

Global Development of Camel Populations, Production Systems, and Systems Productivity

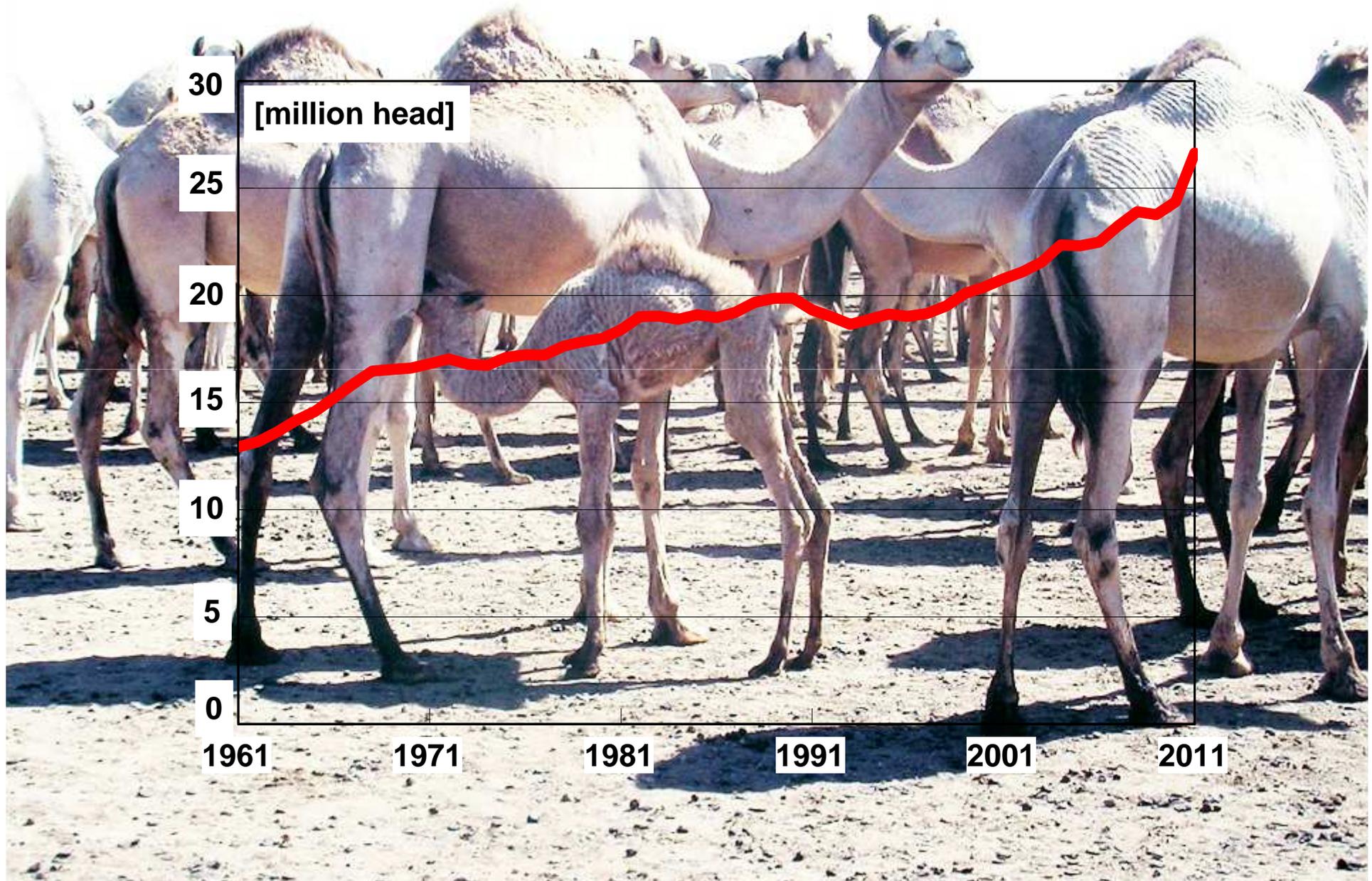
H. J. Schwartz, MSc, PhD, Professor em.
Faculty of Agriculture and Horticulture
Humboldt University of Berlin



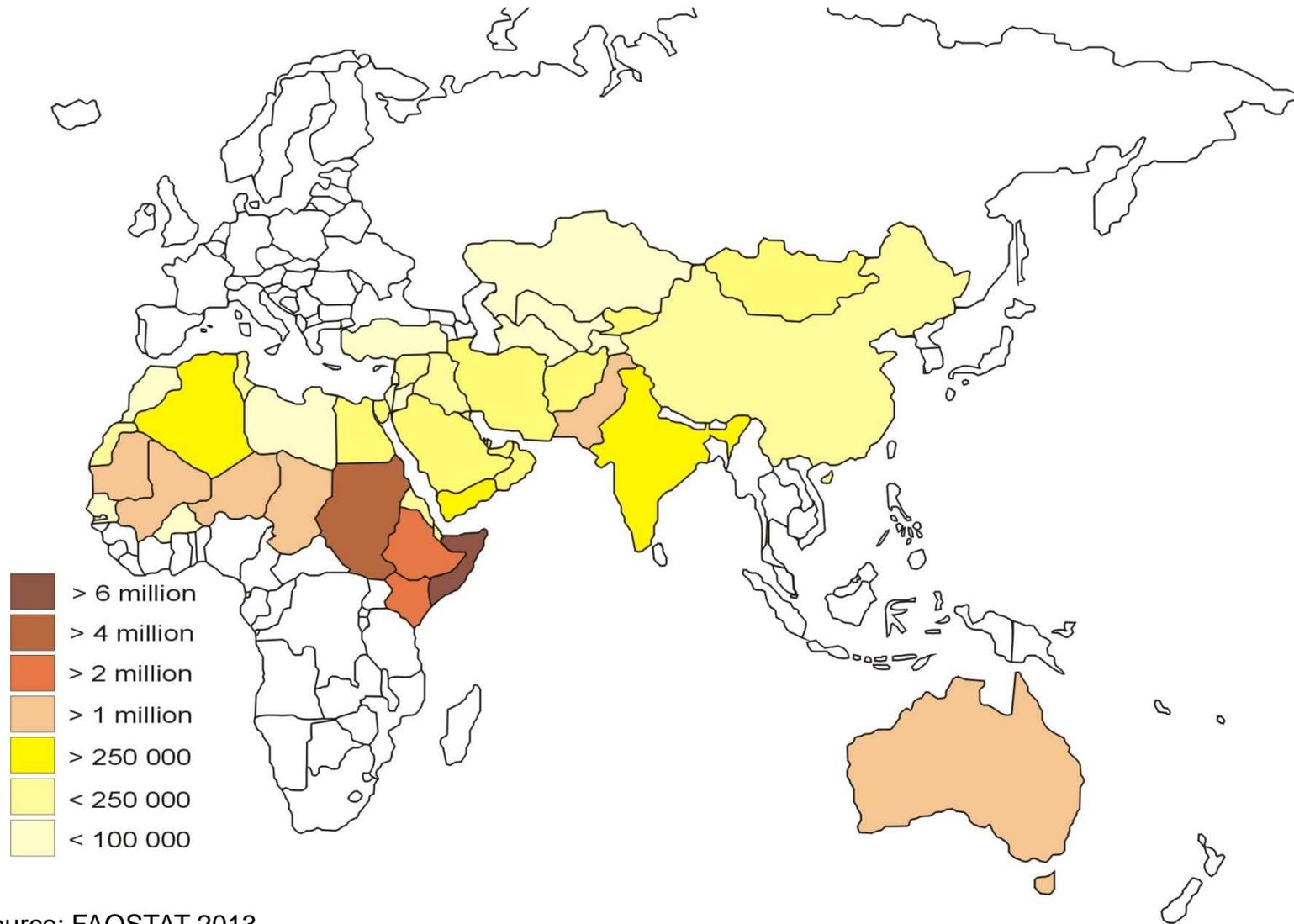
schwartzhj@gmail.com

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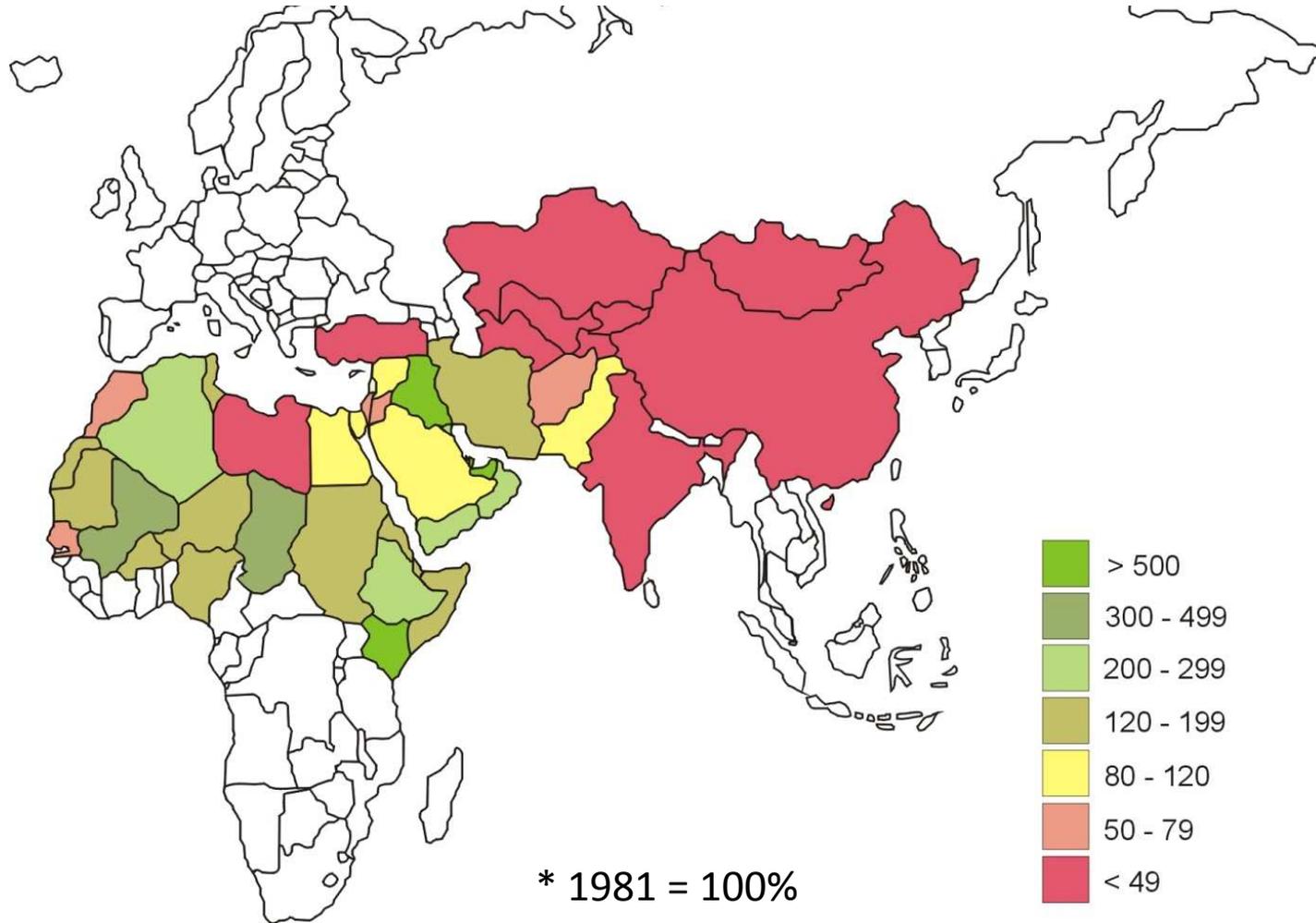
Growth of the world camel population since 1961



Estimated camel populations in 2011 by country

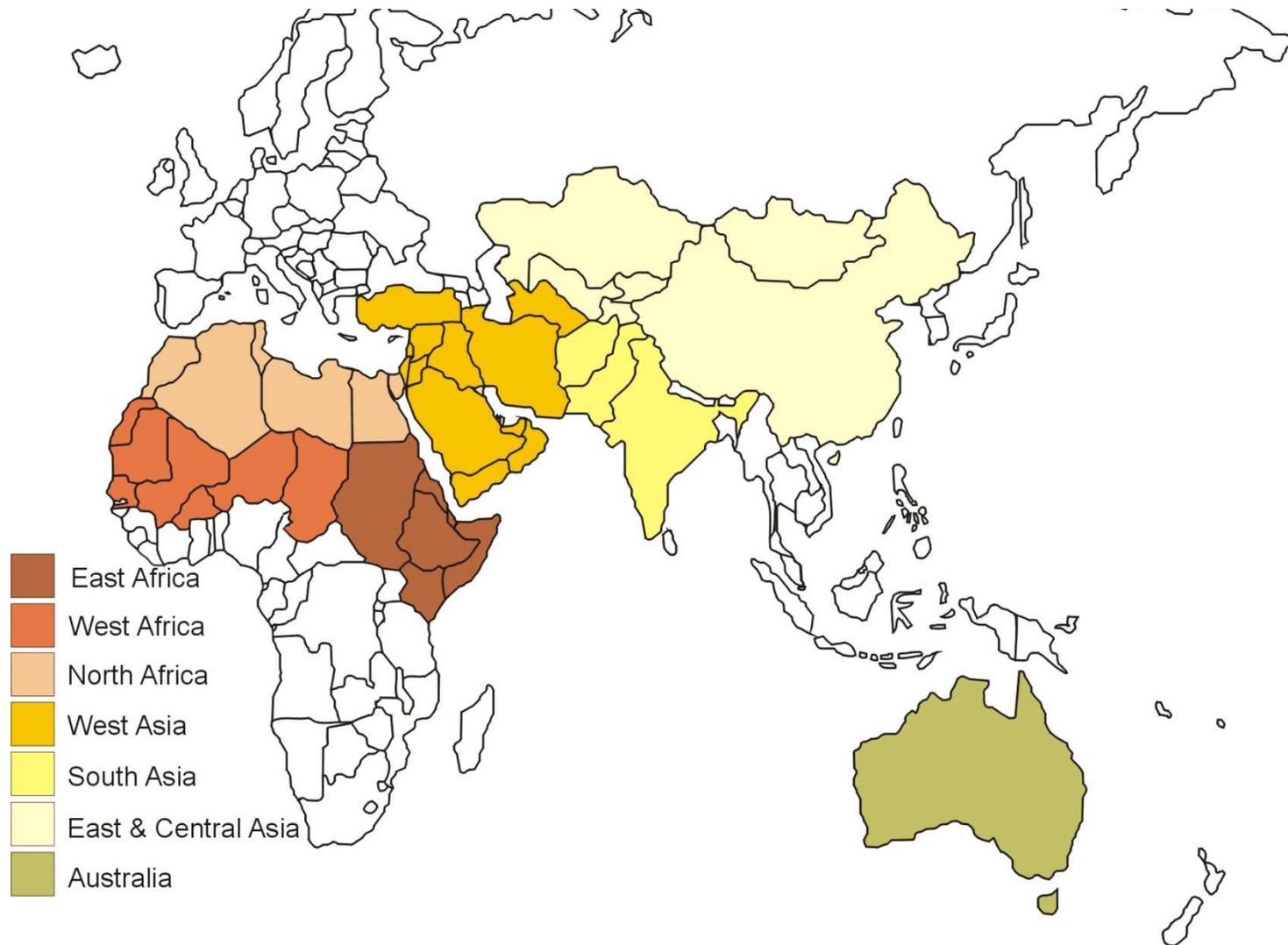


Estimated camel population change [%]* between 1981 and 2011 by country

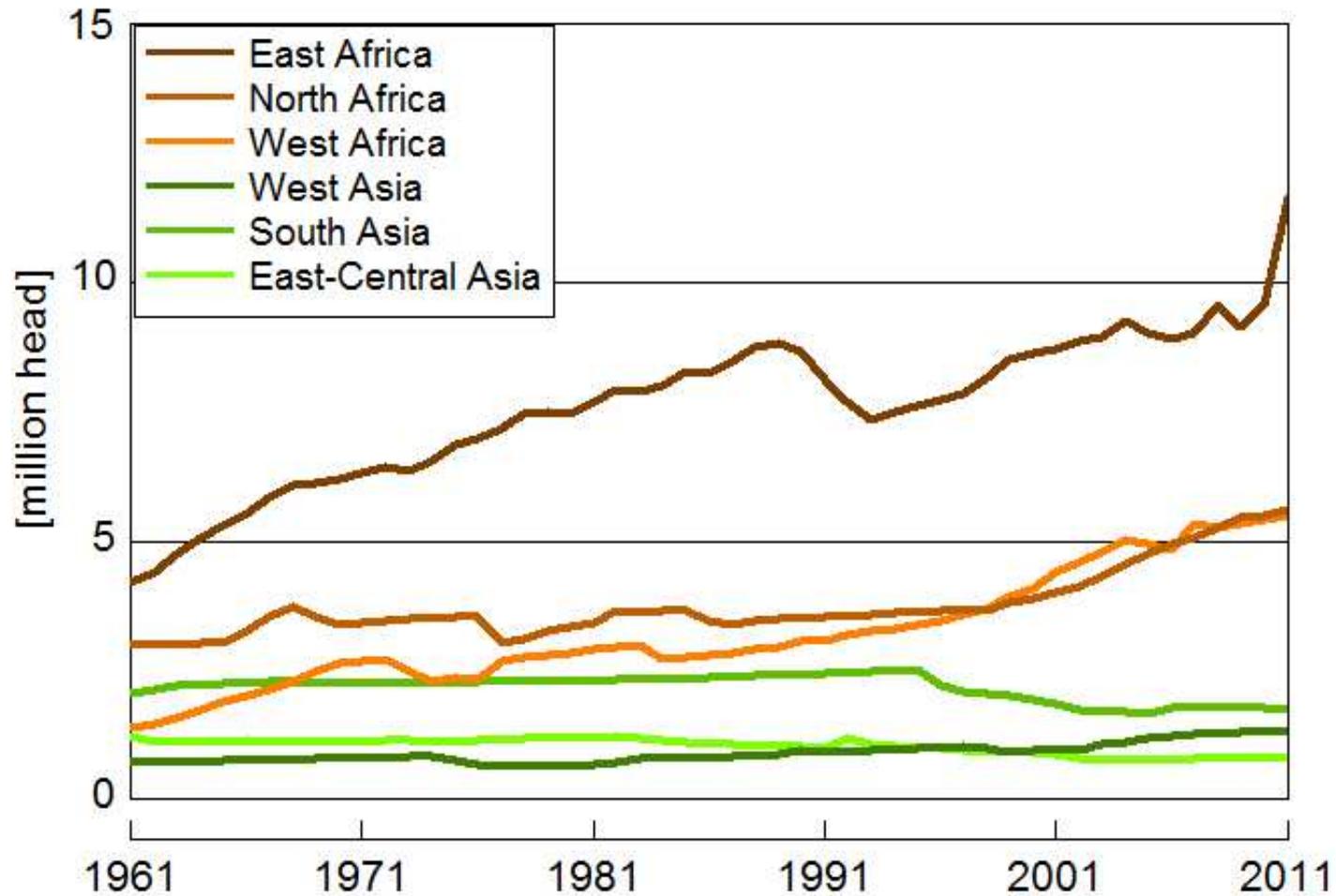


Source: FAOSTAT 2013

Six Regions as defined by FAOSTAT for production statistics where camels are found in larger numbers

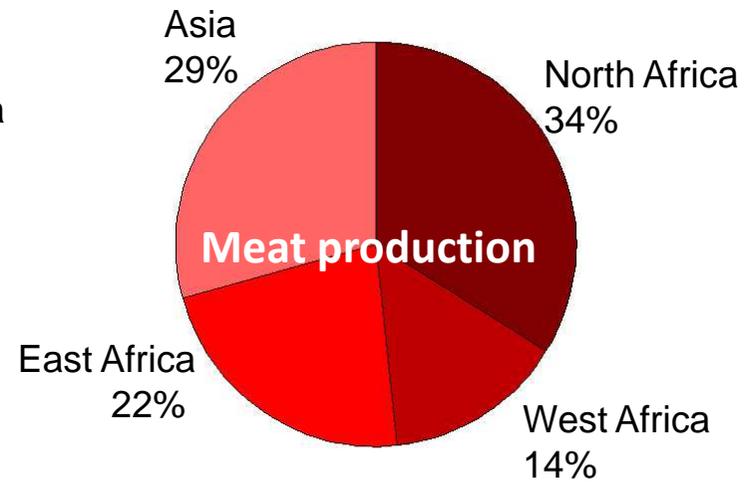
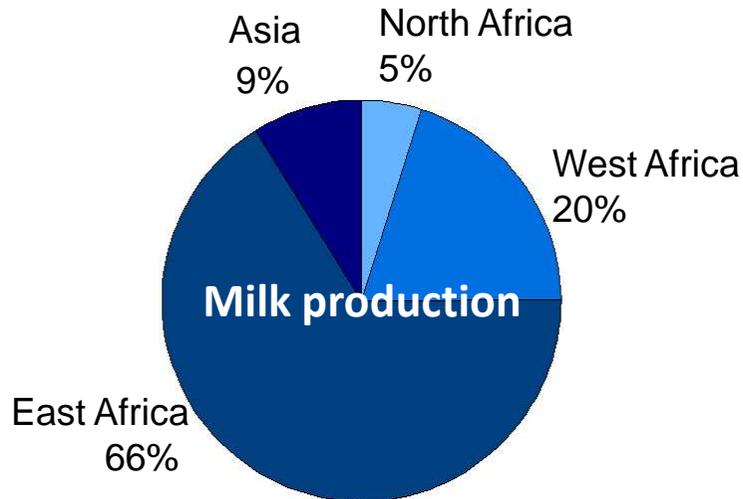
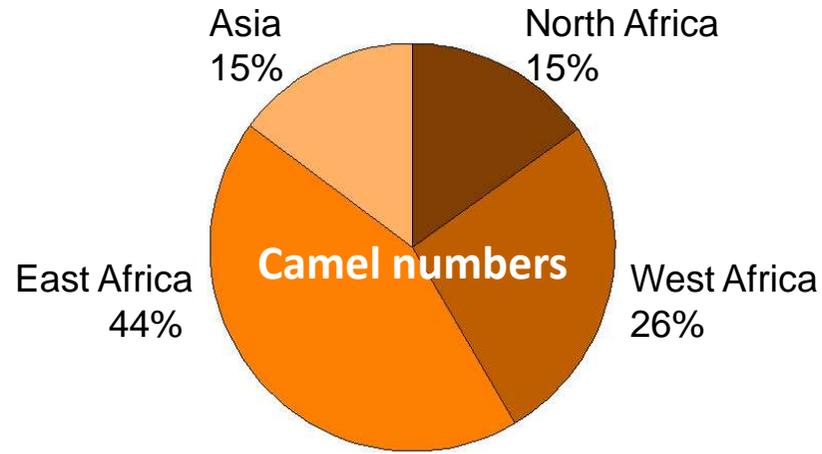


Change of camel numbers by region since 1961



Source: FAOSTAT 2013

Proportion [%] of camel numbers, milk and meat production by region in 2011



Source: FAOSTAT 2013

Production systems with camels

Production system	Climate type
Mixed farming, irrigation farming	Sub-humid to arid
Agro-pastoralism	Dry sub-humid
Sedentary pastoralism including ranching	Dry sub-humid
Semi-sedentary pastoralism	Semi-arid
Migratory pastoralism including transhumance	Arid to very arid
Off-farm systems, commercial transport	All climate types

Major camel products and services

Milk for subsistence
for marketing

Meat for subsistence
for marketing

Work on farm
off farm

Live slaughter animals for export

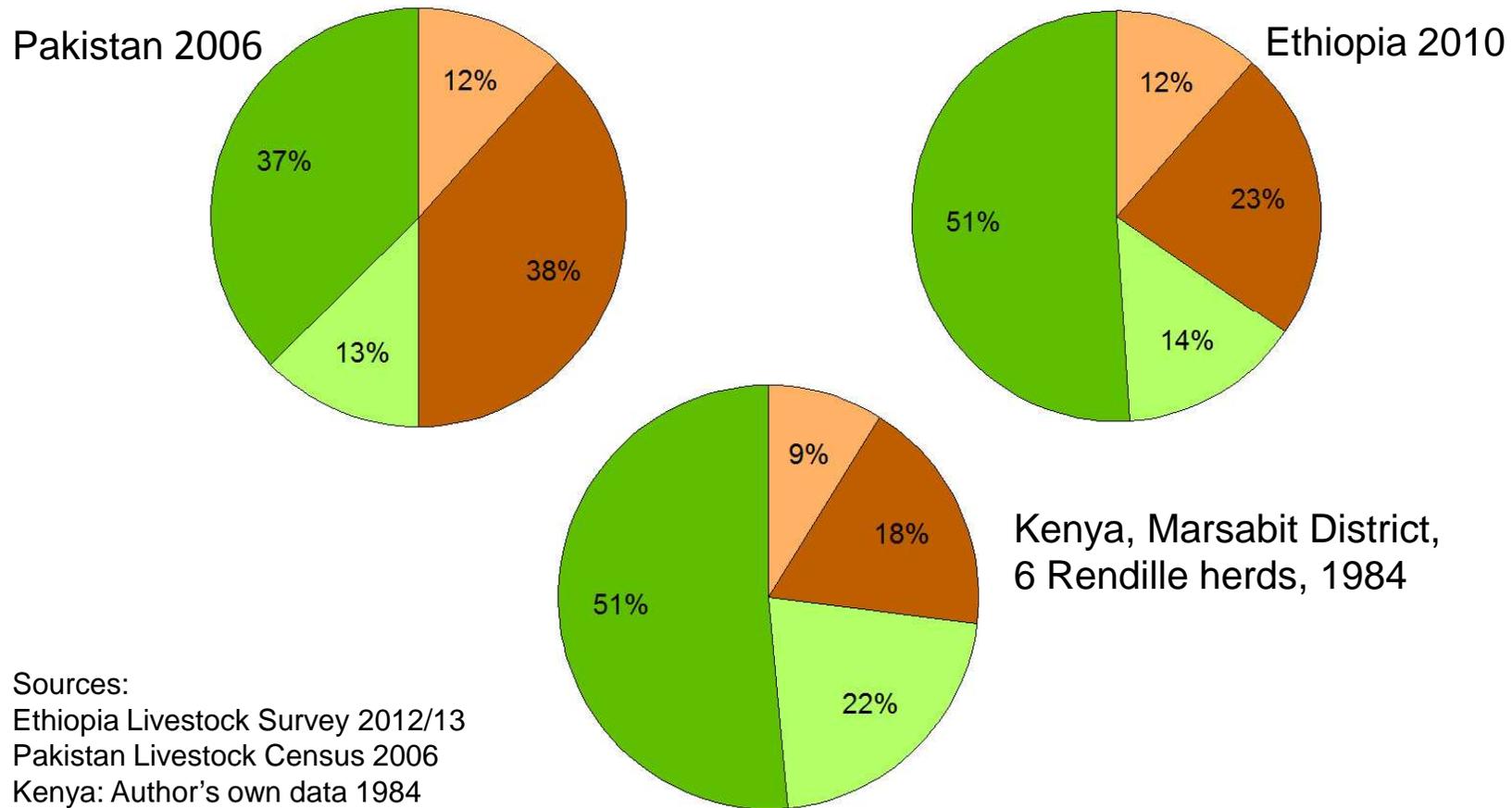
Work animals and breeding stock for marketing

Hair and incidental by-products



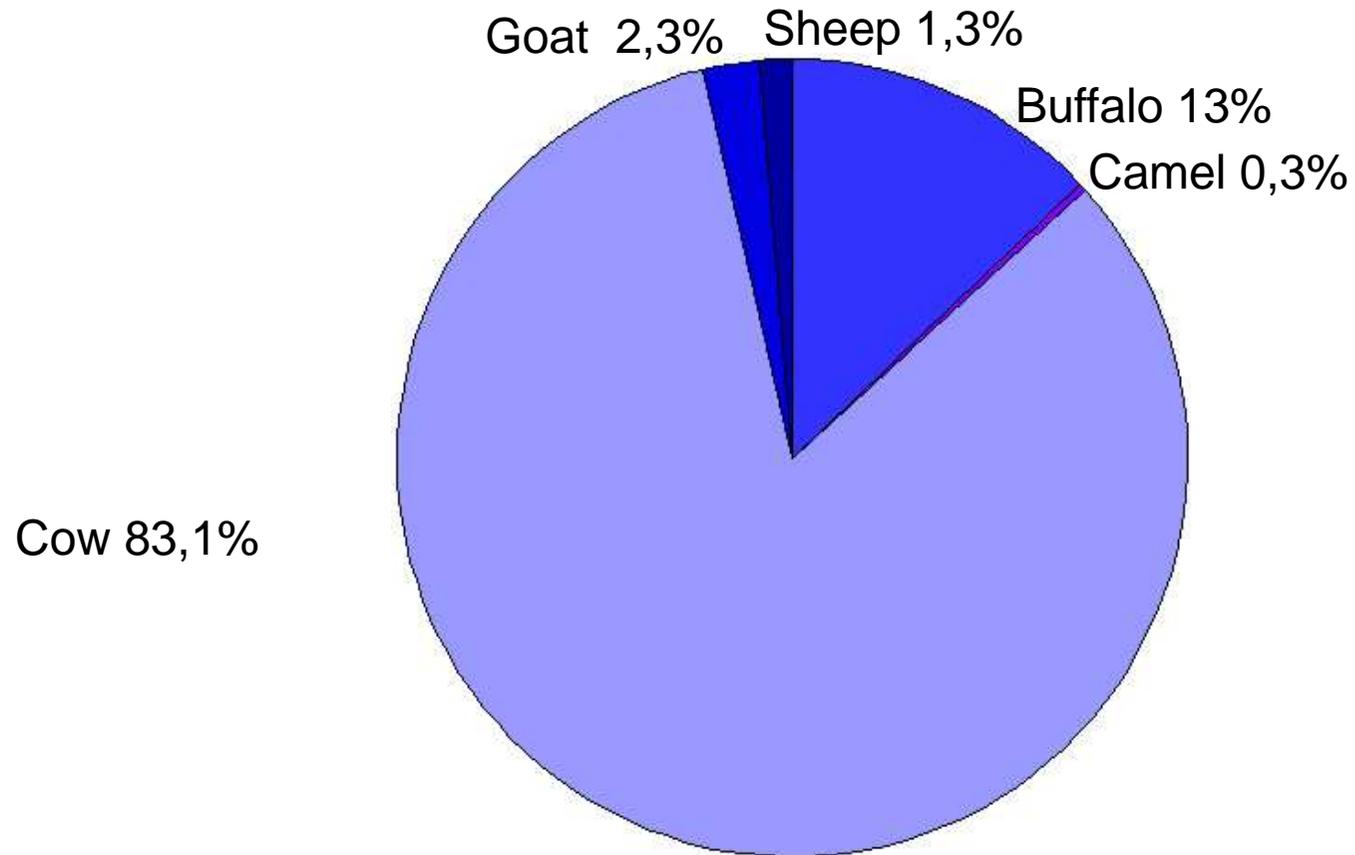
Estimated composition of some national camel herds by sex and age

immature males mature males immature females mature females



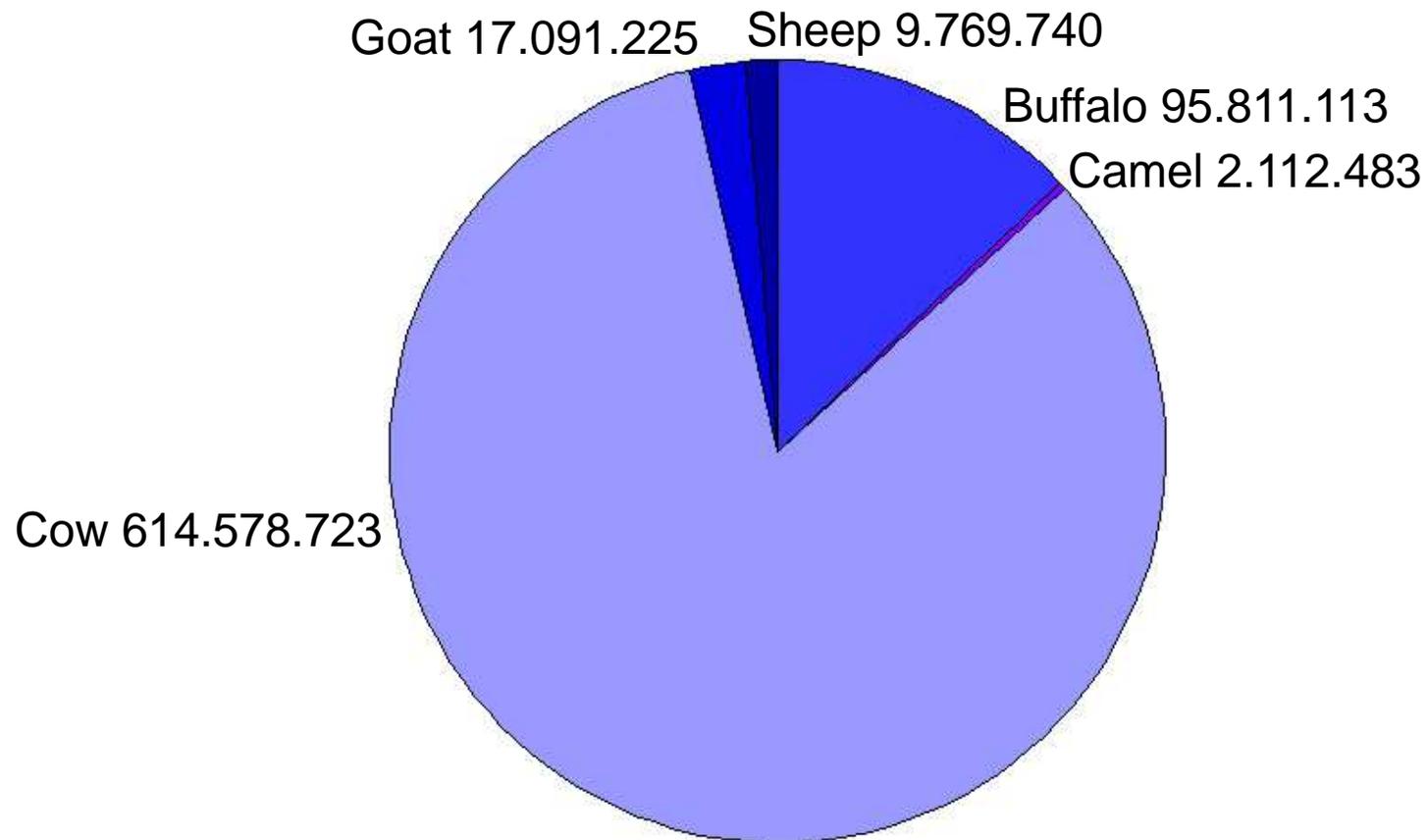
Sources:
Ethiopia Livestock Survey 2012/13
Pakistan Livestock Census 2006
Kenya: Author's own data 1984

Total world milk production by animal species [% of global milk production]



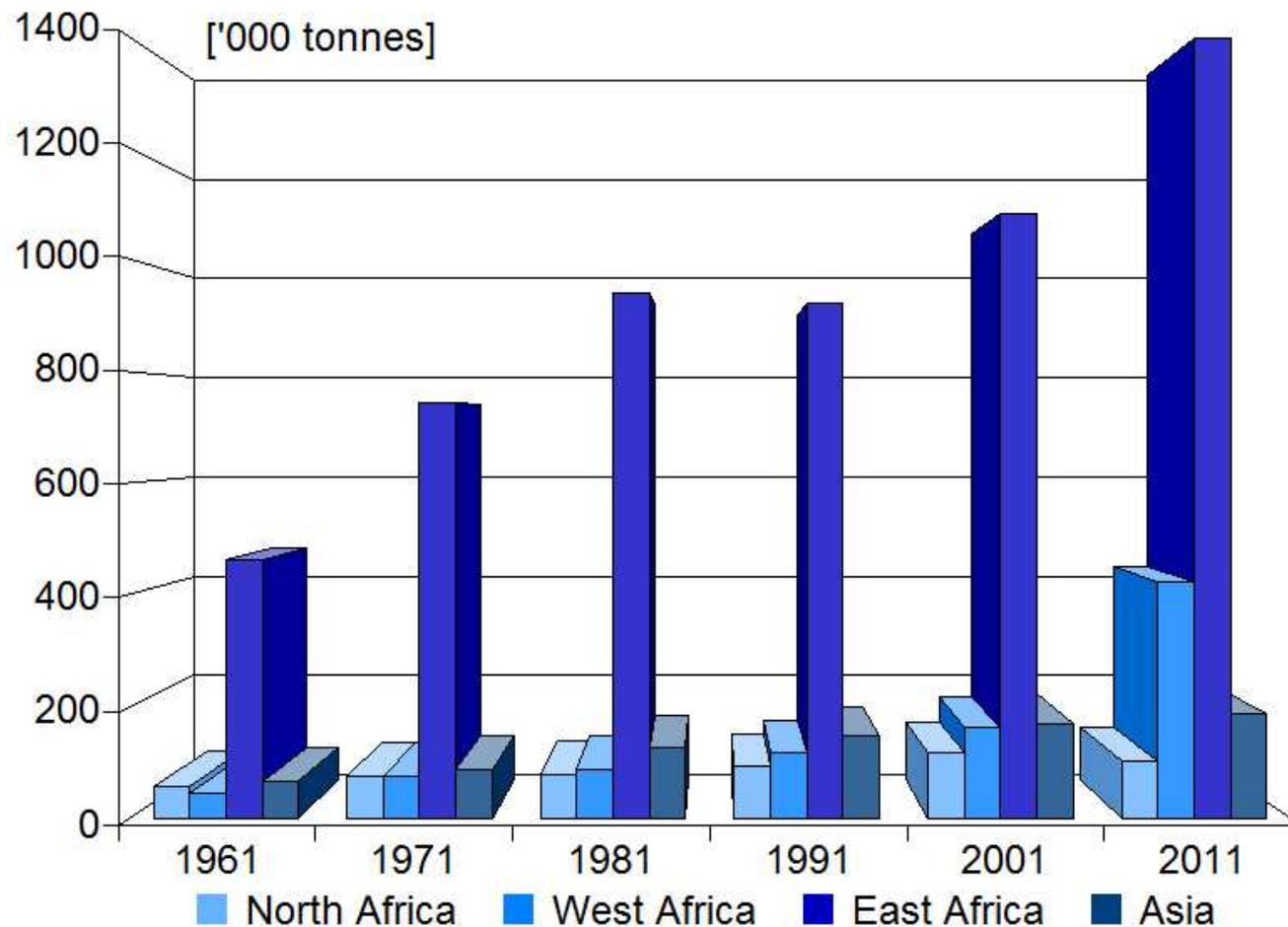
Source: FAOSTAT 2013

Total world milk production by animal species [tons]



Source: FAOSTAT 2013

Changes in camel milk production by region since 1961



Source: FAOSTAT 2013

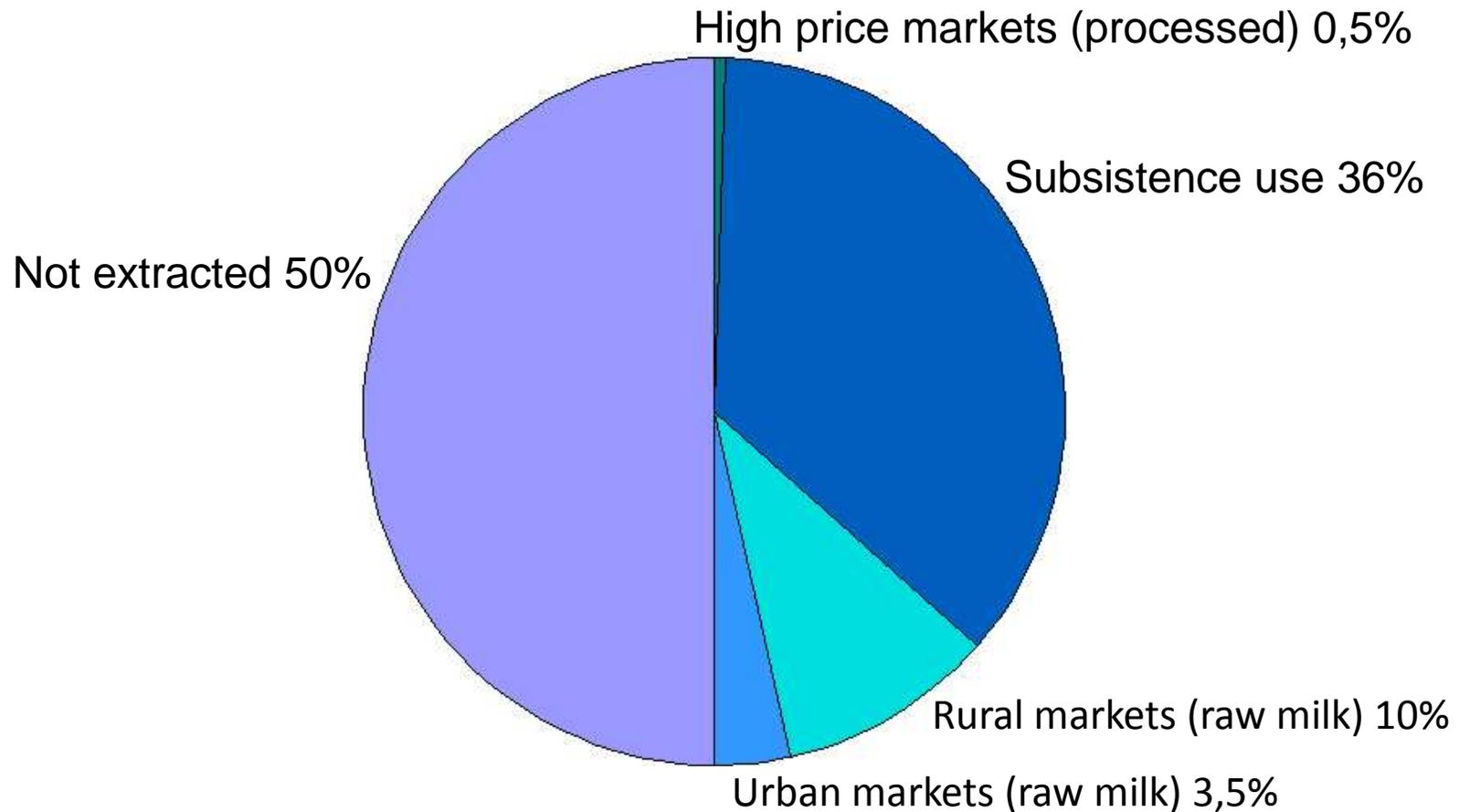
Some key descriptors for extensive milk production in Kenya (2007)

Common herd size	< 30 to > 500
% lactating animals	18 to 35 %
Average milk yield per female and year	1180 to 1850 l
Observed marketing quota	5 to 30 %
Observed milk price	18 to 30 KSh/l*

* 100 KSh ~ 1 €

Source: M. Mulinge, D. Kimenye & P. Kivolonzi (2008) The Camel Milk Industry in Kenya. RMC/SNV

Marketing quota [%] in extensive camel milk production in Kenya 2007



Source: M. Mulinge, D. Kimenye & P. Kivolonzi (2008) The Camel Milk Industry in Kenya. RMC/SNV

Intensive camel milk production for high price markets

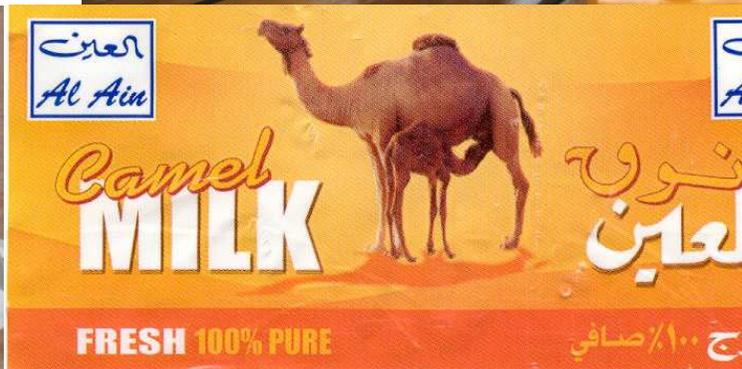




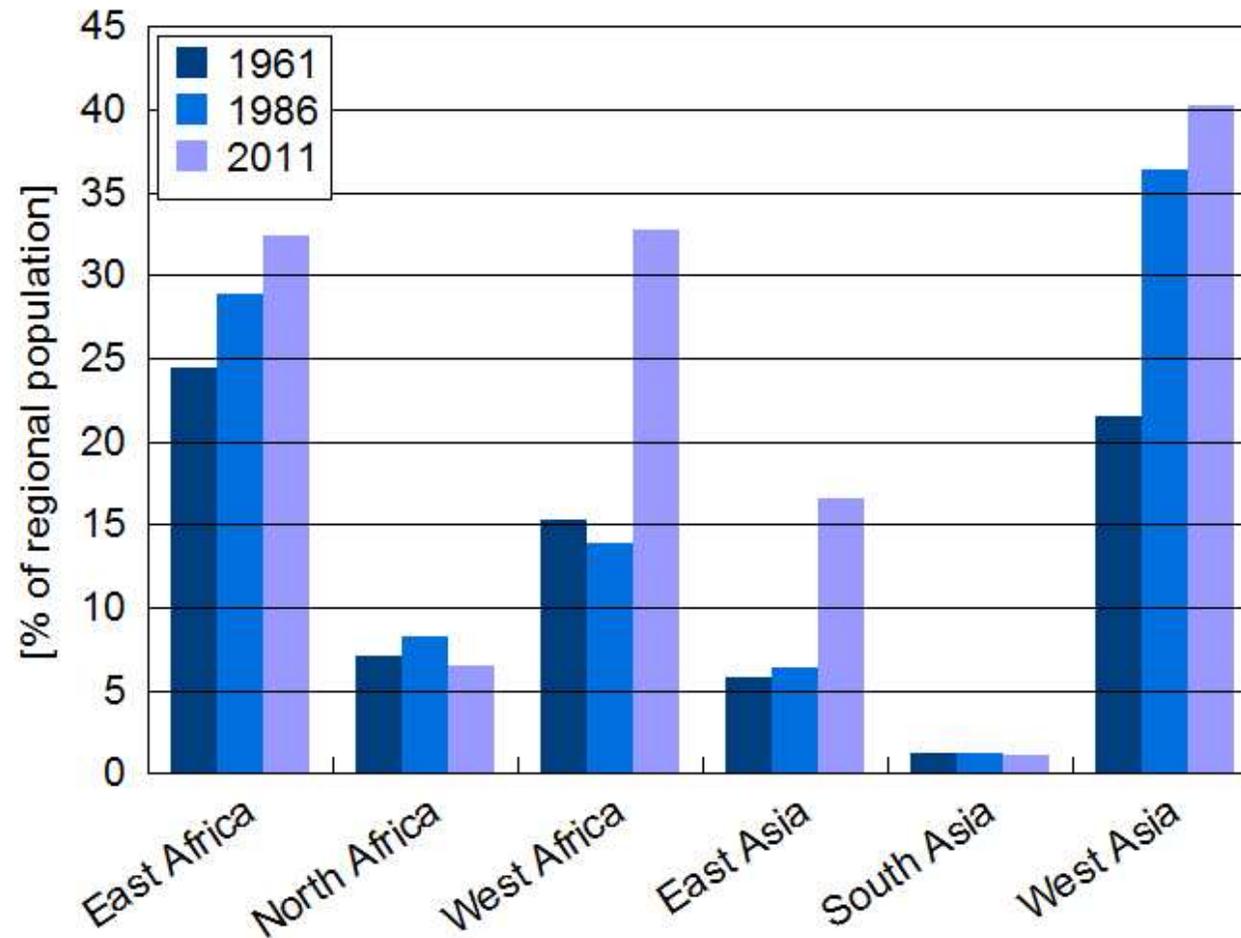
Courtesy of Al Ain Dairy and O2 PR

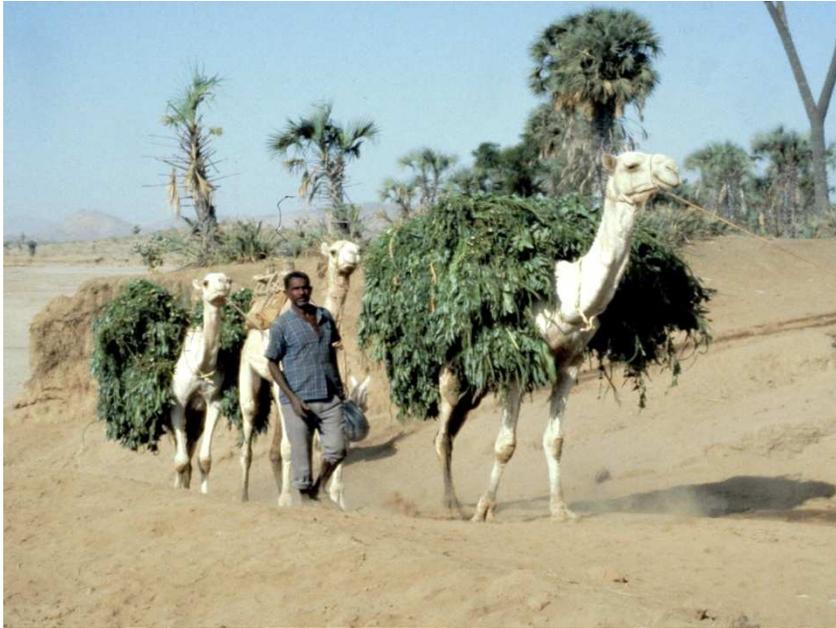


MARHABA CAMEL MILK	
125ml	Rs. 50/-
250ml	Rs. 90/-
500ml	Rs. 180/-
1000ml	Rs. 350/-



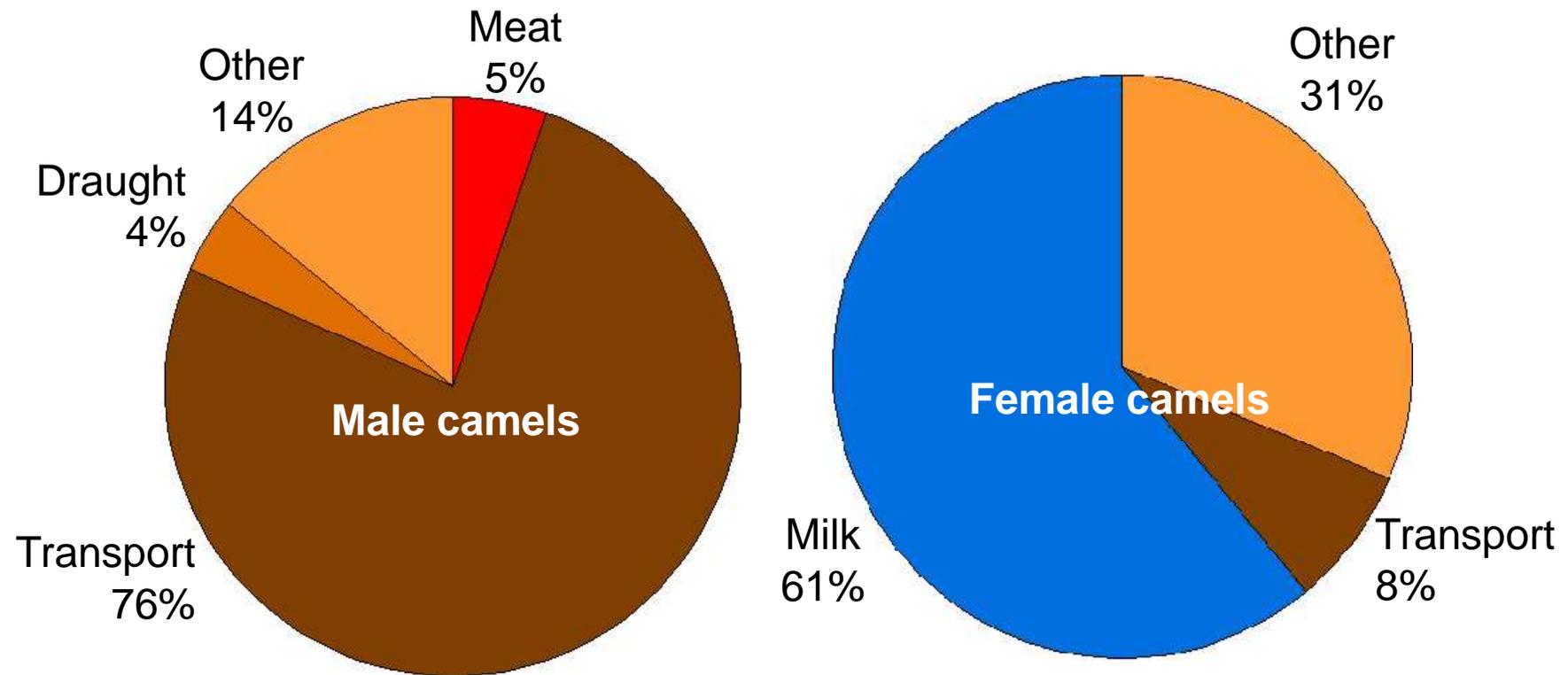
Proportion [%] of milked camels in the regional herds from 1961 to 2011



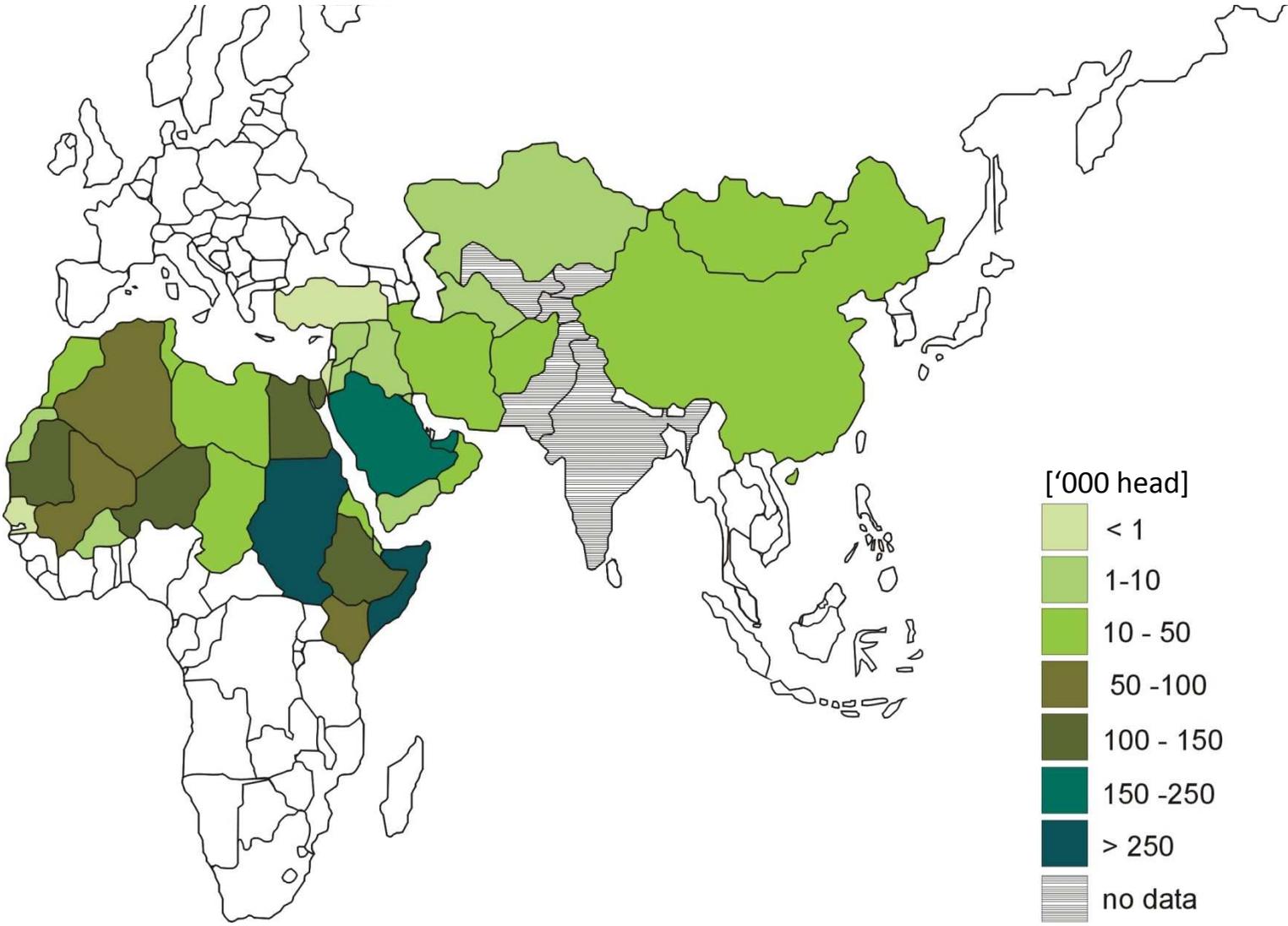




Prevalent uses [%] of male and female camels in Ethiopia

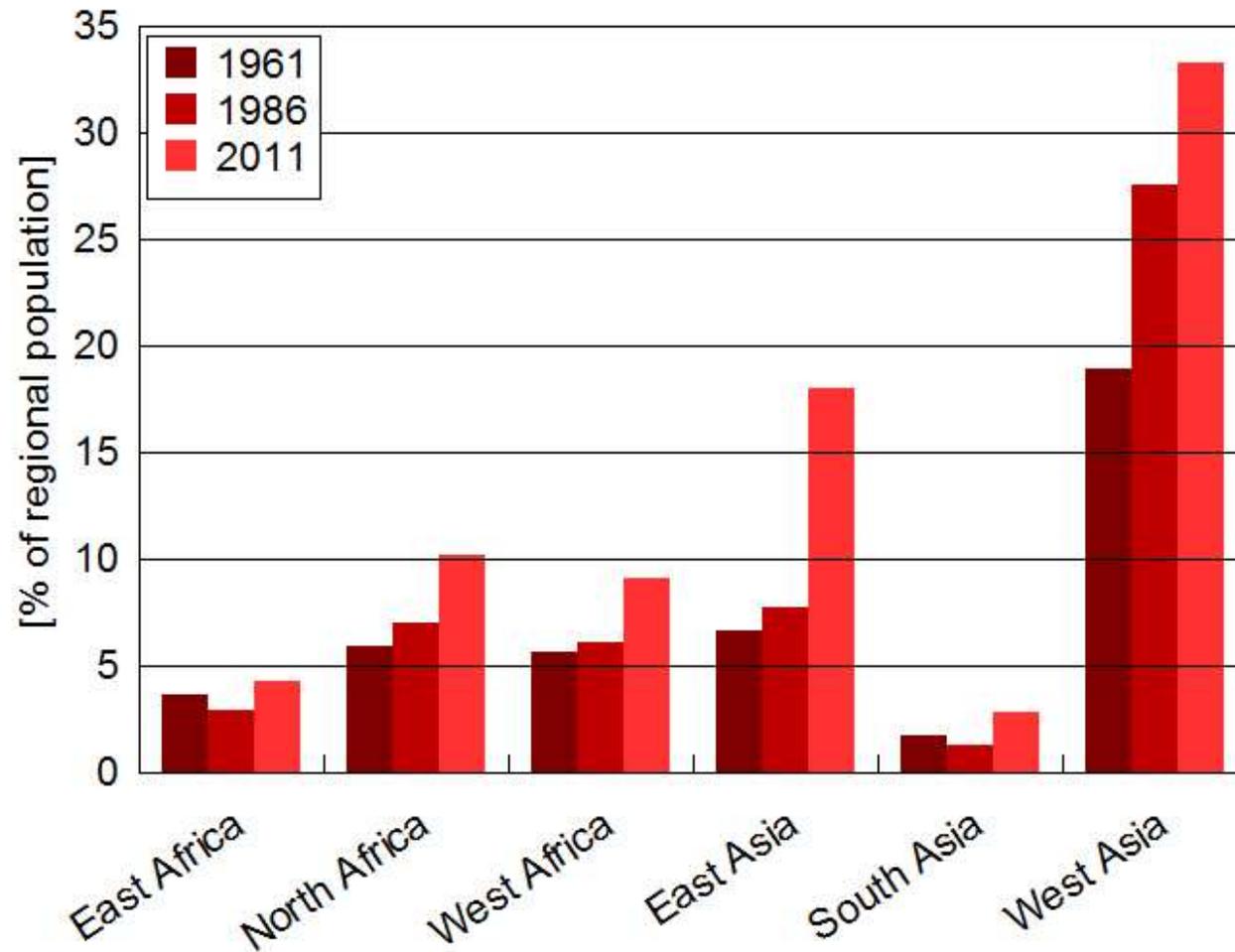


Number of camels slaughtered for internal consumption in 2011



Source: FAOSTAT 2013

Proportion of camels slaughtered for internal consumption in the regional herds from 1961 to 2011



Source: FAOSTAT 2013

Expected herd growth parameters in domestic ruminants and dromedaries under migratory pastoral management in Kenya

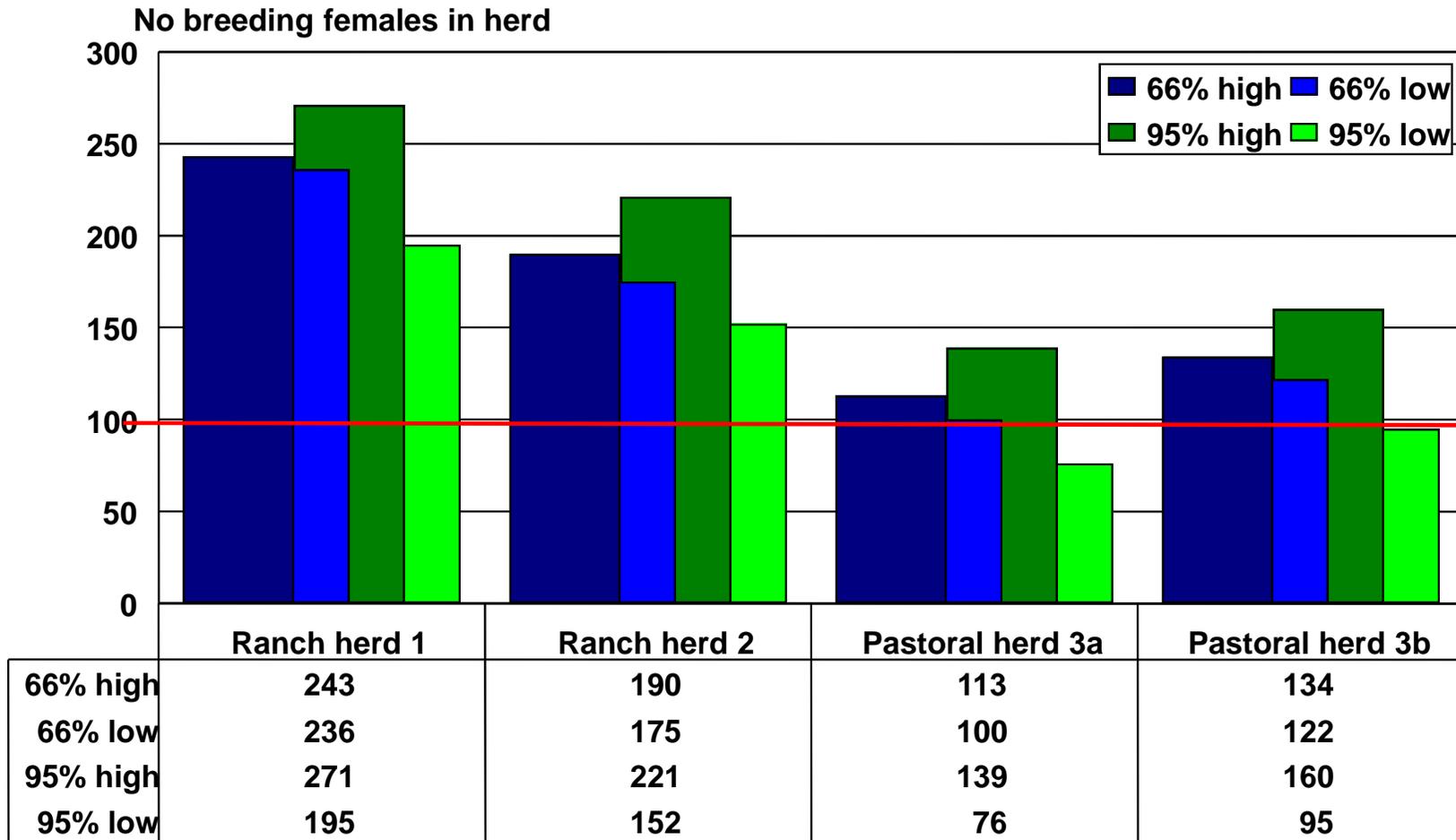
	Goat	Sheep	Cattle	Dromedary
Age at first parturition [months]	15	15	48	60
Litter size	1,4	1,0	1,0	1,0
Interval between births [months]	9	10	20	24
Young born/breeding female/year	1,8	1,4	0,7	0,5
Mortality up to one year[%]	35	35	30	50
Annual mortality after one year [%]	10	10	7	5
Time to doubling of the female breeding herd [years]	4,1	5,9	10,5	14,2

Some key parameters of herd growth in three Kenyan dromedary herds

	Ranch 1	Ranch 2	Nomadic herd
Breeding females (> 3 years)*	63	48	88
Birth rate [%/year]	57,4	54	42
Intercalving interval [months]	20,9	22,2	28,4
Female calf mortality to one year [%]	0	0	37
Male calf mortality to one year [%]	6,2	0	73
Mean extracted milk [kg]	500	400	1050

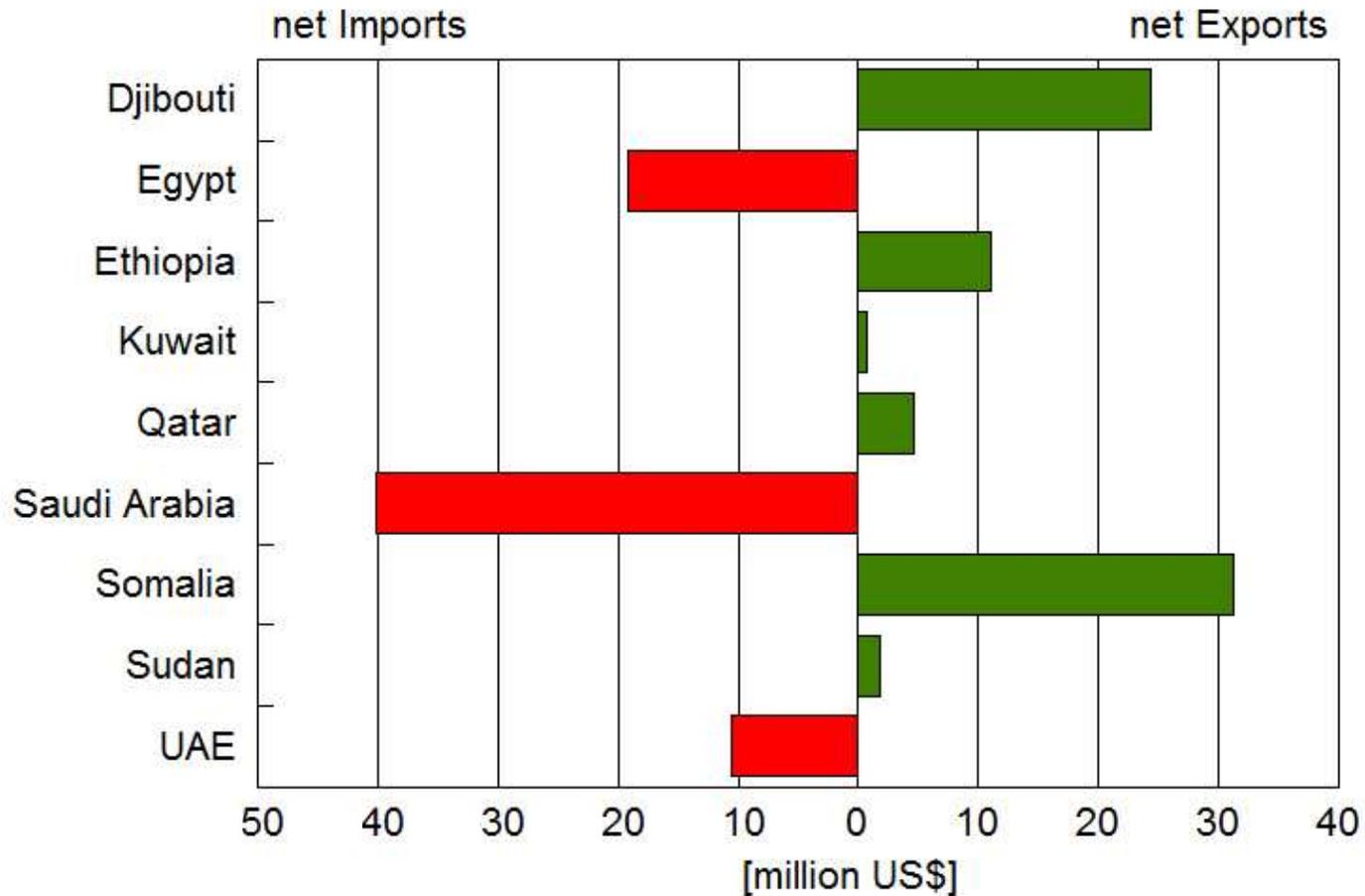
* at the end of the study period

Upper (high) and lower (low) thresholds of dromedary herd size in 4 production systems after 25 years, based on an initial herd of 100 breeding females aged 3 years, estimated at two levels of probability (66% and 95%)



Source: Schwartz & Walsh, 1990

Net import and net export values of live slaughter camels in 2011

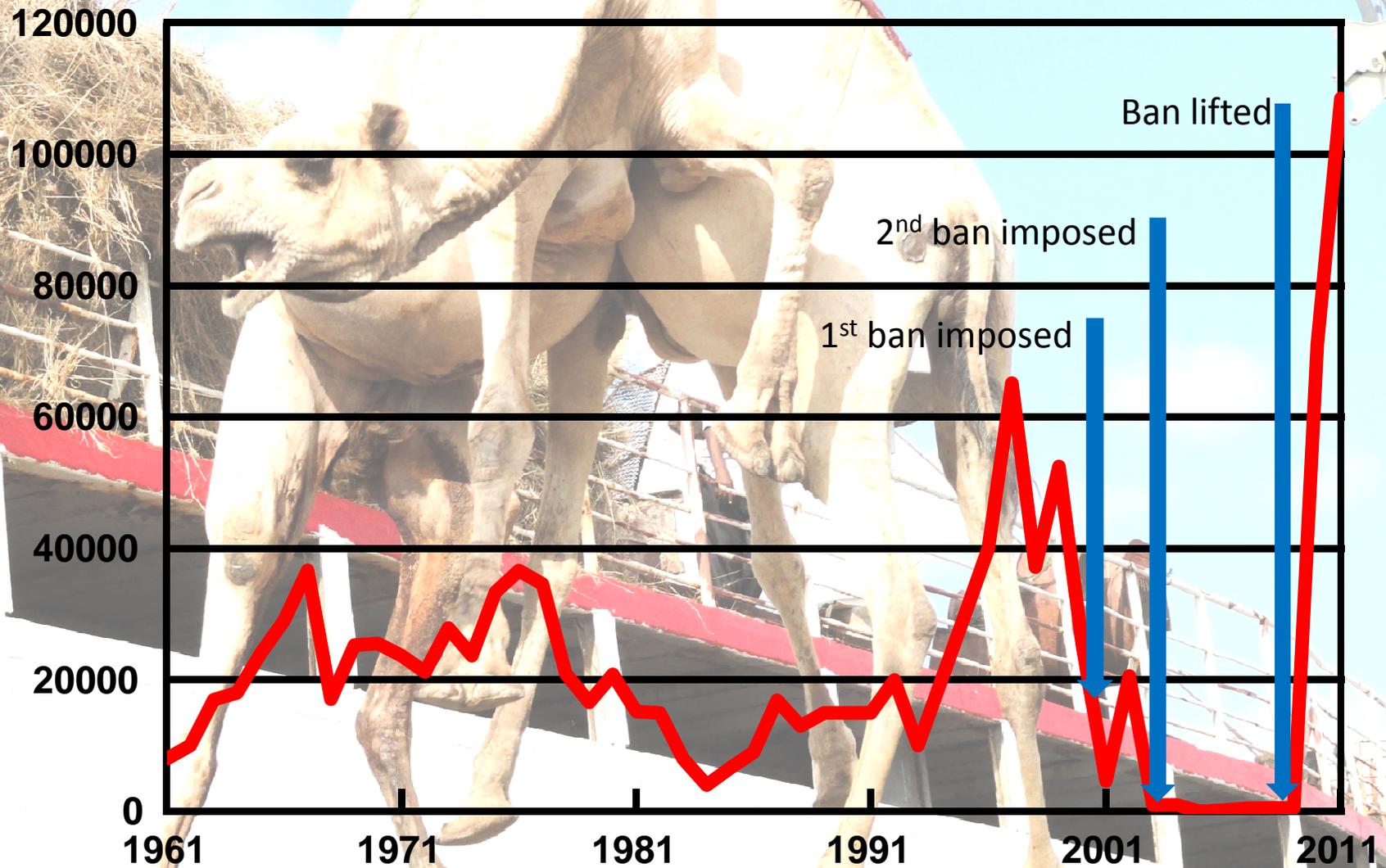


Sources: FAO Trade Yearbook 2013 & Feinstein International Centre 2011

Live camel export [head] from Berbera (Somaliland) port
since 1961



Live camel export [head] from Berbera (Somaliland) port since 1961



Conclusions

Production sector importance

Development of milk production: two directions

Climate change effects

Development of milk production: Extensive to semi-intensive

Key constraints

- 1 Low milk productivity
- 2 Low milk quality
- 3 Poor business orientation of producers
- 4 Underdeveloped support infrastructure
- 5 Poor market development

Key opportunities

- 1 Large and expanding demand
- 2 Potential for increased production and extraction
- 3 Emergence of commercialisation trends
- 4 Existing demonstration enterprises

Development of milk production: Intensive

Key constraints

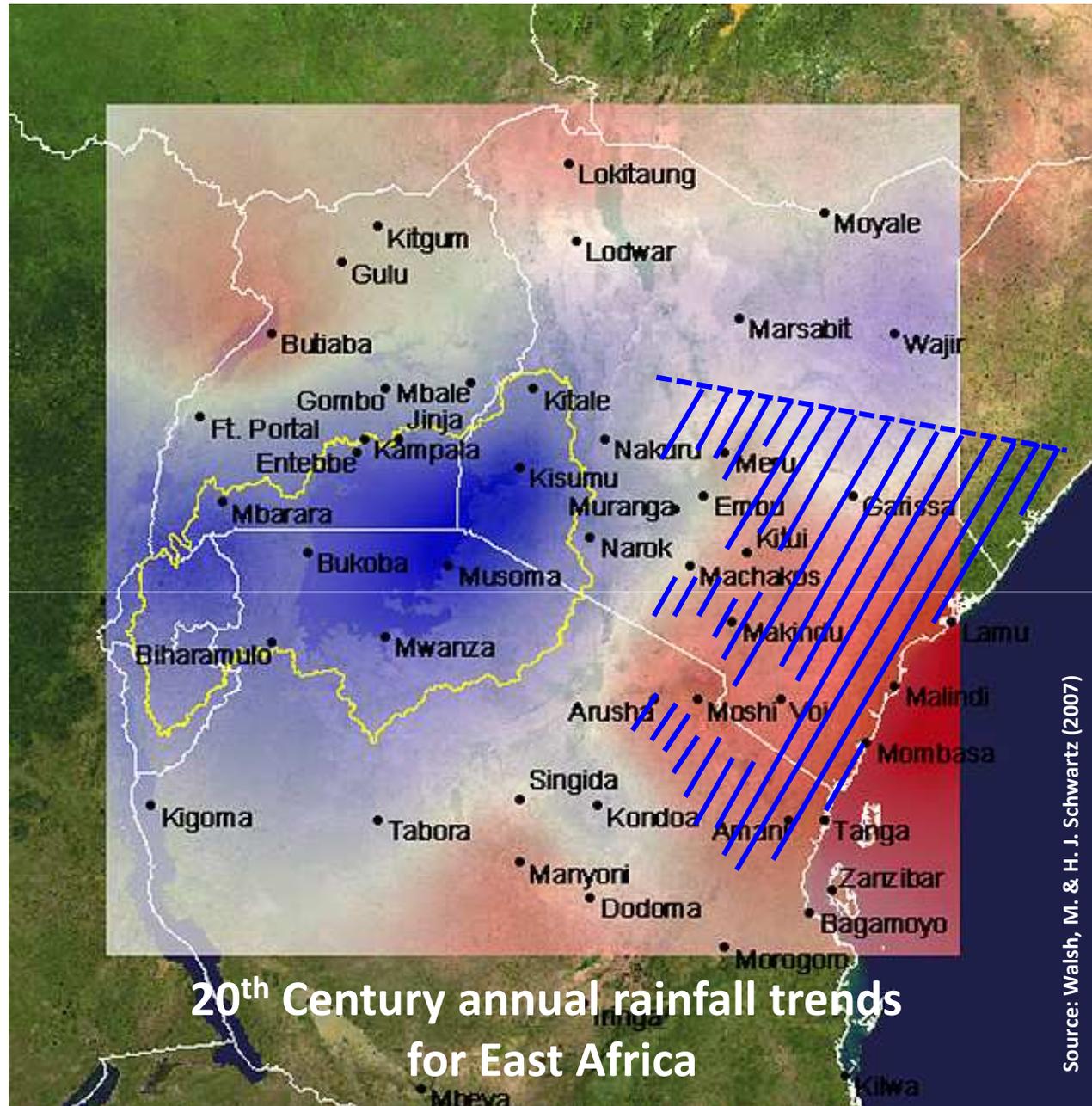
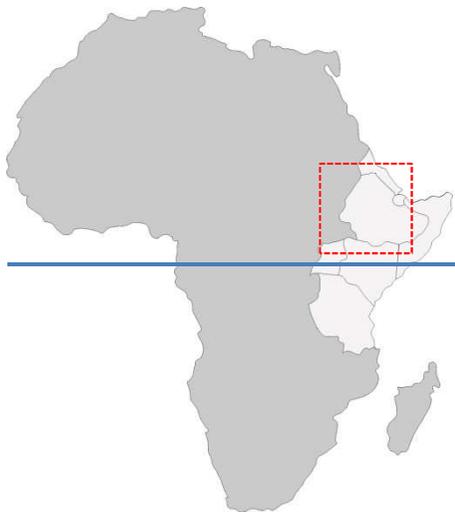
- 1 High technology enterprise
- 2 Poor genetic quality of breeding stock
- 3 High capital demand
- 4 Limited export market development
- 5 Economic feasibility uncertain

Key opportunities

- 1 Breeding biotechnology available
- 2 Discovery of medicinal properties of camel milk
- 3 Existing demonstration enterprises

Climate Change

Southward spread of camel herding in East Africa over the last three decades



20th Century annual rainfall trends for East Africa



Source: Walsh, M. & H. J. Schwartz (2007)

Thank you for your attention

