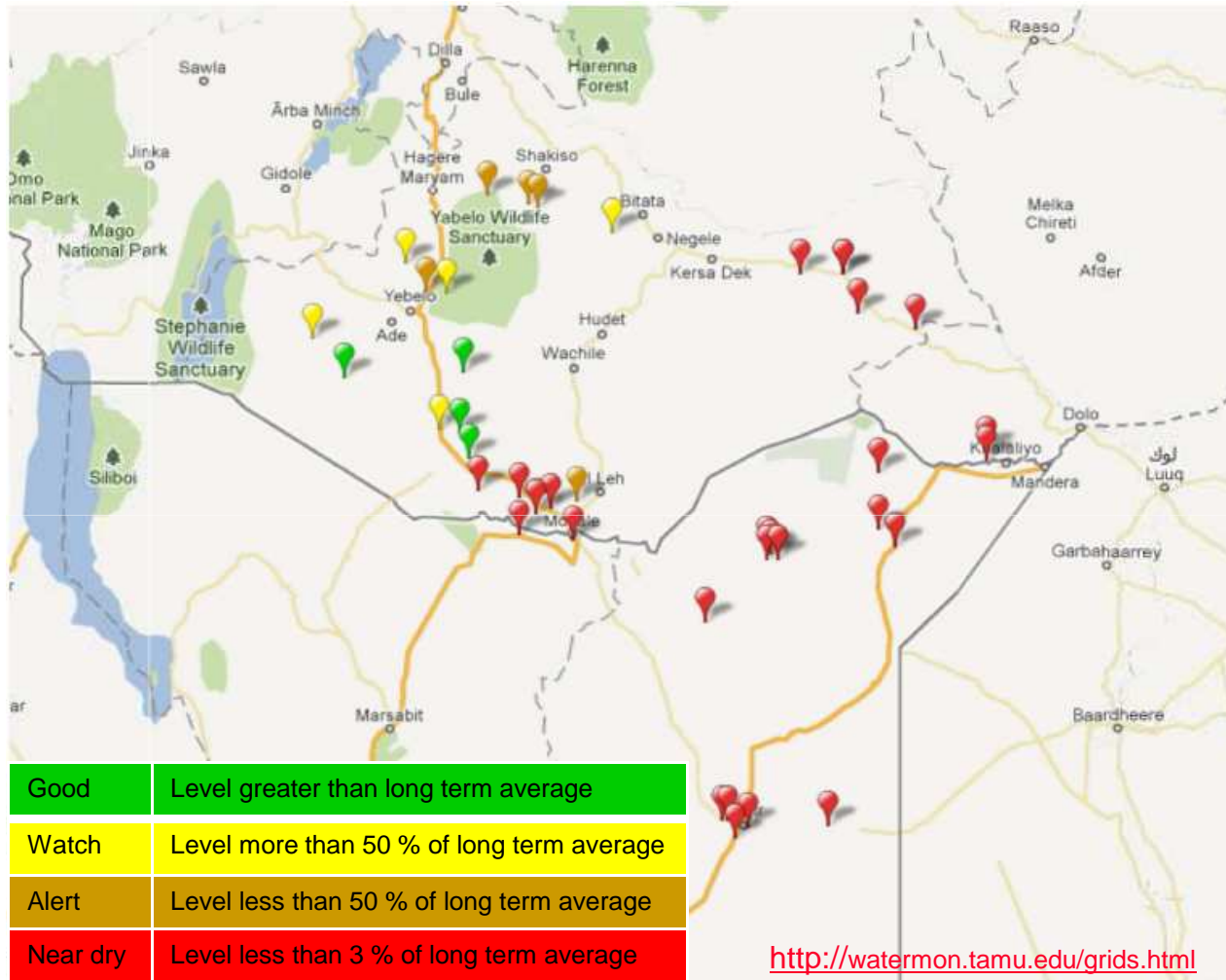
Generate export products (meat, fibre, skins)

Alternative land uses (tourism, irrigation agriculture, forestry)

Resource conservation and rehabilitation

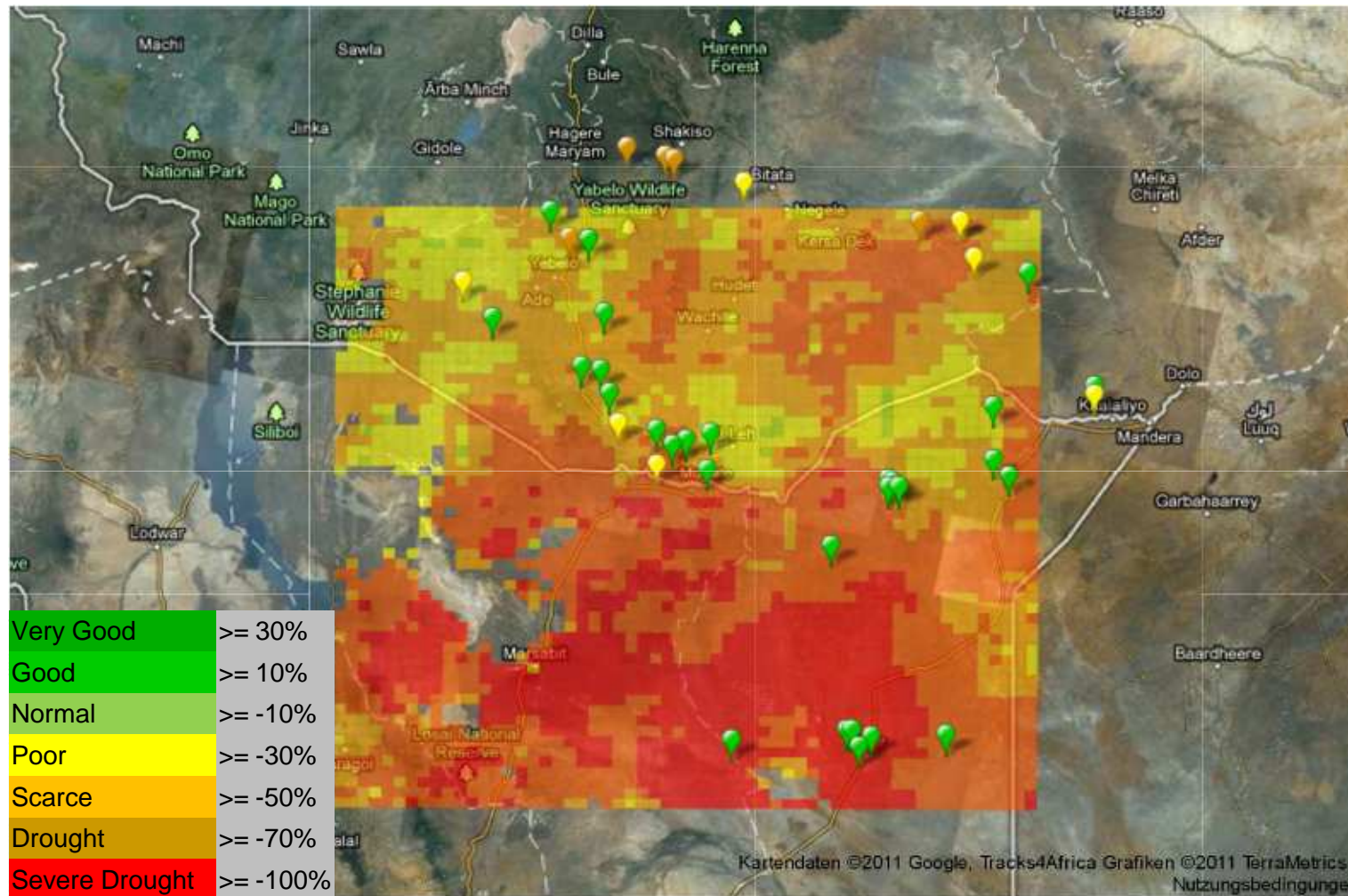


# Waterhole Monitoring for Livestock Early Warning





# Deviation of standing forage biomass from long term average







Bildaufnahmedatum: 7/29/2011

© 2011 Cnes/Spot Image  
Image © 2011 DigitalGlobe  
Image © 2011 GeoEye  
0°05'22.83" N 40°18'57.43" E Höhe 121 m

© 2010 Google

Sichthöhe 25.66 km





Image © 2011 GeoEye

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Bildaufnahmedatum: 7/29/2011

0°00'03.26" N 40°22'21.42" E Höhe 123m

Sichthöhe 4.33 km