THE SURVIVAL OF WILDLIFE ON KENYA'S RANGELANDS

An Economic Perspective

(but without the economics)

Presentation to the 1st National Symposium
Wildlife Policy and Legislation Review Process
27-28 September, Nairobi

Dr. M. Norton-Griffiths
P.O.Box 15227, Langata 00509
Tel/Fax/Vocie: 890918
mng5@compuserve.com
web site: mng5.com

SUMMARY

- This is not an easy subject and there are no easy answers.

- We observe a catastrophic decline in wildlife numbers of >60% everywhere in Kenya, with losses of the same magnitude both inside and outside the Protected Areas.

- While an institutional failure on behalf of the competent authorities to protect wildlife is clear, there are also important underlying economic driving forces.

- Over the rangelands as a whole, populations and settlement densities are increasing (>3% pa), agriculture is spreading (>8% pa), offtake of livestock is increasing (>4% pa) and wildlife are in steep decline (>-3% pa).

- The main economic driving force behind these changes are differential returns to agricultural, livestock and wildlife production. In the current economic and policy environment, returns from agriculture vastly outcompete those from livestock, while wildlife returns are so meagre as to be uncompetitive with either. Furthermore, returns from wildlife, however small, are found only on 5% (23,000 km^2) of the 500,000 km^2 of rangelands where wildlife are found. No returns are made from wildlife anywhere else on Kenya's rangelands.

- The returns from wildlife to pastoral landowners are being forced down, and kept down, by a combination of Policy, Institutional and Market failures.

- The main Policy Failures are first, the ban on all consumptive utilisation of wildlife which restricts the opportunities of landowners to generate revenues, especially away from the areas where tourist go; and second, the denial of compensation for the loss of life and property in the course of raising wildlife.

- This situation is exacerbated by Institutional Failures among the KWS which acts primarily as a regulatory and enforcement service rather than an enabling service; among the conservation NGOs who concentrate too much on single issues which rarely relate to the economics of producing wildlife; and among Local Institutions, such as group ranch committees, who too often serve the interests of local elites rather than those of their ordinary members.

- Finally, Market Failures in the provision of wildlife goods and services derive primarily from the tourism cartels who divert the majority of tourism revenues away from the landowners – the producers of wildlife – to the service side of the industry; who erect barriers against landowners becoming more involved in the tourism industry; and who load a high proportion of the business risk of tourism onto the landowners.

- Accordingly, a major **Policy Objective** must be adopted to raise the revenues that pastoral landowners receive from their wildlife so that wildlife production becomes economically competitive against agricultural and livestock production.

- This task is not straightforward: depending on location, average revenue flows must increase by anything up to 30 times. While this will be hard enough in the 5% of the rangelands where tourists presently go, it will be even harder in the 477,000km^2 of rangelands where currently no wildlife revenues of any sort are being generated.

- No single **Policy Prescription** can achieve this policy objective, and all sources of wildlife revenues must be re-examined and re-evaluated.

- Attention should immediately focus on how to divert a greater proportion of wildlife revenues to pastoral landowners, from both the Public (revenue sharing) and the Private (tourism cartels) sectors; on how to engage landowners more directly in the tourism industry (transport, accommodation and other value added activities); on implementing fair and transparent compensation schemes for losses suffered from wildlife; and to expand the areas visited by wildlife tourists without harming the areas where they currently go.

- Clearly, however, two other major changes must also be implemented. First, to devolve user rights to wildlife, and perhaps even ownership rights, to pastoral landowners. Second, to relax the current restrictions on income generating opportunities.

- This first action will ensure that wildlife become fully marketable commodities from which landowners can make economic returns. The second action opens up the whole range of utilisation and value added activities to landowners. These include live sales between landowners, and between landowners and the Public sector; ranching for local or overseas trade, either live sales or wildlife products; culling locally abundant populations; value added activities (by local artisans) of tanning and making trophies and curios; and, of course, sport hunting.

- It will be difficult enough to raise wildlife revenues to the levels required, but without these last two changes it will be nigh on impossible – in which case the eventual elimination of wildlife from outside Kenya's protected areas becomes inevitable.

A. Wildlife Losses in Kenya

1. The widespread and comprehensive loss of wildlife throughout Kenya became clear by the mid '90s, and while initially the loss rates seemed to be higher outside the protected areas than inside, it is now clear that these loss rates are now similar (Western and Agatsiva, this seminar).

2. Compared with 1977, when large scale monitoring of Kenya's rangelands began, some 60%-70% of all wildlife have gone. There are few signs of any reversal to these trends, with the exception of some species such as elephant that have received special attention, and on privately owned and managed conservancies where wildlife seems to have held its own.

B. Implications for Wildlife Policy

3. Given that it was never the intention of Government to loose 60%-70% of its wildlife, losses of such magnitude show unequivocally that the policies adopted by the Government of Kenya over the last 30 years, and which have been encouraged, supported and defended by both the Donor and NGO communities, have failed.

4. But is such failure one of implementation (institutional failure) ? -- or is the policy itself at fault (policy failure)?

5. Clearly, losses of such magnitude from both inside and outside the protected areas indicate a major Institutional failure to protect wildlife. There are, however, clear signals of an economic process underlying these losses which suggest a Policy failure as well, the clearest of which is the pernicious spread of agriculture throughout the ASAL districts, even around important conservation and tourism areas like the Mara area of Narok and the Amboseli area in Loitokitok, Kajiado.

C. Economic Changes in Kenya's Rangelands

6. It has now become clear that the entire economic system of rangeland production in Kenya has undergone a radical transformation since the mid '70s (Figure 1). Specifically, the human population is growing at >3% per annum; cultivation, across all ASAL districts, is growing at >8% per annum; while livestock numbers remain stable, offtake is growing at >4% per annum; and wildlife is decreasing by >3% per annum.

7. These data, drawn from a vast array of independent and verifiable sources within Kenya, demonstrate a fundamental transition from a traditional, extensive pastoral system of production to a more intensive agro-pastoral production system at the expense of wildlife.

8. Yet another important change, evident everywhere in the ASAL districts, is the process of land sub-division whereby large parcels of land under group or communal ownership are being converted into small parcels of land under private ownership.

9. This process of land sub-division is fuelled by three incentives:-

   First: Security of Tenure -- from in-migration, and from land alienation by political elites, government or even conservation NGOs;

   Second: The clear dilution of the value of communal resources following population growth; and

   Third: To capture the economic benefits of agricultural, livestock and wildlife production directly at the household level rather than through communal institutions (e.g. group ranch committees) or other agencies.

10. Land sub-division, which is almost complete in a number of ASAL districts[1], has far reaching impacts. First, the smaller the physical size of the landholding the lower the density and diversity of wildlife (Figure 2). Second, with sub-division comes increased density of settlements which in turn displaces wildlife (Figure 3). Third, sub-division imposes on the landowner a change from extensive to more intensive methods of production – again at the expense of wildlife. Finally, land values rise with sub-division, making it easier to raise capital for land development and making the land more attractive to outside investors.

D. The Economic Driving Forces of Change

11. Such wholesale, and clearly interlinked, sets of changes suggest common, underlying economic processes at macro-, micro- and household scales.

12. From the perspective of the individual pastoral landowner, at the macro-economic scale domestic and international markets are expanding and there are real gains in producer prices. Similarly, at the micro-economic scale the pastoral landowner sees improved market and transport networks, improved information networks about market conditions, improved access to financial services, ever increasing opportunities for off-farm jobs and investment[2], and a wider availability and choice of goods and services. All of these create real economic incentives for pastoral landowners to increase returns to land by investing in land development and production.

13. At the household scale, however, the major economic driving forces are the differential returns to pastoral landowners from agricultural, livestock and wildlife production, expressed here as net returns to land[3] and measured as $ per hectare per year ($/ha/y).

Differential Returns to Land Use

14. Net returns to pastoral landowners from agricultural production (Figure 4) are closely related rainfall: higher potential land with higher rainfall yields greater net returns than does land with lower potential and less rainfall.

15. This has major implications for the survival of wildlife, because land with higher potential is preferentially converted to agricultural production (Figure 5). Over the rangelands as a whole, more than 50% of the higher potential land has already been converted in this way (Table 1).

16. Conversion of land to agriculture displaces wildlife (Figure 6). In contrast, livestock seem unaffected and are absorbed into the developing agro-pastoral land use complex.

17. Net returns to pastoral landowners from livestock production show a similar strong relationship to rainfall (Figure 7), with net returns being markedly greater in areas of higher rainfall compared with areas of lower rainfall.

18. Net returns to pastoral landowners from the wildlife on their land are derived from both from public conservation and from private conservation (Table 2). No relationship can be found between returns to wildlife and rainfall, as exists for agricultural and livestock production – so simple averages have to suffice.

19. Pastoral landowners receive on average net returns of $5/ha/y for their wildlife. The best returns are for "concession and access fees" (Table 3) where pastoral landowners rent a concession area, or allow sole access to such an area, to an individual tour company. Here, the net returns average $10/ha/y, with the highest rents of $50/ha/y being found very occasionally in the Mara area.

20. A comparison between the net returns to pastoral landowners from agricultural, livestock and wildlife production show clear discrepancies (Figure 8). Agricultural returns are always greater along the rainfall gradient than are the returns to livestock, while returns to wildlife are substantially less.

21. These data show that returns to wildlife of $10/ha/y year are competitive with agricultural returns only in very dry areas of below 300mm of annual rainfall[4] and with livestock returns below 600mm annual rainfall. Above this rainfall, the contemporary returns to wildlife simply cannot compete against those from livestock and agricultural production. And even though the higher returns of $50/ha/y that are occasionally paid in the Mara[5] are competitive with livestock production anywhere below 900mm of rainfall, even they cannot compete against agricultural returns above 650mm annual rainfall.

22. To make matters worse, the net returns from livestock shown in Figures 7 and 8 are calculated "with wildlife". The best data now becoming available from

detailed studies in Loitokitok, Narok, Machakos and Laikipia suggest that on average wildlife cost the pastoral landowner approximately 40% of his net production (Table 4). In other words, net returns from livestock could be some 66% higher were wildlife to be eliminated.

In Conclusion

23. *These differentials between the net returns to pastoral landowners from agricultural, livestock and wildlife production offer the clearest explanation we have to date for the widespread and comprehensive loss of wildlife throughout Kenya's rangelands. The uncompetitive returns from wildlife compared with other production systems encapsulate the entire dynamics of change observed on the rangelands.*

24. *They focus our attention that under current conditions wildlife simply cannot compete economically with livestock or agricultural production, and as a result pastoral landowners are disinvesting in their wildlife resource*[6].

E. Why are Returns to Wildlife So Low?

25. Wildlife returns to pastoral landowners are low and uncompetitive through a combination of Policy Failures, Institutional Failures and Market Failures.

26. **Policy Failures** follow the failure to either recognise, or act in response to, the fundamental economic realities of rangeland production, specifically wildlife production. Policy failure can be seen in:-

    FIRST: The ban on all consumptive utilisation of large wildlife[7] restricts the opportunities for pastoral landowners to generate revenues from their wildlife resources.

    The **impact** of this policy failure is to largely disenfranchise 95% of the pastoral rangelands from any income generating opportunities from wildlife (Table 5): tourist wildlife viewing (and its associated income generating opportunities) is restricted to a mere 23,000 square kilometres (5% of the total) in only eight out of the 19 ASAL districts where wildlife are found.

    SECOND: The investment of wildlife ownership and user rights almost solely in the State.

    The **impact** of this policy failure is that wildlife are not marketable goods, so for most landowners wildlife remain a cost while yielding meagre benefits.

THIRD: The denial of compensation for the costs of raising wildlife.

The **impact** of this policy failure is that the costs of wildlife on production cannot be recovered by landowners, making wildlife yet more uncompetitive against agricultural and livestock production.

27. **Institutional Failures** are found in the KWS, the NGOs and in communal institutions on ranches.

FIRST: The KWS acts as a regulatory and enforcement service rather than an enabling institution; lacks technical expertise in wildlife production and management; and endlessly vacillates in applying regulations.

The **impact** of this is to reduce incentives on the part of pastoral landowners to invest in, and encourage, wildlife.

SECOND: Many NGOs are often too focussed on single issues which rarely concern the economics of producing wildlife[8]; they are largely unaware of the importance of market forces in determining land use and production decisions by pastoral landowners; and they are often too reticent in challenging Government over policy issues.

The **impact** of this is inappropriate investment on the part of the NGO community into "conservation initiatives" of one kind or another instead of supporting the development of free and unencumbered markets for wildlife goods and services; and a lack of support to pastoral landowners in making wildlife production more viable economically.

THIRD: Many communal institutions, e.g. group ranch committees, pander to locally powerful elites and fail to keep the interests of their ordinary members in mind when entering into development or tourism contracts, and when disbursing revenues from such contracts.

The **impact** of this has been to fuel demands for sub-division so that economic benefits can be captured directly at the household level.

28. **Market Failures** for the provision of wildlife goods and services stem primarily from the tourism cartels which:-

FIRST: Divert the major portion of all wildlife generated revenues away from the producers of wildlife – the pastoral landowners – to the service side of the industry (agents, and the providers of transport and accommodation). In general terms, landowners (which here includes private landowners, the KWS and County Councils) see perhaps 5% at most of the total revenues generated by wildlife[9].

SECOND: Maintain barriers that prevent landowners becoming more directly involved in the tourism business (e.g. transport, accommodation) and thus capturing for themselves more of the potential revenues[10].

THIRD: Pass onto the landowners a disproportionate amount of the business risk involved in tourism[11].

F. Major Policy Objective

29. A very significant increase to the net returns from wildlife production to pastoral landowners **must be adopted as a major Policy Objective**, so that producing wildlife becomes economically competitive compared with other production systems (agriculture and livestock). This is especially important in the 96% of the rangelands where tourist do not go.

30. While this might sound straightforward, the sheer scale of the problem needs to be clearly understood. Figure 9 shows the required net revenues from wildlife to make a wildlife:livestock option the most advantageous production system for landowners to adopt[12]. Also shown are the contemporary returns to landowners from wildlife of $10/ha/y (the average returns for concession and access fees) and $50/ha/y (found occasionally in the Mara area).

31. In dry areas, say below 500mm of rainfall, the average returns of $10/ha/y must be doubled to become competitive against other production systems; between 500mm and 700mm returns from wildlife must increase by between 3 and 7 times; and above 700mm of rainfall they must increase anywhere from 12 to 30 times. And even though the high return of $50/ha/yr is competitive at rainfall below 600mm, above this it needs be doubled or tripled.

32. Raising revenues from wildlife by this amount is going to be hard enough in the tourist areas, but even more so in the 95% of the ASAL rangelands (477,000 square kilometres) where there are currently NO returns at all to landowners from their wildlife.

G. Policy Prescriptions

33. No single Policy Prescription can achieve this Policy Objective, and all sources of wildlife revenues must be re-examined and re-assessed, from both Public and Private sectors.

34. Policy prescriptions relevant to all rangelands include:-

- Wider and more equitable revenue sharing between the KWS and County Councils and pastoral landowners;
- Enhanced payments for ecosystem services (PES) – perhaps through donor and NGO programmes;
- Implement fair and transparent compensation schemes for loss of life and property to wildlife; and

- Expand wildlife tourism use into new areas – but without harming the areas where they currently go.

35. Policy Prescriptions specifically relevant to the current wildlife tourism areas (5% of the rangelands) include:-

    - Programmes to improve the negotiating skills of landowners with the tourism cartels to obtain – fairer contracts which do not load the business risks onto the landowner; concession and access fees that match the agricultural and/or livestock potential of the land; and fewer barriers to landowners becoming more involved in the tourism business so they may capture a larger share of the total revenues; and

    - Programmes to enable landowners themselves to establish and manage tourism ventures as individual firms.

36. There are in addition two other major policy changes which have to be implemented. First, to devolve user rights, and perhaps even ownership rights, to wildlife from the State to pastoral landowners. Second, to relax the current restrictions on income generating opportunities.

37. The devolution of user (and perhaps owner) rights to landowners will ensure that wildlife become fully marketable commodities from which landowners can make economic returns.

38. Relaxing the current restrictions on wildlife utilisation opens up the whole range of utilisation and value added activities to landowners. These include live sales between landowners, and between landowners and the Public sector; ranching for local or overseas trade, either in live sales or in wildlife products; culling locally abundant populations; value added activities (by local artisans) of tanning and making trophies and curios; and, of course, sport hunting.

39. It is going to be difficult enough in practice to raise wildlife revenues to the levels required to make them competitive against other land uses and production systems, but without these last two Policy changes it will be effectively impossible. If these Policy changes are not made then the eventual elimination of wildlife from outside Kenya's protected areas becomes inevitable – and it will happened sooner rather than later.

FIGURES

Figure 1: Economic changes on Kenya's rangelands since 1977

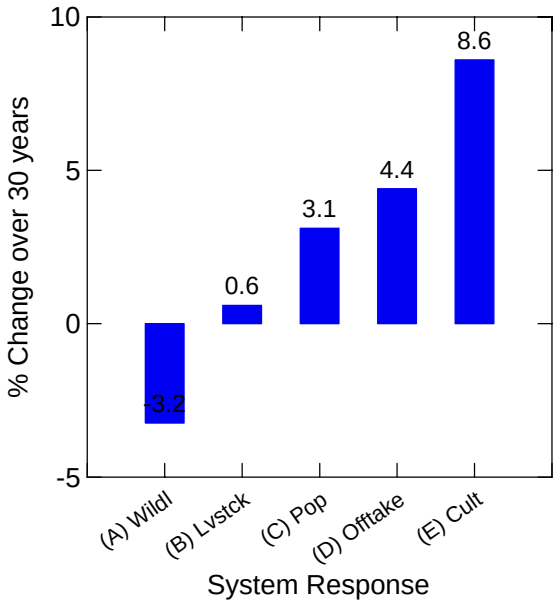


Figure 2: Density and diversity of wildlife as a function of size of landholding

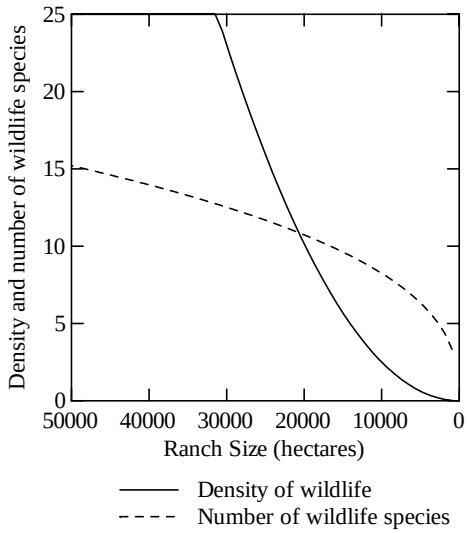


Figure 3: Influence of the density of occupied pastoral settlements on wildlife density in the Mara Area

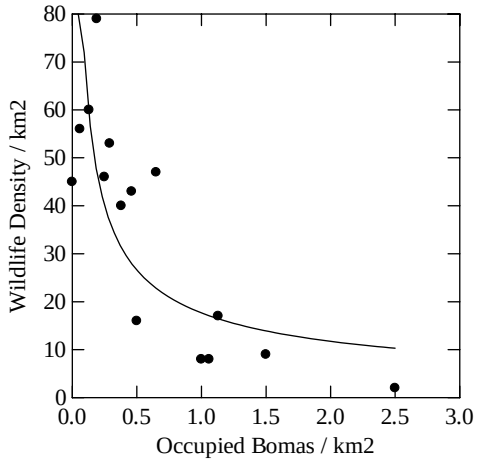


Figure 4: Net returns ($/ha/y) to pastoral landowners from agricultural production

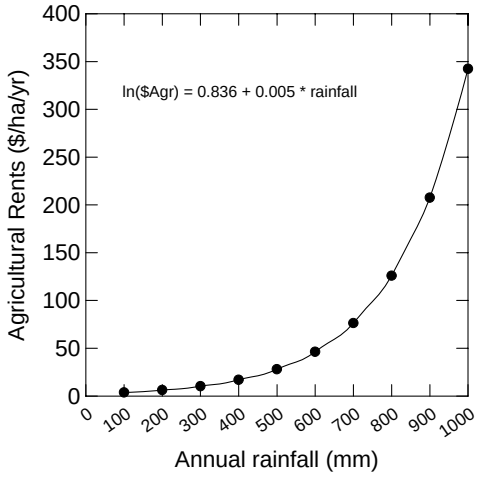


Figure 5: Conversion of land to agriculture as a function of potential net returns

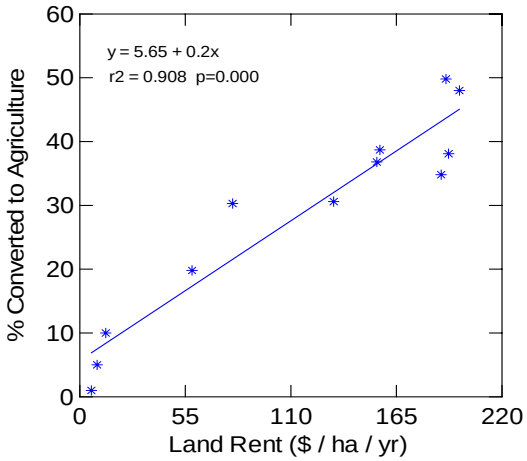


Figure 6: Displacement of wildlife and livestock with land conversion in the Mara Area

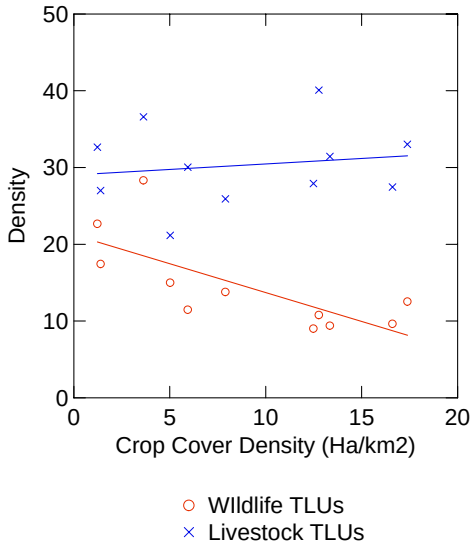


Figure 7: Net returns to pastoral landowners from livestock production

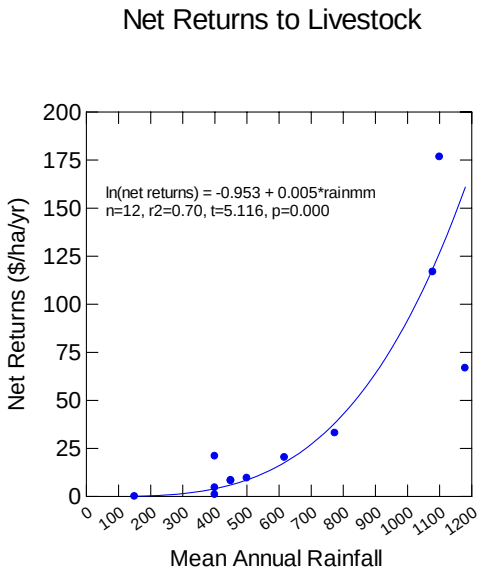


Figure 8: Comparison between the net returns to pastoral landowners from agricultural, livestock and wildlife production

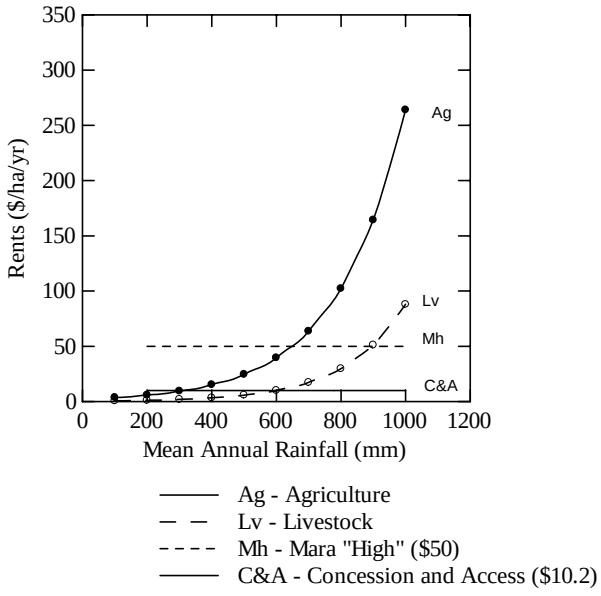
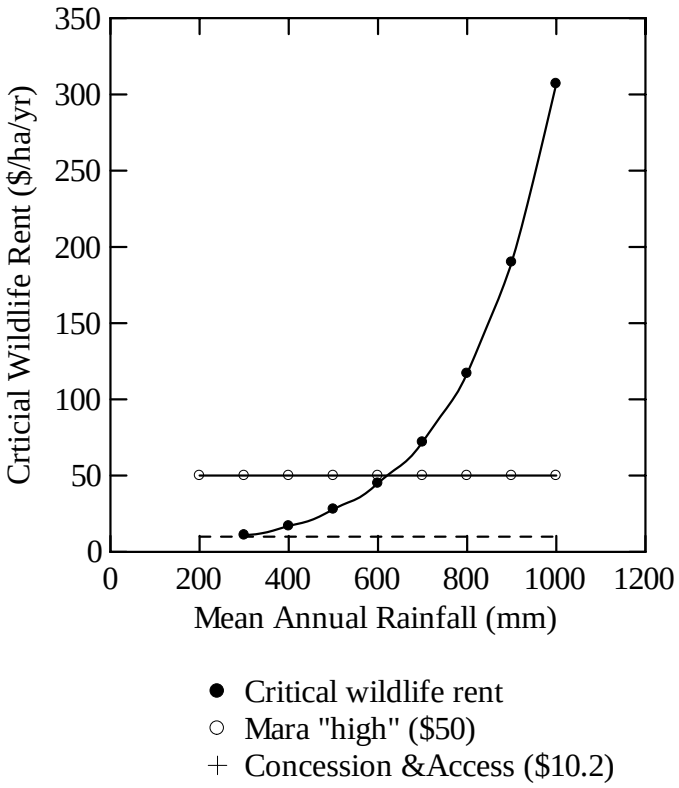


Figure 9: Required returns from wildlife to make a mixed wildlife:livestock production system optimal, for both normal and drought years



TABLES

Table 1: The extent of cultivation on Kenya's rangelands

Annual Rainfall	% ASAL Districts	% Cultivated
Low < 400mm	60%	<1%
Medium >400mm <700mm	30%	20%
High >700mm	10%	51%

Table 2: Sources of wildlife revenues to pastoral landowners

- PUBLIC CONSERVATION
  - Revenue sharing schemes with KWS & County Councils
  - NGO revenues, programmes etc
- PRIVATE CONSERVATION
  - Consumptive Utilisation
    - [Cropping – now banned]
    - Bird shooting [was banned, now reinstated]
  - Non Consumptive Utilisation
    - Concession / Access fees
    - Bednight fees
    - Local Employment
    - Cultural Bomas
    - Simple Camp Sites

Table 3: Wildlife revenues to pastoral landowners ($/ha/yr)

- Average from all sources (n=68) $5/ha/yr

Split into:-
- Average concession & access fees (n=25) $10/ha/yr
- Average from all other sources (n=43) $1/ha/yr

- Highest revenues paid occasionally in the Mara $50/ha/yr

Table 4: Costs of wildlife on livestock production

Costs of Wildlife on Livestock Production Over Eight Years on a Single Ranch in Kenya		
		$ $ha^{-1}y^{-1}$
Gross Ranch Output		$143.46
Costs of production		$119.28
Additional costs of wildlife		$7.87
Security (anti-poaching)	37%	
Disease (losses and control)	33%	
Predation (direct losses)	18%	
Repairs to infrastructure	9%	
Compliance costs (KWS)	3%	
Net returns **with** wildlife		$16.31
Net returns **without** wildlife		$24.18
% cost of wildlife on net returns		48%

Table 5: Extent of Tourism Activities in the ASAL Districts of Kenya

Table 5.1 Extent of wildlife tourism outside the formally protected areas		
District	Extent	Km^2
Baringo	Very limited	< 1,000
Kajiado	Loitokitok mainly, but also one or two private ranches	c. 3,000
Kwale	Very limited	< 1,000
Laikipia	Main ranches	c. 7,000
Makueni	Very limited	< 1,000
Narok	Group Ranches around the Maasai Mara National Reserve, Loitas etc.	c. 6,000
Samburu	Concessions on some GRs	c. 2,000
Taita Taveta	Community conservation areas, and private ranches	c. 2,000
Total area used by tourists for game viewing		**c. 23,000**
Total Area of 19 ASAL Districts		500,000
% ASAL Districts supporting wildlife tourism		**c. 5%**

REFERENCES

This data presented in this paper has been sourced from the following publications[13].

ABSA, 2004. *Game Ranch Profitability in Southern Africa (2004)*. Rivonia: The SA Financial Sector Forum. www.absa.co.za

Africover 2003. www.africover.org for full details of methodologies, applications and downloads.

Broten, M.D. and Said, M. 1995 Population trends of ungulates in and around Kenya's Masai Mara Reserve. In *Serengeti II: dynamics, management and conservation of an ecosystem*, ed. A.R.E. Sinclair and P. Arcese, 169-193. Chicago: University of Chicago Press.

Epp, H. and Agatsiva, J. 1980. Habitat types of the Mara-Narok area, western Kenya. Technical Report Series No. 20. Nairobi: KREMU Department of Resource Surveys and Remote Sensing.

ESL, 1985. Integrated land use survey of the lake basin of Kenya. Final Report to the Lake Basin Development Authority, Ministry of Energy and Regional Development. Nairobi: EcoSystems Ltd.

_____1987. Integrated land use database for Kenya. Nairobi: Government of Kenya, Long Range Planning Unit, Ministry of Planning and National Development. 65pp.

Hilborn, R. 1995. A model to evaluate alternative management policies for the Serengeti-Mara ecosystem. In *Serengeti II: dynamics, management and conservation of an ecosystem*, ed. A.R.E. Sinclair and P. Arcese, 617-638. Chicago: University of Chicago Press.

Hilborn, R. and Sinclair, A.R.E. 1979. A simulation of wildebeest and other ungulates and their predators in the Serengeti. In *Serengeti: Dynamics of an Ecosystem*, eds A.R.E. Sinclair and M. Norton-Griffiths, 287-309. Chicago: University of Chicago Press.

Homewood, K,. Lambin, E.F., Coast, E., Kariuki, A., Kikula, I., Kivelia, J., Said, M., Serneels, S. and Thompson, D.M. 2001. Long-term changes in Serengeti-Mara wildebeest and land cover: pastoralism, population, or policies? *Proceedings of the National Academy of Sciences*, 98: 12544-12549.

Homewood, K., Coast, E. and Thompson, D.M. 2004. In-migrants and exclusion in east African rangelands: access, tenure and conflict. *Africa* 74 4: 567-610.

Jaetzold, R. and Schmidt, H. 1982. Farm management handbook for Kenya. Nairobi: Ministry of Agriculture.

Lamprey, R.H. 2006. Profit and prestige: game policy, tourism revenues and community conservation in Maasai Mara. *Environment, Development and Sustainability*. in press.

Lamprey, R.H. and Reid, R.S. 2004. Expansion of human settlement in Kenya's Maasai Mara: what future for pastoralism and wildlife? *Journal of Biogeography* 31: 997-1032.

Maddock, L. 1979. The "migration" and grazing succession. In *Serengeti: Dynamics of an Ecosystem*, eds A.R.E. Sinclair and M. Norton-Griffiths, 104-129. Chicago: University of Chicago Press.

Mduma, S.A.R., Sinclair, A.R.E., and Hilborn, R. 1999. Food regulates the Serengeti wildebeest population: a 40-year record. *Journal of Animal Ecology* 68: 1101-1122.

Monke, E.A. and Pearson, S.R. 1989. *The Policy Analysis Matrix for Agricultural Development*. Ithica and London: Cornell University Press.

Norton-Griffiths, M. 1995. Economic Incentives to Develop the Rangelands of the Serengeti: Implications for Wildlife Conservation. In *Serengeti II: dynamics, management and conservation of an ecosystem*, ed. A.R.E. Sinclair and P. Arcese, 588-604. Chicago: University of Chicago Press.

_____1996. Property rights and the marginal wildebeest: an economic analysis of wildlife conservation options in Kenya. *Biodiversity and Conservation* 5: 1557-1577.

_____1998 The economics of wildlife conservation policy in Kenya. In *Conservation of Biological Resources*, ed. E.J. Milner-Gulland and R. Mace, 279-293. Oxford: Blackwells.

_____2000 Wildlife losses in Kenya: an analysis of conservation policy. *Natural Resources Modeling* 13(1): 13-34.

Norton-Griffiths, M. and Butt, B. 2006. The economics of land use change Loitokitok Division, Kajiado District, Kenya. Lucid Working Paper 34. Nairobi: International Livestock Research Institute. www.lucideastafrica.org

Norton-Griffiths, M. and Southey, C. 1993. The opportunity costs of biodiversity conservation: a case study of Kenya. CSERGE Working Paper GEC 93-21. Norwich: University of East Anglia.

Ottichilo, W.K. 2000. Wildlife dynamics: an analysis of change in the Masai Mara ecosystem of Kenya. Ph.D. thesis, ITC, The Netherlands.

PARD, 1991. Farm budgets in selected districts of Kenya. Policy Analysis for Rural Development Working Paper Series 14. Nairobi: Edgerton University.

Reid, R. S., Rainy, M.E., Ogutu, J., Kruska, R. L., Kimani, K., Nyabenge, M., McCartney, M., Kshatriya, M., Worden, J.S., Ng'ang'a, L., Owuor, J., Kinoti, J., Njuguna, E., Wilson, C.J. and Lamprey, R.H. 2003. People, wildlife and livestock in the Mara ecosystem: the Mara Count 2002. Nairobi: International Livestock Research Institute. www.maasaimaracount.org

Said, M.Y., Ottichilo, W.K., Sinange, R.K., Aligula, H.M., 1997. Population and distribution trends of wildlife and livestock in the Mara Ecosystem and surrounding areas: a study on the impacts of land-use on wildlife and environmental indicators in the East African Savannah. Ministry of Planning and National Development, Department of Resource Surveys and Remote Sensing, Nairobi, Kenya.

Sellen, D. 1991. Representative farms and farm incomes for seven districts in Kenya. Research Training in Agricultural Policy Analysis Project. Nairobi: USAID.

Serneels, S. 2001. Drivers and impacts of land-use/land-cover change in the Serengeti-Mara ecosystem: a spatial modelling approach based on remote sensing data. Ph.D. thesis, University of Louvain, Belgium.

Serneels, S. and Lambin, E.F. 2001(a). Impact of land-use changes on the wildebeest migration in the northern part of the Serengeti-Mara ecosystem. *Journal of Biogeography* 28: 391–407.

_____2001(b). Proximate causes of land-use change in Narok District, Kenya: a spatial statistical model. *Agriculture, Ecosystems and Environment* 85: 65–81.

Serneels, S., Said, M.Y. and Lambin, E. F. 2001. Land cover changes around a major east African wildlife reserve: the Mara Ecosystem, Kenya. *International Journal of Remote Sensing* 22(17): 3397–3420.

Sinclair, A.R.E. 1995. Serengeti past and present. In *Serengeti II: Dynamics, management and conservation of an ecosystem,* ed. A.R.E. Sinclair and P. Arcese, 3-30, Chicago: University of Chicago Press.

Sinclair, A.R.E., Dublin, H. and Borner, M. 1985. Population regulation of the Serengeti Wildebeest: a test of the food hypothesis. *Oecologia Berlin* 65: 266-268.

Thirgood, S., Mosser, A., Borner, M., Tham, S., Hopcraft, G., Mlengeya, T., Kilewo, M., Mwangomo, E., Fryxell, J. and Sinclair, A.R.E. 2004. Can Parks protect migratory ungulates? The case of the Serengeti wildebeest. *Animal Conservation* 7: 113-120.

Thompson, D.M. 2002. Livestock, cultivation and tourism: livelihood choices and conservation in Maasai Mara buffer zones. Ph.D. thesis, University of London, London.

____2005. Valuing land use options in the Maasai Mara. Draft Report of the 2004 Socio-Economic Survey *Better Policy and Management Options, for Pastoral Lands*. Nairobi: International Livestock Research Institute.

Thompson, M. and Homewood, K. 2002. Entrepreneurs, elites and exclusion in Maasailand: trends in wildlife conservation and pastoral development. *Human Ecology* 30(1): 107-138.

Thompson M., Serneels S. and Lambin E.F. 2002. Land-use strategies in the Mara Ecosystem Kenya: a spatial analysis linking socio-economic data with landscape variables. In *Remote Sensing and GIS Applications for Linking People, Place and Policy*, ed. S.J. Walsh and K.A. Crews-Meyer. Boston: Kluwer Academic Publishers.

TWCM, 1999. Status and trends if migratory wildebeest in the Serengeti ecosystem. Arusha: Tanzania Wildlife Conservation Monitoring, Tanzania Wildlife Research Institute.

END NOTES

[1] Land sub-division is almost complete in a number of ASAL districts. In Narok district, for example, the original 33 group or communal land holdings around the Maasai Mara National Reserve, which were on average some 38,000 hectares in size, have been converted to about 33,000 privately owned land parcels of on average 38 hectares in size. Mohammed Said (this seminar) has demonstrated a similar pattern in Kajiado district, on the Kitengela surrounding Nairobi National Park and in Loitokitok division surrounding the Amboseli National Park.

[2] Over the rangelands as a whole, recent studies demonstrate that livestock now represent at most only one half of income at the household level, and it is rare for pastoral landowners to rely on livestock as their sole source of wealth and savings. Where this is still found is indicative of a local deficiency in economic alternatives.

[3] Net returns represent the difference between gross revenues and all direct and indirect costs, including equipment, labour and material inputs. When expressed as $ per hectare per year ($/ha/y), these net returns allow direct comparisons between different land use and production systems.

[4] Sadly, apart from Amboseli tourists rarely venture into these very arid areas.

[5] Note, however, that less than 10% of the tourism areas in the Mara area receive less than this rainfall.

[6] There persists a romantic notion that pastoralists coexist with wildlife in an harmonious relationship and perhaps in the past, when population densities were lower and economic opportunities more restricted, pastoralists could indeed afford to ignore wildlife. But today, burgeoning human populations and ever increasing financial imperatives, economic expectations and opportunities for investment create the absolute necessity to raise productivity per unit area of land. Given the uncompetitive returns from wildlife, pastoralist landowners simply can no longer afford the extra costs of production associated with their presence.

[7] The inconsistency in all this is completely astonishing. Some consumptive utilisation of wildlife is still permitted but with quite restricted benefit streams. The companies ranching crocodiles (1), ostrich (1) and butterflies (2 or 3) create local benefits primarily through employment opportunities. In contrast, bird shooting (either pest control on rice schemes, or game birds on ranchland) creates significant revenues, between $10,000 and $20,000 a year for some group ranches. Returns from bird shooting could be significantly higher if the landowners were more skilled in negotiating contracts with the shooting operators (see Endnote 10). And in a single recent example where culling of locally abundant populations has been permitted, the entire carcasses had to be fed to crocodiles -- they could not be used in any other way! Furthermore, the State accepts wildlife from the Private Sector to restock Protected Areas – but without making any payment, and provides wildlife (typically rhinoceros) to the Private Sector, again without accepting any payment – even though it is fully recognised that the Private Sector makes profits from this same wildlife through tourism activities. Astonishing it all is indeed.

[8] On a more philosophical note, while foreign NGOs claim to speak on behalf of the "world's poor" they speak the language of the "world's rich" and invariably seek their own agendas and purpose rather than those who they purport to help. Through their financial strength and access to political elites, especially in poor countries, NGOs are able to subvert the representative democratic process and insinuate foreign minority views into what are supposedly national parliamentary majority voting systems. The exercise of such power with neither responsibility nor accountability is a heady, and

dangerous, mix. One wonders if any of these conservation NGOs would ever consider compensating Kenya should their policies and programmes prove to be ill founded.

[9] This is seen even more clearly with bird shooting, where landowners typically receive <2% of the daily fee paid by the sportsmen to the operators. In Europe, a sportsman will willing pay £1000 per gun day on a premium shoot – the potential here in Kenya is very great, but landowners must learn negotiating skills.

[10] With the exception of guiding (to which there are now severe barriers in the form of 'standards'), landowners find it difficult to engage in other income generating opportunities. Few have the capital or management capacity to enter the transport or accommodation sectors (unless heavily subsidised).

[11] An operator will typically pay a relatively small amount as a concession or access fee but will load up the bed night fee. When business is slack, both the landowner's and operator's revenue falls – but the landowner, unlike the operator, cannot reduce his costs. Such arrangements should be replaced with a fixed lease – as with agricultural leases. After all, in one case an operator is renting land to grow wheat and in the other he is renting land to grow wildebeest – so why should the terms of business be any different?

[12] This is derived from a model which optimises mixed agricultural, livestock and wildlife production to give optimal returns to landowners. The model estimates the returns to wildlife needed to make a mixed livestock:wildlife production system optimal over all other production possibilities (apart from irrigated agriculture which out competes everything, everywhere) across the whole rainfall gradient, for both normal and drought years (defined as one standard deviation below normal rainfall).

[13] Any reference listing Norton-Griffiths as an author can be found on the web site mng5.com