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Northeast Tanzania's Disappearing Rangelands: Historical Perspectives on Recent Land Use Change*

By Lowe Börjeson, Dorothy L. Hodgson, and Pius Z. Yanda

In the nineteenth century, and during most of the twentieth century, Northeast Tanzania was a region dominated by two distinct types of food producing landscapes—intensively cultivated areas and the pastoral grazing lands of the Maasai Plains.[1] However, in the last few decades a new distinct pattern of land use has developed in the region whereby large areas of the Maasai Plains have become extensively cultivated. In other parts of the world, as well as in other East African rangelands, rapid land use change during the last few decades of the twentieth century has usually been associated with the demands and opportunities of modernist development policies, pressures for increased productivity, rapid urbanization, land tenure reforms, population growth, and increased commercial investments in agriculture—factors that have also dominated recent land change processes in northeast Tanzania. Hence, the relatively abrupt shift in land use on the Maasai Plains, as documented by satellite image interpretations between the 1970s and 2000, closely follows an expected trajectory of rapid change based on the momentum of such recent driving forces, which in this case implies a conversion of large areas of pastoral rangelands and dry-land wood and bush savanna to a landscape dominated by agricultural production.

The rapid expansion of agriculture on the Maasai Plains is commonly viewed as a new era in Maasai history. Many policymakers believe that Maasai have had to overcome

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[1] Where possible, we use the preferred spelling"Maasai," although we have retained "Masai" where it is used by others in writings, letters, titles, and place names.

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their "traditional" pastoralist ideals to embrace agriculture and other income opportunities in response to increased problems with sustaining pastoralist livelihoods. A telling example is the selection of Maasai Pastoral Rangelands Management as a targeted land use system within the current FAO program for preserving "Globally Important Agricultural Heritage Systems" (GIAHS). According to the FAO, Maasai rangelands were included because they represent a "traditional" nomadic pastoral system characterized by an efficient resource use and intimate ecological knowledge of "a poorly endowed semi-arid region that occur throughout the world" which currently is under threat by agricultural expansion and other factors such as urbanization, development policies and changing values.[2]

In contrast to this position, our study shows that Maasai pastoralists have sought opportunities for diversifying their livelihoods throughout the twentieth century. Moreover, the landscapes of northeast Tanzania have been shaped for centuries by a diversity of production systems, including trajectories of both specialization and diversification. The great expansion of Maasai specialized pastoralism during the latter half of the nineteenth century, for example, represents a rather extraordinary but brief period in the economic history of the region. In this article we trace the influence of colonial policies and precolonial political economic relations on the recent process of rapid land cover change on the Maasai Plains.

Land Systems Science and History

The current surge for more and better data on global environmental change and an enhanced understanding of its underlying processes and consequences for human societies have generated a number of international scientific initiatives, such as those of the International Geosphere-Biosphere Programme (IGBP) and the International Human Dimensions Programme on Global Environmental Change (IHDP). A recent example is the Global Land Project (GLP), which aims to promote interdisciplinary research on "land systems" change, that is, land use change and management as a function of coupled socio-ecological systems.[3] Like similar initiatives, this is an example of a growing interest in what has been variously labeled as a "land change science" or "land systems science" which builds on an already large body of research on land use and land cover change within the framework of the IGBP and IHDP.[4]

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[2] FAO, "Traditional Maasai Pastoral Rangeland Management (Kenya and Northern Tanzania)," GIAHS web page: http://www.fao.org/sd/giahs/other_kenya_desc.asp.

[3] Global Land Project (GLP), *Science Plan and Implementation Strategy* (Stockholm: IGBP Report No. 53/IHDP Report No. 19, IGBP Secretariat, 2005), 1–64.

[4] E.F. Lambin and H. Geist, eds., *Land-Use and Land-Cover Change: Local Processes and Global Impacts* (Berlin and Heidelberg: Springer, 2006), 1–222; R.R. Rindfuss, S.J. Walsh, B.L. Turner II, J. Fox, and V. Mishra, "Developing a Science of Land Change: Challenges and Methodological Issues," *PNAS* 101, 39 (2004), 13976–81; B.L. Turner, E.F. Lambin, and A. Reenberg, "The Emergence of Land Change Science for Global Environmental Change and Sustainability," *PNAS* 104, 52 (2007), 20666–71.

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A recent review article on land use and land cover change[5] in tropical regions emphasizes the importance of "a systematic analysis of local-scale land-use change studies, conducted over a range of timescales," by which "dominant pathways" of change can be uncovered.[6] The authors stress the need to pay attention to historical processes and to the complex set of factors that generate specific human-environment interactions. Similarly, the incorporation of narratives, circumstantial evidence, and inferential reasoning may contribute to the analysis of driving forces: "A good story about the driving forces of landscape change is more than just a meager alternative to quantification, but might well be appropriate as well as sufficient."[7] As Lambin et al., argue, "The narrative perspective recognizes the path dependence of recent evolutions. It avoids the simplifications and erroneous interpretations that could result from studies focused only on the present and immediate past, outside the context of longer histories of human-environment interactions."[8]

The research agenda of land systems science also recognize that land change[9] processes are shaped by the patterns of previous land use and thus the importance of considering path dependencies, or historical trajectories, in analysis of land change.[10] It has become increasingly clear that we have much to learn from studying the past, and we need to combine different temporal scales (long-term and more recent) as we address issues of current and future environmental change. This, in turn, requires interdisciplinary studies of landscape history.[11]

In studies of land change, change is commonly measured against a baseline, which is usually set, by default, on the basis of available data. For studies based on remotely sensed (RS) data or other historical records of limited time-depth, this is obviously an intrinsic limitation. For practical reasons, therefore, studies of land use and land cover change in Africa seldom start their analysis before the mid-twentieth century. A few

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[5] Land-cover is a concept that is common in remote sensing analysis and used to classify vegetation and other land surface features. According to the *Global Land Cover Network* land-cover is the observed (bio)physical cover on the earth's surface, while land use is characterized by the arrangements, activities, and inputs people undertake in a certain land cover type to produce, change, or maintain it. For example, "grassland" is a cover term, while a term such as "rangeland," which refers to a particular use of grassland, is a land-use type. See the official website of the *Global Land Cover Network*, http://www.glcn.org.

[6] E.F. Lambin, H.J. Geist, and E. Lepers, "Dynamics of Land-Use and Land-Cover Change in Tropical Regions," *Annual Review of Environment and Resources* 28 (2003), 205–41.

[7] Matthias Bürgi, Anna M. Hersperger, and Nina Schneeberger, "Driving Forces of Landscape Change—Current and New Directions," *Landscape Ecology* 19, 8 (2005), 857–68 (quote from page 864).

[8] Lambin et al., "Dynamics of Land-Use," 230.

[9] Land change is a short form that implies both land use and land cover change.

[10] D. Foster, F. Swanson, J. Aber, I. Burke, N. Brokaw, D. Tilman, and A. Knapp, "The Importance of Land-Use Legacies to Ecology and Conservation," *BioScience* 53, 1 (2003), 77–88; GLP, *Science Plan*.

[11] J.A. Dearing, R.W. Battarbee, R. Dikau, I. Larocque, and F. Oldfield, "Human-Environment Interactions: Learning from the Past," *Regional Environmental Change* 6 (2006), 1–16; C.T. Fisher and G.M. Feinman, "Introduction to 'Landscapes over Time,'" *American Anthropologist* 107, 1 (2005), 62–69.

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notable examples of studies of land change processes in Africa, however, have successfully combined an analysis of remotely sensed data with an analysis of historical sources.[12] These studies demonstrate ways to extend the time-frame in land change analysis, for example by linking RS data with archival sources. Previously classified cold war intelligence data (i.e., Corona satellite photography) can also be used to push the baseline for land change analysis at the regional scale back to the 1950s or 1960s. For local case studies, aerial photographs are commonly used to trace changes back to the same time period (i.e., roughly the mid-twentieth century). This sets the limits for historical RS data, but there is, of course, a host of historical sources that provide information on earlier time periods, such as travel reports, colonial documents, photographs, sketch-drawings, and oral histories. A common characteristic of such historical source materials is, however, that they are patchy and not easily compiled into datasets that are readily comparable with RS data. Historical maps, in contrast, often contain information on vegetation or land use that provides a more comparable data source to RS sources.[13] However, even if there clearly are possibilities for making use of historical data in studies of African land cover and land use change, there are no spatially explicit data available on late nineteenth or early twentieth century land use that covers the region of northeast Tanzania. Hence, we are left with the options of compiling such a data-set through quantifications and detailed spatial comparisons, or using historical narratives of landscape change to add historical depth to recent RS data and land change studies.

The central questions addressed in this article are: (1) what areas in northeast Tanzania have experienced the most dramatic processes of landscape change, in terms of conversion from one type of land use to another; (2) what kind of landscape change process has been the dominant factor of change in these areas; and (3) to what extent is this change primarily an effect of recent driving forces or more deeply rooted in the colonial and precolonial history of the region? The first and second questions are answered by visual interpretations of LANDSAT imagery and literature studies; the third question is answered by data from historical and ethnographic research from the area identified as having experienced the most extensive recent conversion of land use in the region. Hence, our aim in this article has not been to quantify landscape changes over time, but to assess the historical relevance of recent narratives of rapid landscape change in the region. The second half of the twentieth century was a period characterized by rapid landscape change in many places. That said, the time-frame bias set by the availability of RS data may, if not critically reflected upon, nourish the (re)production of historically myopic narratives of African environments by potentially producing overstated narratives of "rapid change."

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[12] See for example: D.A. Wardell, A. Reenberg, and C. Tøttrup, "Historical Footprints in Contemporary Landuse Systems: Forest Cover Changes in Savannah Woodlands in the Sudano-Sahelian Zone," *Global Environmental Change* 13 (2003), 235–54; H. Hamandawana, F. Eckardt, and R. Chanda, "Linking Archival and Remotely Sensed Data for Long-Term Environmental Monitoring," *International Journal of Applied Earth Observation and Geoinformation* 7 (2005), 284–98; J. Fairhead and M. Leach, *Misreading the African Landscape* (Cambridge: Cambridge University Press, 1996).

[13] See L. Börjeson, "Using a Historical Map as a Baseline in a Land-Cover Change Study of Northern Tanzania," *African Journal of Ecology* (in press).

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Such conclusions can in turn reinforce Eurocentric assumptions about Africa, such as an unhistorical juxtaposition of traditional versus modern as a basic temporal periodization or by enhancing neo-Malthusian readings of ongoing processes.[14] Adding historical perspectives to recent rapid land-change processes therefore counteracts the limitations set by the informational gap between recent RS data and the patchiness and heterogeneity of land cover and land use data from the more distant past.

Not only is the timeframe important for understanding the dynamics of historical land use change, but the spatial scale matters as well. Processes of change on the local scale are, as discussed in the introduction to this special issue, situated within a nested hierarchy of political ecology. Hence, the character of land use in one place is not indifferent to the land use and processes taking place in its surroundings, or elsewhere, depending on the role of trade and other spatial relations. But an expanded spatial focus must also tackle the trade-off and division, common within scholarly work on landscape change, between detailed local case studies and more generalized regional studies. For example, Turner has shown that although complexities in processes of landscape change are often lost as the analytical focus shifts from local to regional scale, it is indeed possible and of critical importance to trace the effects of local land use practices on regional patterns; that is, to merge local and regional perspectives on landscape change.[15] In this study we take an assessment of recent changes in land cover in northeast Tanzania as a starting point for tracing how both local and regional historical processes have interacted to produce the current pattern of land use. Finally, we compare our historical analysis with the current narratives or explanations of recent rapid landscape change in the region.

The Study Region: Historical Settlement and Land Use Patterns

Northeast Tanzania is a region with stark contrasts in the physical environment, notably the rise of Mt Kilimanjaro from the surrounding plains and the Great Rift Valley escarpments. The region is characterized by an arc of relatively well watered mountains and highlands, of different geological origins, surrounding a large dry-land plain. This physical geography has produced conspicuous contrasts in land use, vegetation, and population densities. Forests cover substantial parts of the higher mountain areas, but large areas in the relatively well watered highlands are also intensively cultivated and densely populated. In the dry savanna plains, land is more extensively utilized for cultivation and livestock herding and sparsely populated. Over the twentieth century land has also been protected for hunting, conservation, and wildlife tourism.[16]

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[14] For a critical discussion about the use of RS-data in studies of land change in Africa, see M.D. Turner, "Methodological Reflections on the Use of Remote Sensing and Geographical Information Science in Human Ecological Research," *Human Ecology* 31, 2 (2003), 255–79.

[15] M.D. Turner, "Merging Local and Regional Analyses of Land-Use Change: The Case of Livestock in the Sahel," *Annals of the Association of American Geographers* 89, 2 (1999), 192–219.

[16] D.L. Hodgson, *Once Intrepid Warriors: Gender, Ethnicity, and the Cultural Politics of Maasai Development* (Bloomington: Indiana University Press, 2001). See also D. Brockington, H. Sachedina, and K. Scholfield, "Preserving the New Tanzania: Conservation and Land Use Change," *International Journal of African Historical Studies* 41, 3 (2008), 557-559.

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The geographically uneven historical settlement pattern of the region is clearly seen in the population density map produced by Clement Gillman in the mid-1930s (see Figure 1b, below). The contrast between the "empty" Maasai Plains and the surrounding population clusters is striking in Gillman's map. Although this contrast is enhanced in Gillman's map because the large nomadic population of the Maasai is not represented cartographically as dots,[17] the contrasting landscapes of the pastoral rangelands on the plains and the intensive agriculture of the highlands and in other centers of agricultural production, was a characteristic feature of the regional settlement and land use pattern in the 1930s. The population densities displayed on Gillman's map can, at least at the generalized regional scale shown in Figure 1b, be used as a proxy for land use intensity, as people, at the time, would mainly have cultivated land nearby their homesteads. In fact, except for disturbances caused by "the disasters" of the 1880s and 1890s (see below), this basic pattern was more or less the same from at least around the mid- to late-nineteenth century, even if local and temporary changes did of course occur.[18] Indeed, as we argue below, many Maasai did already engage in cultivation in the 1930s. Hence, the absence of population dots for the Maasai living on the Plains does not mean a real absence of either people or farming.

A Regional Visual Appraisal of Recent Land Cover Changes in Northeast Tanzania

Remotely sensed data (and satellite images in particular) are an attractive data source for tracing regional patterns of change due to their extensive spatial coverage. One LANDSAT scene, for example, covers an area of *ca.* 185 x 185 km, a larger area than that analyzed by most local case studies of land use change. We compiled data from four adjacent LANDSAT scenes to cover the study region, i.e., northeast Tanzania. The availability of free, publicly accessible LANDSAT images from the early 1970s to early 2000s offers opportunities for undertaking historically-oriented studies of land cover changes over large areas. The visual assessment of LANDSAT images presented below is an example of how processes of land change can be traced at a regional scale, relatively rapidly and without advanced skills in RS analysis, to produce a result that is sufficient for the purpose of identifying major areas of land conversion.

To obtain a comprehensive picture of the spatial pattern of recent landscape change in northeast Tanzania, satellite image data from the 1970s, 1980s, and early 2000s was downloaded and visually interpreted to identify areas of clearly visible land conversion. The interpretation of the satellite image data thus yielded a rough picture of where recent

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[17] Some of the text in the original map has been removed in order to increase readability of the map in Figure 1b. In the original map there is a text notification across the Maasai Plains that states: "31.000 Nomadic Masai," indicating only vaguely the location of Maasai settlements in the region.

[18] N.T. Håkansson and M. Widgren, "Labour and Landscapes: The Political Economy of Landesque Capital in Nineteenth Century Tanganyika," *Geografiska Annaler*, Series B: Human Geography 89, 3 (2007), 233–48; M. Widgren, "Towards a Historical Geography of Intensive Farming in Eastern Africa," in M. Widgren and J.E.G Sutton, eds., *Islands of Intensive Agriculture in Eastern Africa* (Oxford: James Currey, 2004), 1–18; F. D. Huijzendveld, "Changes in Political Economy and Ecology in West-Usambara, Tanzania: *ca.* 1850-1950," *International Journal of African Historical Studies* 41, 3 (2008), 383-409.

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land transition processes have occurred in the region (i.e., conversion of one type of land use to another, such as agricultural expansion into rangelands or forests). The study was deliberately restricted to open access LANDSAT data, as a means to test the potential of using these freely accessible data for the purpose of performing a rapid regional assessment of land cover change.

The comparison of satellite images over time (based on the spectral signals of image pixels) by either visual or automatic methods, poses a number of methodological constraints, such as accounting for differences in seasonality (wetness), differences in atmospheric disturbance, and similar pixel values for different land cover types.[19] These constraints can be reduced by careful classifications based on field data (i.e. ground truthing), as in the case of the more detailed satellite image interpretation of the central areas of the Maasai Plains below. However, for the purpose of doing a rapid regional appraisal of ongoing land transition processes, an alternative strategy was used, whereby images of all three time periods were examined simultaneously, section by section. Areas showing clear signs of land conversion, i.e., primarily where visible changes in the land cover pattern was observed, were indicated on the basis of a 5 x 5 km grid overlaid each image to produce a map (Figure 1a and 1b) of the region showing all grids-cells that were associated with land change.[20] The resulting spatial distribution of areas showing clear signs of recent rapid land change are, for comparative purposes, overlaid on cultivated land in the late 1990s based on data produced by FAO-Africover,[21] in Figure 1a, and on Gillman's population map from the 1930s in Figure 1b. Apart from agricultural expansion, a few areas with different types of landscape change such as reforestation and abandoned arable fields were observed. As agricultural expansion is by far the most common process of land conversion in the region as well as the most distinct type of land change process that could be observed in the images, the following discussion will focus on this process. Hence, Figure 1a and 1b only display areas of agricultural expansion. The 5 x 5 km grid-

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[19] J.-F. Mas, "Monitoring Land-Cover Changes: A Comparison of Change Detection Techniques," *International Journal of Remote Sensing* 20, 1 (1999), 139–52; E. Lambin, "Modelling and Monitoring Land-Cover Change Processes in Tropical Regions," *Progress in Physical Geography* 21 (1997), 375–93; A. Singh, "Digital Change Detection Techniques Using Remotely-Sensed Data," *International Journal of Remote Sensing* 6, (1989), 989–1003.

[20] LANDSAT images (scenes: 181/063, 1973-09-22; 169/063, 1986-07-23, 2000-02-12; 180/062, 1976-01-24; 168/062, 1987-02-25, 2000-02-21; 180/063, 1972-12-25; 168/063, 1986-09-18, 2000-02-21; 179/063, 1975-07-27; 167/063, 1987-01-01, 2001-03-04) were downloaded from the Global Land Cover Facility website (http://glcf.umiacs.umd.edu). The resolution, i.e., pixel size, is *c.* 60 sq meters for the 1970s images (MSS sensor) and *c.* 30 for the 1980s and 2000 images (TM, ETM+ sensors). Hence, the 1970s images contain much less detail than the more recent. Overall the resolution in the images means that areas of land conversion in general needs to cover several hectares of land in order to be clearly visible in the images.

[21] FAO-Africover (www.africover.org) has produced land-cover data intended for free public access. The land cover has been produced from visual interpretation of digitally enhanced LANDSAT TM images (Bands 4,3,2) acquired mainly in the year 1997. The land cover classes have been developed using the FAO/UNEP international standard classification system. The aggregated data for cultivated areas shown in Figure 1a contains all cultivated land in the Africover database.

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cells shown in the figure indicate areas where minor (less than approximately 30 percent of the grid cell area) or major changes (more than approximately 30 percent of the grid cell area) have occurred. Overall, Figure 1 represents a generalized overview and not a complete mapping of agricultural expansion in the region.

Figure 1 (a and b) shows a significant expansion of cultivation into pastoral rangelands and savanna of the Maasai Plains. Looking at this pattern of land cover change, it is clear that the Maasai Plain is the "hot spot" of the region in terms of recent processes of land conversion. Within the historical core areas of agricultural production only marginal changes in land cover were observed. In contrast to the plains the dominant process of landscape change in the much more densely populated highland areas is largely one of continuity—a continued historical trajectory of intensive agricultural land use.[22] In national perspective, the Maasai Plains are also one of the few large remaining areas of low population density (i.e., not already intensively utilized for settlement and agriculture) that is not set aside specifically for conservation purposes such as national parks or game and forest reserves. Hence, the Maasai rangelands have offered a space for large-scale agricultural expansion that has not been available to the same extent in many other parts of the country in recent years.[23]

Two major areas of recent agricultural expansion can be seen in Figure 1 (a and b): the central Maasai Plains (A) and the southwestern part of the plains immediately east of Kondoa, along the western and southern border of the Mkungunero Game Controlled Area (B). These areas of agricultural expansion thus mark a shift in the regional historical land use pattern; a shift from the previous regional division between agricultural producing areas and areas of predominantly pastoral production, to a more uniform focus on agriculture. This relatively abrupt shift from pastoral rangelands to large scale cultivation suggests that a new set of driving forces have emerged to produce an altered regional land use pattern and political ecology. In what follows we will use the example of the central Maasai Plains as a case study to investigate the process of transition from rangeland to agricultural use.[24]

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[22] See articles in this special issue, as well as Widgren, "Towards a Historical Geography;" and Håkansson and Widgren, "Labour and Landscapes." For a case study of recent change, see also E. Soini, "Land Use Change Patterns and Livelihood Dynamics on the Slopes of Mt. Kilimanjaro, Tanzania," *Agricultural Systems* 85, 3 (2005), 306-23.

[23] This observation is based on a comparison of open access spatial data of protected areas for 2008 provided by the World Database on Protected Areas (WDPA) and population density by wards from the 2002 national census in Tanzania.

[24] For recent studies of land use changes east of Kondoa, see P.Z. Yanda, "Implications of Population Increase and Land Tenure on Land Resources Integrity in the Kondoa Lower Irangi, Central Tanzania—the Case of Mrijo Village," *Tanzania Journal of Population Studies and Development* 12, 1 (2005), 103–112, and P.Z. Yanda, "Transformation of Natural Ecosystem to Agricultural Land and Implications on Environmental Integrity and Rural Livelihood in Lower Irangi, Semi-arid Central Tanzania," *UTAFITI Journal of the Faculty of Arts and Social Sciences* (University of Dar es Salaam), 7, 1 (2007).

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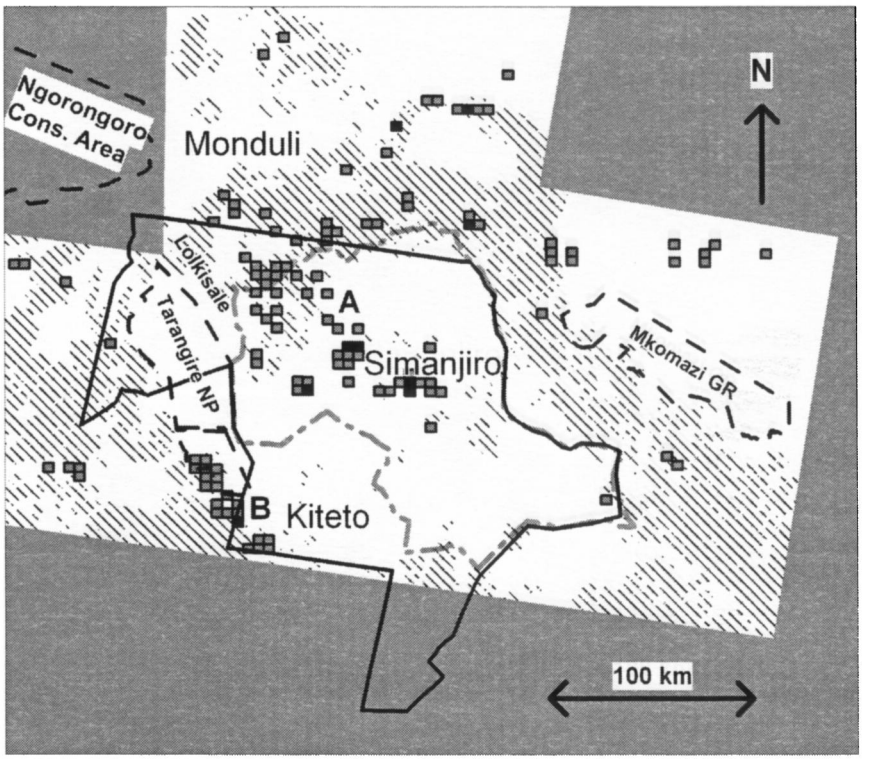


Figure 1a. Areas of agricultural expansion in Northeast Tanzania based on a visual interpretation of land cover change in LANDSAT images from the 1970s, late 1980s, and early 2000s overlaid on cultivated areas in the late 1990s based on FAO-Africover data (http://www.africover.org). The squares in the figure represent 5 x 5 km areas. Grey represent areas of minor agricultural expansion and black represent areas of major agricultural expansion.

Legend to Figure 1a and 1b

Protected areas

GR=Game Reserves; NP=National Park

Detailed land-cover change study area

See figures 2 to 4

Area with minor agricultural expansion

Area with major agricultural expansion

Areas where LANDSAT data has not been interpreted

Cultivation in late 1990s

Simanjiro District boundary

Monduli/Simanjiro/Kiteto=District names

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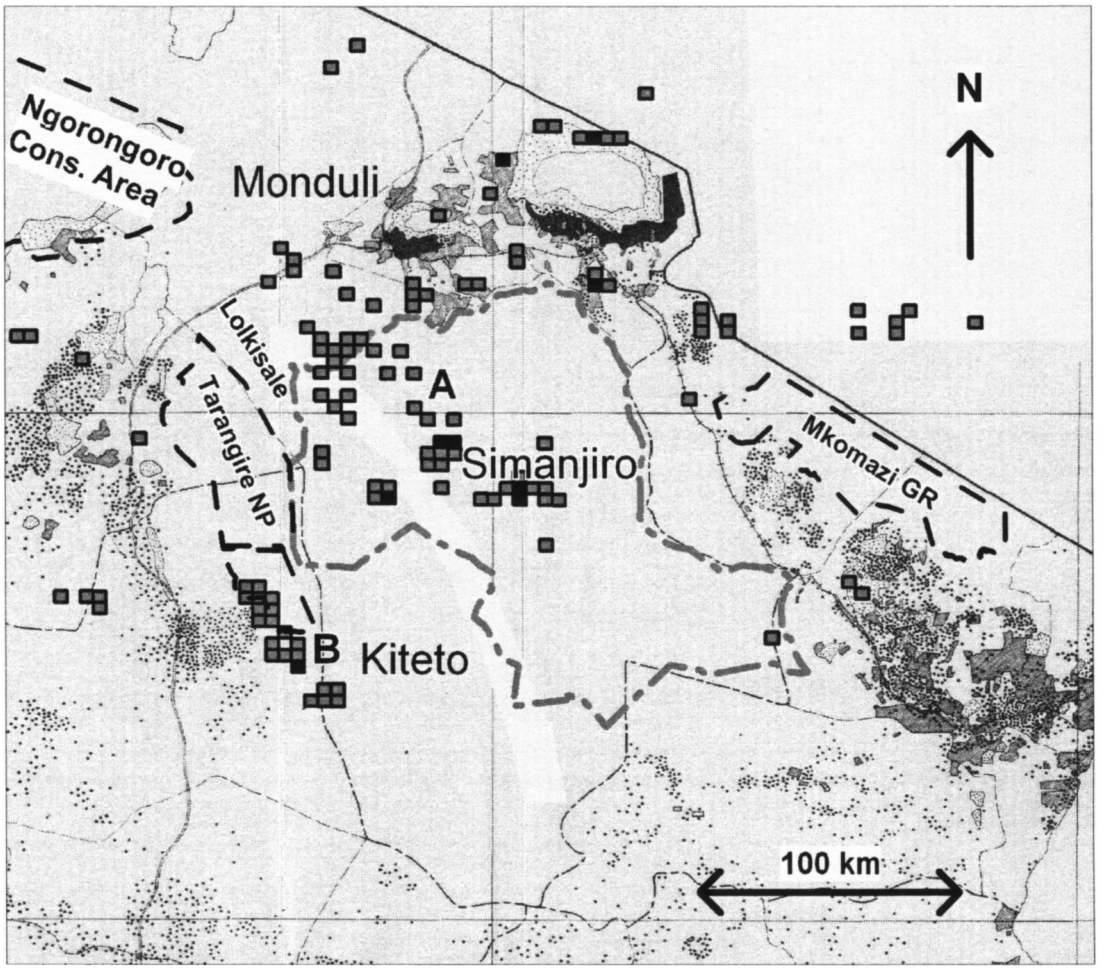


Figure 1b. Areas of agricultural expansion in Northeast Tanzania based on a visual interpretation of land cover change in LANDSAT images from the 1970s, late 1980s and early 2000s overlaid on Gillman's population distribution map from the mid-1930s (see main text for reference). The squares in the figure represent 5 x 5 km areas. Grey represents areas of minor agricultural expansion and black represent areas of major agricultural expansion.

Legend to Gillman's population distribution map shown in Figure 1b.

Every 200 people represented thus •

Areas with a mean density exceeding 150 people per sq. km. (approx. 400 per sq. mile)

Land alienated to non-natives

Forest reserves

Townships of over 4000 inhabitants •

Railways

Main roads

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Land Cover Changes on the Maasai Plains, 1970s to 2000

The analysis of land cover change at the regional scale only provides a rough overview of where land conversion processes have taken place. In this section, however, we examine the process of the disappearing rangelands on the Maasai Plains based on a detailed visual interpretation of LANDSAT images and fieldwork by Yanda and colleagues at the Institute of Resource Assessment, University of Dar es Salaam in 2001,[25] and by ethnographic research among the Maasai by Hodgson[26] during the 1990s. The primary aim is to identify the extent of recent land cover and land use changes and their underlying driving forces.

The Maasai Plains is a dry area with bimodal rainfall ranging from 400 to 600 mm per year. The short rains fall between November and December whereas the long rains fall between February and April. The investigated area covers the heart of the Maasai plains that stretch out south of the towns of Arusha and Moshi, including most of Simanjiro District and some parts of Kiteto District south and southwest of Simanjiro (see Figure 1a). The specific extent of the analyzed area was constrained by the LANDSAT images used for interpretation.

The maps in Figures 2–4 show the rapid expansion of cultivation in the area between the 1970s and 2000. By 2000, a large proportion of wood and bush vegetation had been cleared for cultivation compared to the situation in the 1970s. Cultivation had also expanded into grasslands and there had been a shift in the geographical concentration of grasslands from the northwest part of the mapped area in the 1970s to the northeast part in 2000.[27] The expansion was driven both by the needs and interests of small-scale subsistence farmers and by investments in large scale commercial agriculture in the area. Seed beans (for export) are now a major crop in commercial farms, while smallholders primarily cultivate maize and beans. The majority of the farmers investing in large-scale commercial production are either from Arusha or from abroad (foreign investors). Some

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[25] The data presented here are based on the interpretation of LANDSAT images from 1975/1978, 1995 and 2000/2001 (scenes: 181/063, 1978-10-20; 181/062, 1975-10-27; 167/063, 1995-07-01, 2001-03-04; 167/064, 1995-07-02, 2000-02-22; 168/063, 1995-09-27, 2000-09-16). Interpretation of satellite images was done by Mr. Francis Msuya and Mr. Simon Mwansasu, practical GIS work by Mr. Abel Kapele and Ms. Tunu Mndeme, and analytical GIS work by Mr. Simon Mwansasu and Ms. Anna Mushi. Msuya, Mwasasu and Mushi also took part in the fieldwork. Mapping of the land use and land cover types was based on D. J. Pratt, M.D. Greenway, and M.D. Gwyne, "A classification of the East African Rangelands," *Journal of Applied Ecology* 3, 2 (1966), 369–82. For further details see United Republic of Tanzania (URT) Ministry of Natural Resources and Tourism, "Status of Game Controlled Areas as a Basis for the Establishment of Wildlife Management Areas in Tanzania – the Case of Arusha Region," Dar es Salaam: Institute of Resource Assessment, 2002.

[26] Hodgson, *Once Intrepid Warriors*.

[27] If the spatial distribution of the expansion of cultivation in Figures 2–4 is compared with the regional scale analysis of land change discussed above and the FAO-Africover data shown in Figure 1a, it is clear that these three sets of satellite image interpretations captures the same basic spatial pattern of agricultural expansion on the Maasai Plains.

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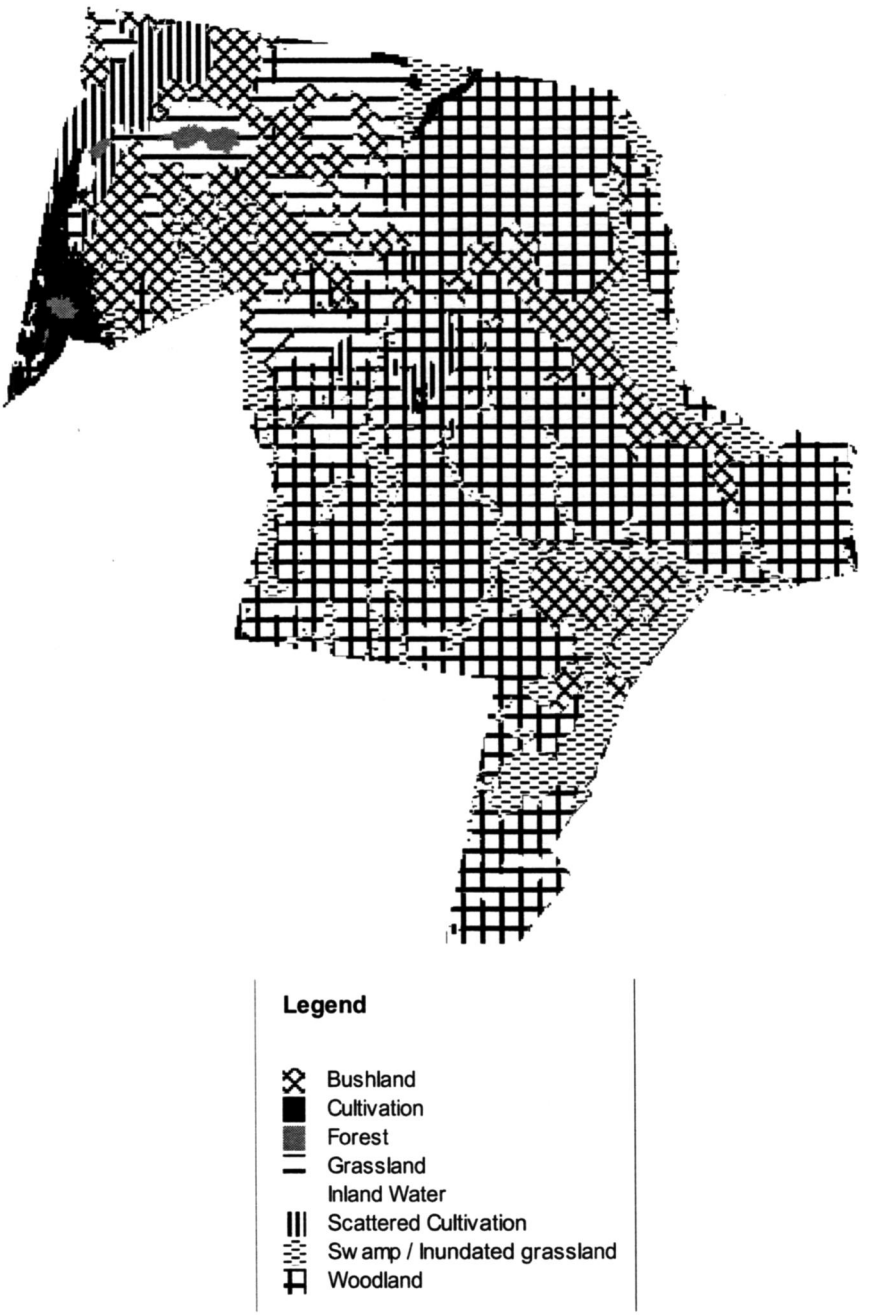


Figure 2. Land use and land cover on the central Maasai Plains in 1975/1978.

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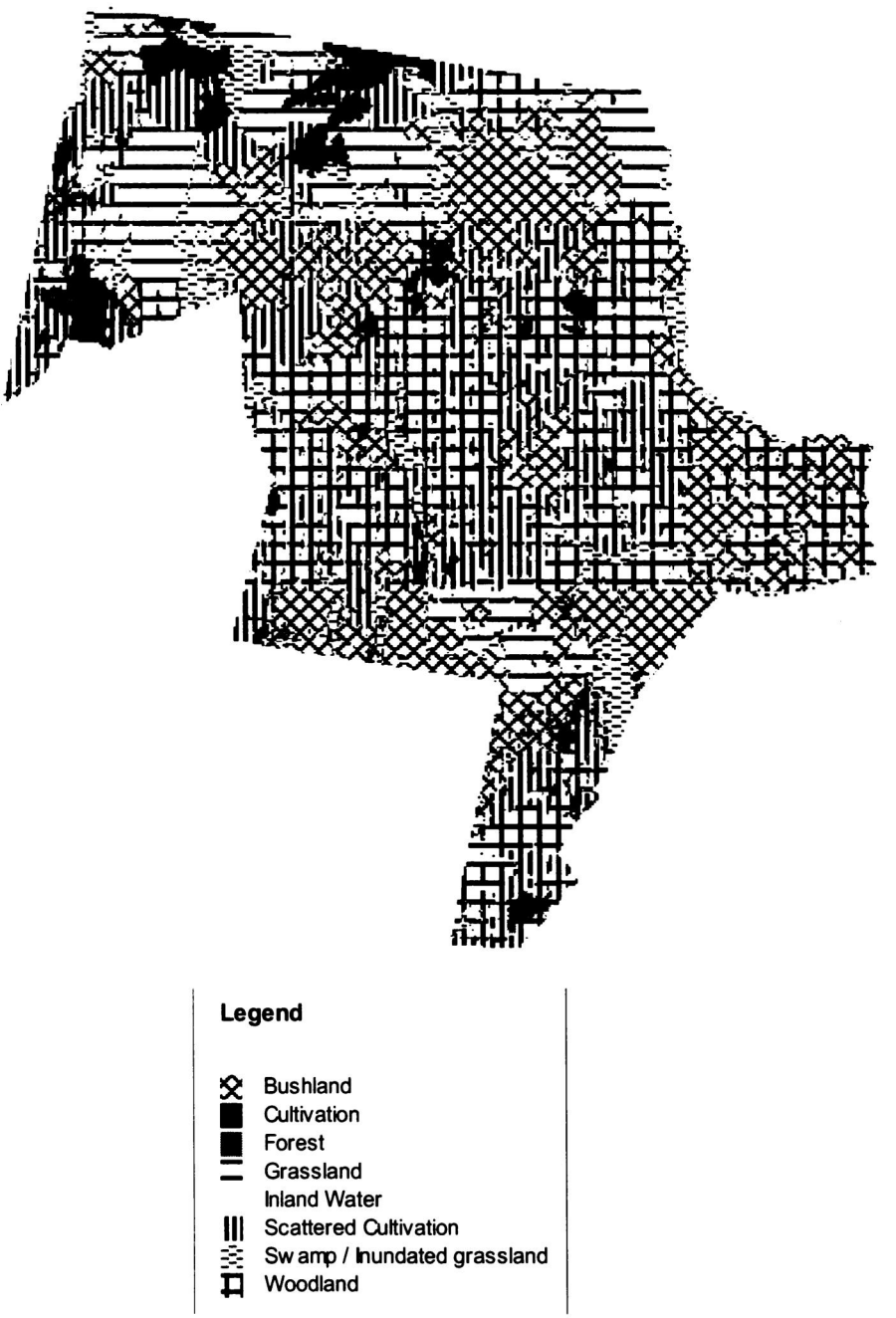


Figure 3. Land use and land cover on the central Maasai Plains in 1995.

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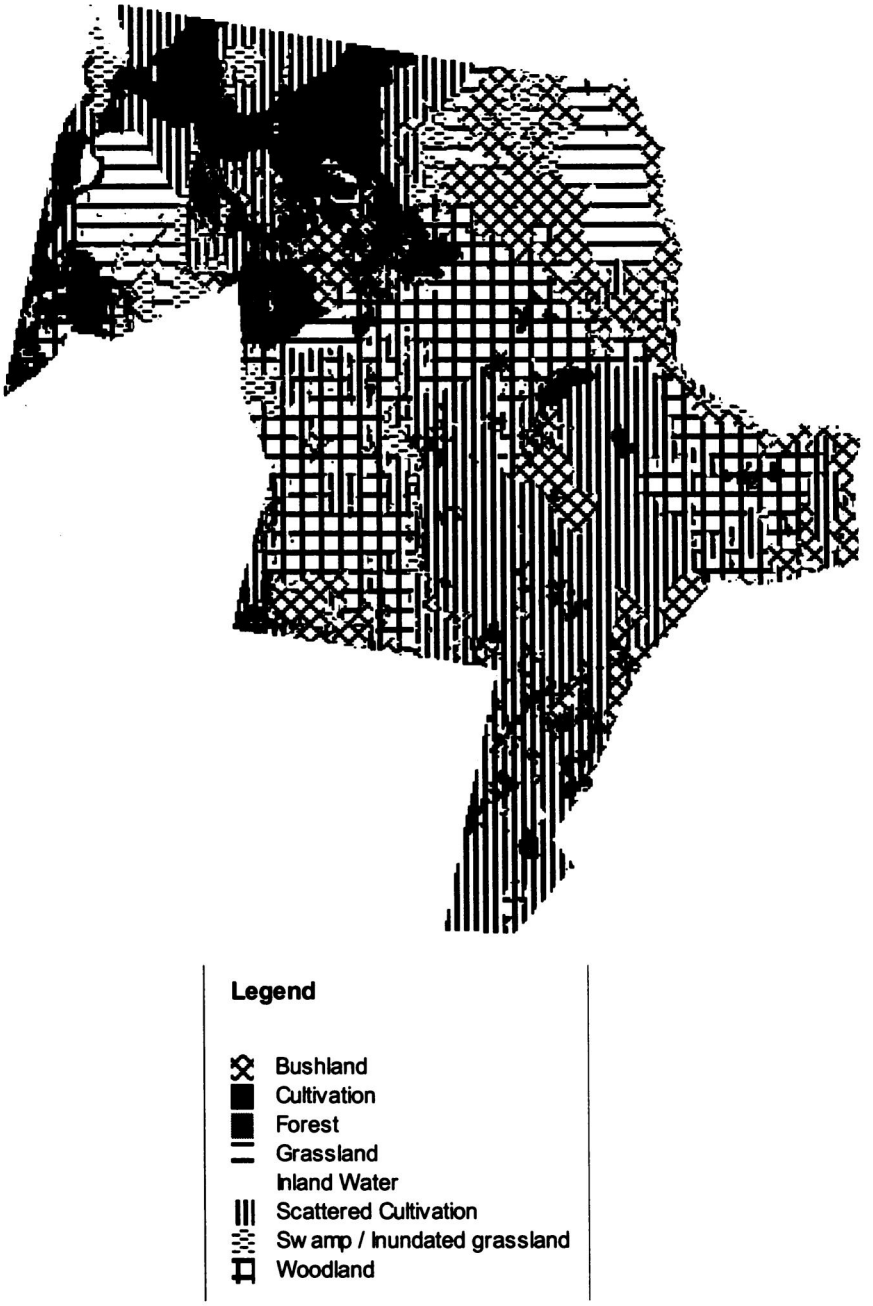


Figure 4. Land use and land cover on the central Maasai Plains in 2000/2001.

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farms are owned by government officials.[28] However, local Maasai also invest in agriculture to a large extent, using ox-ploughs, tractors, and hired seasonal labor (mainly non-Maasai from Moshi, Arusha, Singida, Mbulu, and other parts of Tanzania). Most of these local entrepreneurial Maasai farmers were previously pastoralists.[29]

Because of extensive cultivation, livestock keeping is now a secondary activity for many Maasai and livestock herds are squeezed onto small marginal areas prone to land degradation and competition with wildlife. The grazing regime on the plains follows seasonal variation in the availability of pasture and water, but shrinkage of rangeland has made this practice increasingly problematic and unsustainable. As a result, there has been out-migration of pastoral communities with their livestock searching for better pastureland. Some of the destination areas are Usangu Wetlands in Iringa Region, areas around Lake Rukwa, and Kilombero wetlands in Morogoro Region.[30] Ethnographic research from three communities in Monduli district[31] (just north of the area shown in Figures 2–4) show that, by the early 1990s: economic stratification among Maasai had increased[32] and rigidified as such customary means of redistribution and assistance such as clientship, stock partners, bride service, and so forth disappeared; homestead sizes had declined (from a 1980 average of 7.2 houses per homestead to 3.8 houses in 1992); and education levels were on the increase, especially for girls.[33]

As the above suggests, Maasai communities, as well as individual men and women, have intensified their efforts to diversify economically over the past few decades. Certain well-placed communities like Terrat, which lies in the north part of the area mapped in Figures 2–4, negotiated contracts with photographic safari companies to provide access to land for camping and walking tours in exchange for concession fees. A few, such as those on the borders of Tarangire National Park, even took advantage of growing interest in "cultural tourism" to build their own lodges and camps, often in collaboration with safari

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[28] URT, "Status of game controlled areas." See also: P.Z. Yanda and C. William, "The Changing Livelihoods in the Maasai Plains—Implications on Poverty Levels and Sustainability of Natural Resource Base," Dar es Salaam: Institute of Resource Assessment, REPOA Research Report, 2007); P.Z. Yanda and C. William, "Livelihoods Diversifications and Implications on Food Security and Poverty Levels in the Maasai Plains—The Case of Simanjiro District, Northern Tanzania," Dar es Salaam: Institute of Resource Assessment, 2006); T. McCabe, "Sustainability and Livelihood Diversification among the Maasai of Northern Tanzania," *Human Organization* 62, 3 (2003), 100–111.

[29] For a detailed account of recent land-use changes in the Simanjiro area, apart from those mentioned above, see: H. Sachedina, "Wildlife is Our Oil: Conservation, Livelihoods and NGOs in the Tarangire Ecosystem, Tanzania" (Ph.D. thesis, University of Oxford, 2008).

[30] Yanda and William, "Changing Livelihoods;" Yanda and William, "Livelihoods Diversificastions;"

[31] For details, see Hodgson, *Once Intrepid Warriors*.

[32] In 1992, out of 251 households, two owned over 300 head of cattle each of the 1,879 total cattle in one of the studied communities (Emairete), while eighty-nine households had no cattle and 105 households had between one and five animals.

[33] But see N.K. Sikar and D.L. Hodgson, "In the Shadows of the MDGs: The Situation of Pastoralist Women and Children in Tanzania," *Indigenous Affairs* 1, 6 (2006), 30–37.

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operators. Profits usually were channeled into a village development account, to be applied towards projects of the village's choosing. Young men left their homesteads in droves to seek work in the expanding mining sector in Mererani, Simanjiro District, or wage labor as night guards in Arusha, Dar es Salaam, and even Zanzibar. Some older men experimented with contract farming of first barley for Tanzania Breweries and more recently flower seed for Multiflower and other large corporations. Women sought any means possible to earn money: producing beadwork to sell to tourists, selling milk and hides at local markets, raising chickens, making and selling illicit alcohol, cultivating not only maize and beans but also small garden crops like tomatoes for sale, and even providing sexual services in exchange for cash or food. Hence, cultivation by Maasai expanded exponentially, as both a subsistence strategy and as a means to mark and protect their remaining land.[34]

Strategies for diversification have also varied, and many homesteads and individuals pursued several strategies simultaneously, taking advantage of environmental differences, social relations, and expanding market opportunities. For example, some wealthy men in Monduli District used polygyny to achieve economic diversity, establishing multiple homesteads and therefore multiple land rights by placing a wife or wives in two or more communities. Less wealthy households accessed grazing and farming indirectly through the marriages of their children. Poor households, which were usually monogamous and had no cattle or smallstock, moved to areas where cultivation was possible and begged housing and a small plot of land from wealthier clan members. Both the husband and wife worked in the fields and sometimes contributed labor to their benefactor's fields. Widowed women whose sons refused (or were unable) to support them faced the most difficult situations—unable to work for themselves, they subsisted by circulating among their family and clan to beg food and shelter. Although the future for most of these families was extremely bleak, a few were able, with the help of family and friends, to recover and improve their situations. After one man in a village in Monduli district "drank" all of his stock (i.e., sold his animals to buy alcohol), his wife moved with her three children to live with her brothers. They gave her some land to farm, which she did successfully, reinvesting the profits in a few animals. Gradually, the herd increased, and within five years she was re-established, and moved into her own house and homestead. Her husband, who had quit drinking, moved back with her.[35] Moreover, the belief in the importance of education, so that children can access "the power of the pen" to survive in a "world that is blind,"[36] combined with the constant migration of men to towns and mines, has substantially increased the workload and responsibilities of married women who remain in the rural homesteads as the *de facto* heads of households.

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[34] See Sachedina, "Wildlife is Our Oil," 264–312 and Brockington et al., "Preserving the New Tanzania."

[35] Hodgson, *Once Intrepid Warriors*. For more on the gender dynamics of these social transformations, see D.L. Hodgson, ed., *Rethinking Pastoralism in Africa: Gender, Culture & the Myth of the Patriarchal Pastoralist* (Oxford: James Currey, 2000), and D.L. Hodgson, *The Church of Women: Gendered Encounters between Maasai and Missionaries* (Bloomington: Indiana University Press, 2005).

[36] Hodgson, *Once Intrepid Warriors*, 184.

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From Exchange to Diversification: The Political Economy of Maasai Livelihoods and Landscapes, 1850–1970s

The analysis of more detailed LANDSAT imagery of the Maasai Plains, including related fieldwork in Simanjiro and Kiteto Districts, and ethnographic information from Monduli District suggests that the expansion of agriculture in the Maasai Plains is a fairly recent product of pressures on Maasai households to diversify economically and protect the remaining lands from alienation, as well as commercial investments in large scale cultivation by Maasai and others.

The historical analysis of the regional political economy in the precolonial and early colonial periods, however, shows that these pressures and strategies reflect and have been shaped by a much longer history of regional economic relations and political interventions. The following historical overview briefly traces and summarizes these processes.[37]

1850–1883: Before the Disasters

Several hundred years ago, Maa-speaking people began migrating southwards, along the Rift Valley, through Kenya and eventually into Tanzania.[38] By the early 1800s, they were scattered in Tanzania, as far south as Usagara near Mpwapwa by some reports.[39] Fosbrooke calls the first half of the nineteenth century the "period of consolidation," as Maasai established themselves throughout northern Tanzania through raids, fighting, marriage, and the absorption, assimilation, and adoption of pre-existing groups.[40] They displaced Tatog, Gogo, "Kwavi," "Lumbwa" (Parakuyo) and other groups to occupy vast lands in northern Tanzania. By 1869, Maasai lived throughout what is now considered Monduli, Ngorongoro, and Simanjiro Districts, with an expanding presence in the Karatu, Talamai, and Kiteto areas. They also lived between the east bank of the Ruvu/Pangani river and the Pare mountains.[41] By the late 1880s, when Merker first encountered them, he

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[37] The historical overview is largely based on Hodgson, *Once Intrepid Warriors*.

[38] Hodgson, *Once Intrepid Warriors*, 22–26.

[39] H.A. Fosbrooke, "An Administrative Survey of the Masai Social System," *Tanganyika Notes & Records* 26 (1948) [1939], 1–50. J. Bernsten, "Pastoralism, Raiding, and Prophets: Maasailand in the Nineteenth Century" (Ph.D. thesis, University of Wisconsin—Madison, 1979)

[40] All historical work on Maasai that begins before the twentieth century faces the challenges of naming, categories, and geographic inaccuracy. Perhaps the most difficult is determining who "counted" as Maasai in the earlier periods. "Maasai" itself only emerged as an ethnonym in the later nineteenth century. Originally it referred to Maa-speakers living in a certain place, but by the late 1870s it was used by foreign explorers and missionaries to label only those Maa-speakers whose primary livelihood was livestock-herding (see J. Bernsten, "The Enemy is Us: Eponymy in the Historiography of the Maasai," *History in Africa* 7 [1980], 1–21). Nonetheless, by the 1850s, a group of Maa-speakers who specialized in pastoralism had emerged, who henceforth will be called Maasai, including their descendants in later periods who self-identify as Maasai (rather than Arusha or Parakuyo, for example), even though their livelihood practices may have changed.

[41] Fosbrooke, "An Administrative Survey," 4–5. R.T. Wakefield, "Routes of Native Caravans from the Coast to the Interior of Eastern Africa," *Journal of the Royal Geographical Society* 40 (1870), 303–39; R.T.

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called them the "masters of the wide plains."[42] The dispersal of Maasai is also shown by the scattering of Maa place names throughout surrounding areas of Kilimanjaro and Pare mountains in maps produced by the German colonial administration.[43]

As the above distribution of Maasai suggest, many of them lived interspersed with farmers and hunter-gatherers, especially on the "borders" to the east along the Ruvu river, south near Kiteto, to the west along the upper Rift plateau near Karatu, and around Mount Kilimanjaro, Mount Meru and on the plains east of the Pare mountains. Their lands also encircled several non-Maasai "oasis communities" such as Sonjo in the north (west of lake Natron), which used water cascading down from nearby highlands to irrigate the dry floor of the Rift Valley.[44] Maasai interactions with their neighbors occurred through trade, intermarriage, and other forms of social and economic exchange, and varied from peaceful (especially if the group had few if any cattle to raid) to violent.[45] Most scholars agree that while the majority of Maa-speakers were once agro-pastoralists, cultivating sorghum and millet and raising cattle and smallstock, in time, a group emerged a few centuries ago with an increasing specialization in pastoralism and a heightened sense of their self-identity as pastoralists.[46] Material, economic, political, social, cultural, and ecological changes enabled increasing specialization, including the discovery and mastery of iron-forging techniques for spears, trade and exchange with neighboring farming communities, the development of age-grades for the horizontal organization of men, and the emergence of prophets (*iloibonok*) as religious and political rallying points for the vertical organization of people into opposing groups.[47]

Few Maasai seemed to farm during the late nineteenth century.[48] Evidence, however, suggests that women traded milk, hides, and smallstock for agricultural products with passing caravans and by traveling to nearby markets, such as Kibongoto (on the

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Wakefield, "Native Routes through the Masai Country," *Proceedings of the Royal Geographical Society* 4, 12 (1882), 742–47; J.P. Farler, "Native Routes in East Africa from Pangani to the Masai Country and the Victoria Nyanza," *Proceedings of the Royal Geographical Society* 4, 12 (1882), 730–42.

[42] Moritz Merker, *Die Masai. Ethnographische Monographie eines ostafrikanischen Semitenvolkes* (1904; 2nd ed, Berlin: Dietrich Reimer, 1910), 8.

[43] P. Sprigade and M. Moisel, *Karte von Deutsch-Ostafrika* (Berlin: Dietrich Reimer, 1911), map sheet B5, *Kilimandscharo.*

[44] John Bernsten, "The Maasai and Their Neighbors: Variables of Interaction," *African Economic History* 2 (1976), 1–11.

[45] Alan Jacobs, "The Traditional Political Organization of the Pastoral Masai" (D. Phil., thesis, Oxford University, 1965); Bernsten, "The Maasai and Their Neighbors."

[46] John Sutton, "Becoming Maasailand," in Thomas Spear and Richard Waller, eds., *Being Maasai* (London: James Currey, 1993); John Galaty, "Maasai Expansion and the New East African Pastoralism," in Spear and Waller, eds., *Being Maasai.*

[47] Hodgson, *Once Intrepid Warriors,* 24.

[48] But see Bernsten, "The Enemy Is Us."

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slopes of Kilimanjaro).[49] Oral traditions from Pare, Kilimanjaro and Arusha also suggest that Maasai traded cattle in exchange for both crops and iron.[50] Maasai also traded for tobacco, cloth, glass beads, and cooper wire from the Swahili traders who traveled in large, armed caravans through their areas or at permanent trading settlements.[51] Young men traveled with cattle and smallstock in search of water, pasture and saltlicks, while elders, married women and children remained at more permanent settlements. Yet these settlements lasted only so long as good rains, access to water and pasture, amiable social relationships, and minimal livestock and human deaths. Movement of the semi-permanent homesteads was always a possibility, with few limits to mobility in the sparsely settled rangelands.

In sum, as Fosbrooke notes, the period from 1860 to 1890 was "regarded by the Masai as one of prosperity."[52] Their settlements (backed by the warriors) dominated the plains, enabling the transhumant mobility required to subsist as pastoralists, including forays into other peoples' lands if necessitated by irregular rains and drought. Women's trade supplemented their diet with grain and other foodstuffs, especially during the dry season. If a homestead's herds were somehow devastated by disease, they could survive by temporarily becoming "Dorobo" (a Maa term, sometimes derogatory, for Maa-speakers who rely on gathering and hunting as their primary livelihoods); borrowing livestock from in-laws, wealthier clan members, or stock-partners; exchanging sisters or daughters for cattle, smallstock or food; raiding other cattle-keepers; or moving to settle among their farming neighbors, depending in part on the subsistence strategies supported by their environment.

1890–1916: Disaster and Recovery

Beginning in 1883, Maasai were ravaged by a series of disasters, including bovine pleuropneumonia (BPP) in 1883, rinderpest in 1891, then smallpox in 1892.[53] Many

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[49] Joseph Thomson, *Through Masai Land* (1885; reprint, London: Frank Cass, 1968), 89. Merker, *Die Masai*, 9, 30; Bernsten, "The Maasai and Their Neighbors."

[50] Isaria Kimambo, *Penetration and Protest in Tanzania* (London: James Curry, 1991), 25; Thomas N. Håkansson, "The Decentralized Landscape: Regional Wealth and the Expansion of Production in Northern Tanzania Before the Eve of Colonialism," in Lisa Cligget and Christopher Pool, eds., *Economies and the Transformation of Landscape* (Walnut Creek, CA: AltaMira Press, 2008), 239–66. T. Spear, *Mountain Farmers* (Oxford: James Currey, 1996), 51.

[51] Farler, "Native Routes," 736; Lewis J. Krapf, *Travels, Researches and Missionary Labours during an Eighteen Years' Residence in Eastern Africa* (1860; 2nd ed., London: Frank Cass, 1968), 364; Merker, *Die Masai*, 212–13; Harry Johnston, *The Kilima-Njaro Expedition: A Record of Scientific Exploration in Eastern Equatorial Africa* (London: Kegan Paul, Trench, 1886), 404.

[52] Fosbrooke, "An Administrative Survey," 10.

[53] For detailed analyses of these crises, see Richard Waller, "Emutai: Crisis and Response in Maasailand 1883–1902," in Douglas Johnson and David Anderson, ed., *The Ecology of Survival: Case Studies from Northeast African History* (Boulder, Colorado: Westview Press, 1988). Juhani Koponen, *Development for Exploitation: German Colonial Policies in Mainland Tanzania, 1884–1914* (Helsinki: Finnish Historical Society Studia Historica, 49, 1995), Huijzendveld, "Changes in Political Economy."

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Maasai people and cattle died during the epidemics and in the ensuing famines and wars among Maasai sections. In the wake of the disasters (the period is referred to as *Emutai* by Maasai), Maasai men and women pursued several survival strategies. A number became hunter-gatherers and/or farmers—often just as a temporary means to rebuild their herds, but occasionally as a permanent shift.[54] Many relied on social relationships—established through marriage, friendship (*osotua*), patron-client, and stock partnerships with farmers (especially Arusha) and the few Maasai whose herds survived—to access land, food, support, and stock to rebuild herds.[55] Some exchanged or lent their children for food or livestock, or just left their children by the wayside for sympathetic strangers to adopt.[56]

As surviving Maasai slowly rebuilt their herds, they confronted another obstacle—the presence of German military and administrative officers. With the formalization of the Anglo-German agreement of 1890, the Germans organized occasionally violent efforts to control Maasai and remove them from lands for German settlement, especially in West Kilimanjaro. According to Fosbrooke, when Germans first made contact, Maasai, "being scattered by famine," must have been very few in number.[57] Thus, "the area south of the Moshi-Arusha-Mbugwe road was therefore thought sufficient as a Masai Reserve, and the objective was to keep Mondul, Longido, Ngorongoro and Loliondo area free for alienation. This meant that several groups of Maasai,[58] were debarred from their grazing grounds."[59] During the First World War, the policy was relaxed, and many Maasai returned.

Thus, "the period 1890 to 1920 was one of great upheaval for the Tanganyika Masai."[60] The consequences of first Emutai and then German administration were several, including the break-up and submergence of many of the sections, the scattering of Maasai, the destabilizing of pastoralist livelihoods, and early confrontations with imperial rule. As a result, while some Maasai resumed pastoralism with an even fiercer embrace of the pastoralist ideals, others sought ways to ensure more economic stability through diversification, especially into small-scale farming.

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[54] Fosbrooke, "An Administrative Survey," 11. Merker, *Die Masai*, 10; Bernsten, "The Maasai and Their Neighbors."

[55] Fosbrooke, "An Administrative Survey," 8; Bernsten, "The Maasai and Their Neighbors"; Hodgson, *Once Intrepid Warriors*, 36–39.

[56] See Oscar Baumann, *Durch Massailand zur Nilquelle: Reisen und Forschungen der Massai-Expedition des deutschen Antisklaverei-Komite in den Jahren 1891–93* (Berlin: Dietrich Reimer, 1894), 32; Hodgson, *Once Intrepid Warriors*, 37.

[57] Fosbrooke, "An Administrative Survey," 10.

[58] Namely the Laitayok and Ndasegera Loita of Loliondo, the Salei and Serenget west of the Rift, the Mweandet of north Meru and Mondul, the Sighirari of Sanya and the Matapatu of Longido.

[59] Fosbrooke, "An Administrative Survey," 10–11.

[60] Ibid., 11.

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1916–1961: British Colonial Rule

After the First World War, the British took control of Tanganyika from the Germans. Like the Germans, they encountered a dispersed, scattered presence of Maasai, living intermingled with farmers, hunter-gatherers, and other pastoralists as they continued to recover their lives and rebuild their herds. According to the 1921 Native Census, Maasai (including some "Kwavi") were reported to number about 21,600, living primarily in Arusha with "smaller numbers in Kondoa-Irangi, Moshi, Usambara, Pangani, and Dodoma."[61] Over 4,000 Maasai lived in Moshi District, interspersed with Pare, Chagga, Kahe, Arusha and "miscellaneous small tribes."[62] The 1925 annual report for Arusha District stated that Maasai lived in Handeni, and "Kwavi" in Handeni, Morogoro, and Dodoma.[63]

A few key factors and events are however important to highlight.[64] First and foremost, this period is characterized by British efforts to concentrate, bound, and control Maasai settlement and movement through the creation of the Masai Reserve (which became Masai District in 1926). Through encouragement, coercion, and mandate, they pressured Maasai pastoralists to move into the reserve with marked success. While the core of the reserve included the main Maasai grazing lands (the Serengeti plains, Maasai plains, floor of the Rift Valley), the borders were firmly fixed to exclude previous Maasai lands (such as the land between Mount Kilimanjaro and Mount Meru, known as the "Sanya corridor" or "West Kilimanjaro") (see Figure 5). Moreover, key areas of the most fertile lands (i.e., dry season grazing lands, drought reserve lands, and permanent water sources) were systematically excised from the reserve over the next few decades for European and African farming, forest reserves, and, eventually, game parks and game reserves. Maasai were prohibited from leaving the reserve without permission, and non-Maasai (including "itinerant" traders) were harassed from entering. Although scuffles over the presence of Maasai (and their cattle) outside reserve boundaries continued over the years,[65] by 1926 some British were boasting about their success at having reconstituted "the Masai" as "a tribe": "The Masai tribe is once more a corporate entity recovered from many fragments which were scattering themselves far and wide in the Territory between the years of our occupation in 1916 the collection of which could not commence until 1920 and ensuing years."[66]

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[61] Table III, "Report on the Native Census, 1921," Cooperative Africana Microform Project [hereafter CAMP], Center for Research Libraries, Reel 28, p. 12.

[62] "Native Census 1921" [of Moshi District], Arusha Regional Book I, CAMP, Reel 28, slide 13.

[63] Arusha District Annual report for 1925, TNA Secr 1733/1:36, page 8,

[64] The shifts in British practices and attitudes towards Maasai are discussed in detail by Hodgson, *Once Intrepid Warriors*.

[65] Morgans, District Officer, Maswa District to Provincial Commissioner, Northern Province, 25 June 1928, TNA 17/37.

[66] Arusha District Annual report for 1926, TNA Secr 1733/8:66, page 4. The report listed 38,045 Maasai living in Masai District and no Masai living in Arusha District.

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Although many Maasai were forced to return to the reserve and pay fines for criminal "trespass," other settlements were eventually condoned, resulting in constant adjustments to the official reserve/district boundaries. For example, even after the district boundaries were expanded in 1927 and 1928, a series of additional boundary extensions were requested in 1929 that were outside the already extended boundaries of the district, but occupied by Maasai: "Each of these areas has been continuously occupied by Masai of one or other of the clans since before the first European occupation."[67]

A second factor was the increasing presence of Arusha, who were Maa-speaking farmers in Masai District. At first there were just a few Arusha settlements at Musa (on the slopes of Monduli mountain), but Arusha were slowly using the marriage of their daughters to Maasai men and exchanges of cattle to seek new land for their homesteads and cultivation. Some colonial officers worried about the encroachment, others saw it as the most practical solution to relieve the "congestion" of Arusha District. [68] By the late 1940s, concerns about the seemingly dire situation of Arusha and increasing land disputes among Maasai, other Tanzanians, and European settlers in the Northern Province prompted a 1946 investigation by Justice Mark Wilson. In his report, he concluded that Maasai had land "plenty and to spare," and recommended ceding much of the most fertile Maasai land to more "productive" European settlers and African farmers as well as repatriating Maasai people and livestock living outside the boundaries of Masai District. On the basis of his recommendations, it was resolved to move some 20,000 head of Masai stock from the Sanya Corridor back into Masai District, to absorb the Tanganyika Masai who were in the Lake Jipe area, to attract Maasai away from the Serengeti National Park, and to seek in Masai District an outlet for Arusha from the "agricultural slum" of Arusha District.[69]

Beginning in the 1950s, large numbers of Arusha were officially resettled by the government in designated areas such as Lendikenya, Lashaine, and Kisongo.[70] In addition to Arusha, other cultivating groups had appeared in Kijungi, Kibaya, Dossi Dossi, Lolkisale, Shambarai, Engaruka, and Loliondo by 1956.[71] The recommendations of the "Wilson Report" were one of many efforts to alienate key fertile areas in Masai District to Europeans and African farmers (in addition to related efforts to alienate land for game

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[67] Dallas, Assistant DO, Longido, to PC, NP, 16 November 1929, TNA 17/37. It is unclear where the requests were approved. For a detailed description of the "Boundaries of the Masai Reserve" as of October 1929, see Webster, PC, NP, to DOs and Senior Veterinary Officer, Northern Province, 8 October 1929, TNA 17/37. The areas in question included in the north (Loliondo and Palalet), south (Essubugu lo'l Datwa), and west (the Serengeti Plains).

[68] G.S. Kitching, District Officer, Arusha District to Provincial Commissioner, Northern Province, 27 April 1928, TNA 69/205/AR/B.

[69] Report of the Arusha-Moshi Land Commission, 1947 (Dar es Salaam: Government Printer, 1947), copy available in Arusha branch of TNA (hereafter ATNA).

[70] P.H. Gulliver, "Interim Report on Land and Population in the Arusha Chiefdom," June 1957, Social Research, Provincial Administration, Tanganyika, EAC HCP/276; P.H. Gulliver, "Memorandum on the Arusha Chiefdom, Pop. 1948–1957," 1957, EAC HCP/277.

[71] Northern Province [NP] Annual Report [AR]1956, 99.

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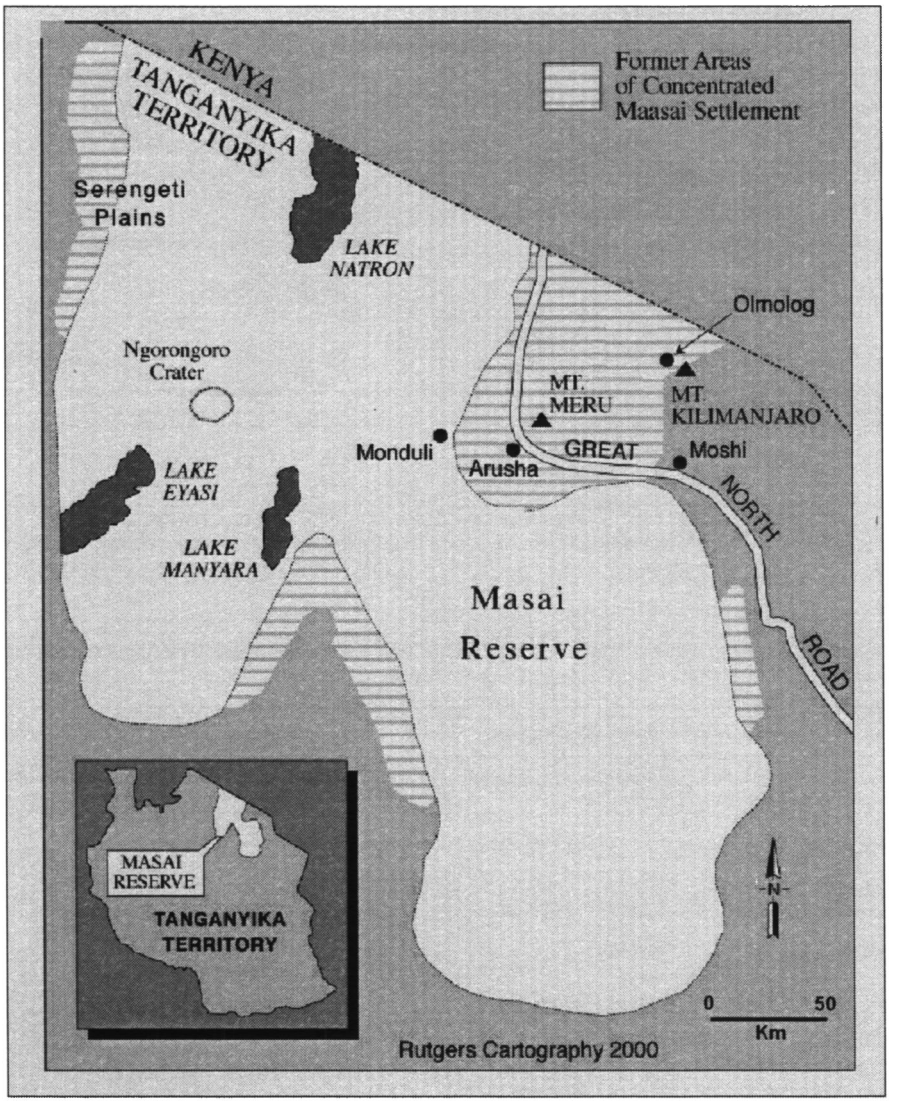


Figure 5. Maasai Reserve, *ca.* 1923.

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parks and forest reserves). In 1930 Land Development Commissioner F.W. Bagshawe proposed to permit Mbulu, Arusha, and others to settle in Masai District; to remove Maasai from most of their settlements outside the District as well as areas within the District such as the Ngorongoro and Embagai craters (in the interests of game); and to encourage alienation of highland forest areas to European settlers.[72] During World War II, Maasai reluctantly agreed to lend the government over 20,000 acres of prime grazing land in the Ardai Plains (c. 20 km southwest of Monduli town) for a disastrous plan to grow wheat, another large block of land in Olomolog (see Figure 5), and provide temporary leases to Europeans for wartime cultivation. Not only were the soils of the Ardai plains degraded by the clearcutting of trees and bush and rapid depletion of fertility by mechanized mono-cropping, but the Olomolog land and other "temporary" blocks were never returned. Over the vehement protests of Maasai, the land was leased to settlers: "it is considered that the lands are of more value to the territory agriculturally than they are to the Masai as pasture," explained Page-Jones, the senior provincial commissioner.[73] Although colonial personnel working in Masai District, including district officers, complained about the consequences of the rapid alienations for the stability of Maasai pastoralism, and warned of the increasing sense of betrayal and anger among Maasai, the alienations continued in the name of "increased productivity." Maasai (and some district officers) were also concerned over their dwindling rights and access to water as the increasing number of settlers dammed up or siphoned off Maasai water in both Monduli town and rural areas and water works financed by the Masai Native Treasury in areas such as Olmolog were lost as part of land alienation.[74] Additionally, the government began an aggressive campaign in 1948 to survey the remaining forested mountaintops in Masai District, then demarcate them as either government or native authority forest reserves in order to restrict the grazing and watering of livestock and the felling of trees.[75] Finally, the battle over their continued presence in the Ngorongoro Crater and Serengeti National Park angered and politicized many Maasai. In the interests of wildlife conservation, Maasai were expelled from the crater in 1954 and the park in 1958. They found it difficult to understand why large areas of fertile land were being set aside for the use of game, not people: "Since we have lived in that area," declared Laigwenan Lekisaka, "we have lived among game animals without killing them. In the past these animals didn't live alone in the forest [without humans], but

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[72] Bagshawe's proposals are outlined in the angry response by the Masai District Officer. Murrells, District Officer, Masai District, to Provincial Commissioner, Northern Province, 13 December 1930, TNA 17/37.

[73] Page-Jones, SPC, NP to CS, Dar, 7 October 1950, TNA 471/949/A/II.

[74] See, for example, Maasai Olkiama to DC, MaD, 17 September 1950, ATNA 284/II; Engineering Hydrologist to Director, Water Development, 30 April 1953, TNA 471/99/1/II. Also DC, MaD, to DWD, Dar, 28 April 1953, TNA 471/949/1/II (Estimates).

[75] During the next decade, forest reserves were demarcated throughout Masai District, including the hills around Loliondo, Essimingor, Burko, Lengoje, Mto-wa-Mbu, Gelai, Kitumbeine, Longido, Landekenya, and the Lemagrut Mountains. Northern Province, Annual Reports 1953 (p. 86), 1954 (p. 95) 1957 (p. 92).

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now they have their own land.... We are human beings and we are worth more than those animals!"[76]

Some colonial officers recognized the growing problems for pastoralist livelihoods caused by the alienation of their land and water. In 1948, they noted that the "present situation" of Maasai was full of "most serious difficulties" involving large human and livestock populations subsisting on inadequate land. Their response, however, was not to address the politically difficult issue of recouping Maasai lands, but to design and implement a technocratic intervention—the Masai Development Project (MDP)—to "develop Maasailand as ranching country." The three primary components of the MDP were to build more permanent water supplies, to clear tsetse-infested bush, and to experiment with grazing controls and fodder production. It was implemented from above, with little or no consultation with Maasai leaders, demanded a substantial monetary contribution from Maasai themselves, and required Maasai to meet certain "voluntary" annual quotas for cattle sales, to move from certain areas, and to allow groups of Arusha to move into designated "expansion" areas in Masai District. The project was not only a failure in its own technocratic terms, but the methods and modes of its implementation intensified struggles between colonial administrators and Maasai over land, labor and livelihoods.[77]

These land decisions—the creation of the Reserve, the negotiation and contestation of boundaries, the alienation of the most fertile lands—shaped Maasai livelihoods in significant ways. First, the consolidation of "the Maasai" into the Masai Reserve/District produced, to some degree, the social and spatial isolation of Maasai. As the Provincial Commissioner wrote in 1927, "The Masai District has been constituted as an ethnological and economic sanctuary; rigidly closed to outside influences and trade, it has remained for 11 years a stagnant island set in the midst of the most progressive areas of the Territory."[78] Second, by excising areas such as dry-season grazing lands, permanent waters and drought reserves, which were critical to sustaining transhumant pastoralism, administrators gradually undermined the ability of Maasai to support themselves through either pastoralism or cultivation. The consequences of these administrative interventions were exemplified in 1929–1930, 1934–35, and again in 1961–62, when severe droughts caused many cattle deaths. Unwilling to admit culpability, administrators blamed the 1929 and 1934–35 deaths on "overstocking," and the 1961–62 deaths on "laziness," rather than the structural issues of inequity of land tenure, alienation of dry-season grazing grounds, and restriction of Maasai movement from areas outside of the District.

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[76] "Mambo Yaliyozungumzwa Katika Olkiama ya December 1953" [Matters discussed at the Olkiama], ATNA 284/II. See also NP AR 1950:94; MaD AR 1952:3; NP AR 1954:98; NP AR 1955:95; NP AR 1957:95.

[77] Hodgson, *Once Intrepid Warriors,* chapter 3; Dorothy L. Hodgson, "Taking Stock: State Control, Ethnic Identity, and Pastoralist Development in Tanganyika, 1940–1961," *Journal of African History* 41, 1 (2000), 55–78.

[78] Mitchell PC, NP to CS, Dar, 16 March 1927, TNA 17/43.

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Finally, administrative efforts to limit Maasai to pastoralism, through both the alienation of cultivable land and the agendas of such projects as the MDP, obstructed Maasai efforts to diversify their economic base and strengthen their food security through cultivation. The government position was clear—Maasai were pastoralists, not farmers.[79] Nonetheless, in the wake of the droughts and famines, increasing numbers of Maasai began to cultivate small gardens themselves or through hiring laborers from Mbulu, Arusha, and other farming areas. For example, migration histories, life history interviews, and conversations from three communities in the Monduli area suggest that the systematic expansion of Arusha into Monduli began in the 1930s. Two elderly Arusha informants of the Terito age-set each claimed to be "the first" to settle in one of the communities (Emairete). Another elder Maasai man moved to Emairete in the 1940s *because* he wanted to farm:

> I came by myself with one wife, before [names two male elders]. Although I hadn't farmed in Ormuswa, I began after I moved here. I thought farming was a good thing, so I planted maize and beans, food Masai like. I learned to farm from watching Arusha in Ormuswa and my wives helped me. I had my plot and each wife had her own, and we shared all of the work: planting, weeding, harvesting. Each person kept the harvest from their own farm.[80]

Some Maasai residents asked the Arusha to teach them to farm, which they happily obliged. Other Maasai men began to marry Arusha women as second and third wives to ensure that small plots of maize and beans were farmed to support their homesteads. Similar relationships were reported between Purko Maasai and Kikuyu women in the Loliondo area, northwest of Lake Natron (see Figure 5):

> In recent years there has been a tendency among the Maasai in the Northern area to cultivate maize gardens near their kraals. This may be attributed very largely to the influence of the Kikuyu women married into the Purko Masai. Every encouragement has been given as this is undoubtedly a first step towards the ultimate mode of life of the Masai i.e., a settled pastoralist-agricultural people. Whereas in 1930 there were only a dozen such gardens in the very neighborhood of the kraals, it is possible today to count up to 20 or 25, a very hopeful sign.[81]

In 1951, the District Commissioner for Masai District wrote that "increased plantings of maize by Masai on old boma sites is noted: the work is done by non-Masai wives or servants."[82] By 1956, some Maasai were not just farming old homestead sites, but "quite large shambas." "One Masai," the provincial commissioner noted with surprise, "the court interpreter at Monduli, owns a tractor."[83]

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[79] See Hodgson, *Once Intrepid Warriors*, 116–118.

[80] Interview with Dorothy L. Hodgson, January 5, 1992, Emairete, Tanzania.

[81] "Masai Cultivation," ca. 1935, Arusha Regional Book/sheet C/6, CAMP Reel 28/slide 301.

[82] District Commissioner, Masai District, "Annual Report, 1951," TNA 69/63/20, p. 7.

[83] NP AR 1956, 99.

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1960s and 1970s: Post-Independence

After independence in 1961 the alienation of land in Masai District (which was eventually broken up into smaller districts—presently Monduli, Longido, Ngorongoro, Kiteto, and Simanjiro districts) continued apace. The Conservation Act of 1974 removed large areas of grazing land in the Serengeti, Ngorongoro, and Tarangire National Parks from use by Maasai herders in the interests of "preserving" wildlife. In the 1970s, the government took some of the best grazing land in the Ardai plains to build a military training camp. One thousand acres of "unused" land (drought reserves and dry-season grazing lands) in Emairete, Monduli District, was allocated to the Tanzania Beer Company (which became Tanzania Breweries) to grow barley and another 1,400 acres to Tanzania Cartons. Arusha, Mbulu, Gogo and other agricultural and agro-pastoralist groups moved in, building on their already present social networks. The general principle seemed to be that while Maasai were no longer allowed to move out of the District, other people were now allowed to move in, further constricting the resource base and straining the already fragile rangelands.

In the face of these changes and challenges, many Maasai continued to diversify their production and income-earning strategies. The 1961–62 drought convinced even more Maasai about the need to farm, even though their efforts directly contravened government policy: "The policy of developing Masailand as a cattle grazing area through the implementation of the Range Development Plan is the official Government policy at all levels. *The expansion of arable cultivation in Masailand is contrary to this policy.*"[84] In response to government pressure to enforce this policy, the Masai Council refused: "[They] insisted openly that some cultivation should be practiced in suitable areas to avoid the dangers of a one-sided economy. The practice of such cultivation would safeguard the inhabitants from such catastrophes as the 1961/62 famine. If mixed farming could be put into practice in suitable areas then this would probably take care of the problem."[85] The Council also objected that "people should not be completely 'pinned down' as some areas which get very little rainfall will be almost impossible to live in without having to move away from them at certain times of the year."[86] After much debate, a compromise was reached whereby Maasai who wished to cultivate had to request and receive permission from the government. Much to the surprise of the Council, long lists of names from Loliondo, Monduli Juu, and elsewhere were submitted of those Maasai men who were cultivating or wished to start.[87] A 1974 census of the Komolonik Ranching Association (in

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[84] Emphasis added. Administrative Secretary, Arusha Region to Area Secretary, Monduli District, 31 March 1964, ATNA AC/MON/D.1/4.

[85] Executive Officer, Masai Council to Regional Commissioner, Arusha Region, 19 June 1964, ATNA AC/MON/D.1/4.

[86] Executive Officer, Masai Council to Regional Commissioner, Arusha Region, 19 June 1964, ATNA AC/MON/D.1/4.

[87] See, for example, MC, Loliondo, to EO, MC, "Wenye Kutaka Mashamba Mapya Loliondo Division" [Those requesting New Farms in Loliondo Division], 29 October 1964; Sokoine, EO, MC, to AC, MD, 3 September 1964; both in ATNA AC/MON/D.1/4.

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the Monduli area) found that almost half of the homesteads surveyed (100 out of 205) were both farming and herding.[88]

Summing Up: Maasai Livelihoods and Land Use 1850 to the Present

Historical analysis demonstrates that Maasai livelihoods and landscapes had already changed quite significantly by the time LANDSAT images captured their land use in the 1970s, not least as a result of political economic interventions, voluntary and involuntary population movements, and changes in access to and use of land. In summary, the land use history of the Maasai Plains since the 1850s can be divided into three broad historical-geographical, and partly overlapping, processes that have shaped land change and livelihoods in the region.

1. *Specialized pastoralism.* Specialized pastoralism has a long history in the region. The economy, ecology and even sense of pastoral identity were flexible and resilient, except in the face of such overwhelming disasters as the late-nineteenth-century rinderpest crisis. With the expansion of Maasai society in the nineteenth century, specialized pastoralism as an economic, social and political force of change expanded its influence on the political economy and land use of the region to an extent that has not been equaled after the disasters of the late nineteenth century. Hence, during the latter half of the nineteenth century, before the disasters, Maasai possessed large herds of cattle and smallstock. Their mobility enabled them to exploit micro-ecological variations in rainfall, climate, and pasture, and prevented concentrated overexploitation of any one area. Moreover, should families lose livestock to disease, raids, or drought, they could rely on raiding or loans of cattle and smallstock to rebuild their herds. Finally, trade of milk, hides, smallstock and cattle with neighboring farmers and bonds of intermarriage and stock partnership supplemented their diet and provided a social safety net in times of severe drought.

2. *Increased sedentarization and diversification of livelihoods.* As a reaction to colonial policies (such as the alienation of key land and water sources and the attempt to contain Maasai within the boundaries of a reserve), which disrupted regional exchange networks and the mobility of Maasai pastoralists, Maasai increasingly withdrew from specialized production—causing a transition in livelihoods from trading livestock and livestock products for agricultural products to economic diversification within households into herding, farming, and certain cash earning activities. The socio-spatial consolidation of Maasai into villages under the forced villagization program by the Tanzanian state in the 1970s further undermined pastoralism as a primary means of support.[89]

Those Maasai who still herd large numbers of cattle and smallstock face a much constricted and more complicated resource base. They encounter constant challenges and conflicts as they try to navigate the endless (and seemingly always-expanding) boundaries of farms, parks, hunting reserves, and settlements. The expansion of the market economy

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[88] Colby Hatfield, "End of Tour Report of C.R. Hatfield, Jr., Sociologist, Masai Range Development Project (1973–1975)" (prepared for USAID, in author's possession, 1975), 20.

[89] Hodgson, *Once Intrepid Warriors*. See also D.L. Hodgson and R. Schroeder, "Dilemmas of Counter-Mapping Community Resources in Tanzania," *Development and Change* 33, 1 (2002), 79–100.

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and increasing reliance on money to pay for food, education, health, and other services have undermined the female-dominated barter economy and restricted social relations of exchange. As a result, most Maasai have continued to pursue ways to diversify their subsistence base through farming, wage labor, and other cash-earning activities, and in the process reconfigured regional political economic relations.

The Tanzanian government's recent embrace of neoliberal economic "reforms" (including the privatization of state parastatals, encouragement of foreign investment, liberalization of trade, withdrawal of support from social services such as health and education, and streamlining of the government workforce) has only intensified the pace of these pressures and processes. Among other consequences, government actions have reduced the economic space on which Maasai livelihoods as pastoralists depend by further accelerating legal, illegal, and quasi-legal land alienations (such as the removal of Maasai to establish new national game parks like Mkomazi, the spread of large-scale commercial farms especially in the Simanjiro and Loliondo areas, the continued influx of other Tanzanians and European settlers, and the appropriation by the state of land for mining and large hunting concessions). The search for economic diversity has thus simultaneously fixed and expanded the resource base of families, as well as restructured their labor and spatial dynamics. Now, rather than entire households moving in search of water and pasture, they remain settled in villages, dependent on women's continued presence and work. Meanwhile, men roam the land in search of opportunities to earn money, returning on occasion with cash, stock and, increasingly, HIV/AIDs. Maasai pastoralists again live interspersed with farmers, hunter-gatherers and others, but their spatial range has been severely constricted. Moreover, while they continue to intermarry and interact with these other groups, these relations are increasingly characterized by cash (as opposed to exchange), conflict (over land, not cattle), and, sometimes, confusion (over who is really "Maasai" these days).

3. *Parallel processes of intensified diversification and specialization in large-scale commercial farming*. In parallel to the process of diversification by individual Maasai households, wealthy farmers (including Maasai) and other investors have captured the expanding opportunities to specialize in large-scale commercial cultivation. However, in contrast to the specialization in cattle herding in the nineteenth century, this specialized land use is more directly linked to national and global markets and incentives and thus only indirectly related to other production systems within the region. Similarly, the appropriation of land for wildlife conservation, commercial hunting and mining are forms of specialized land use that are aimed at national and global markets and thus largely disconnected from the regional economy, even if their presence in the landscape as alienated blocks of land strongly impacts the regional political economy. Hence, the recent change in the regional pattern of land use and political ecological relations is an outcome of both local-scale processes related to changing livelihood strategies (diversification) by individual households,[90] as well as to processes and power relations that overlap local, regional, national and global scales.

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[90] See M.D. Turner, "Merging Local and Regional Analyses of Land-Use Change: The Case of Livestock in the Sahel," *Annals of the Association of American Geographers* 89, 2 (1999), 191–219.

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There is a more or less explicitly stated question, or paradox, that reverberates through studies and debates about the recently changing livelihoods of Maasai. Why have Maasai, despite their pastoralist ideals, become farmers to such a large extent? One answer, as we also have shown, is that, for a variety of reasons, Maasai have felt the need (or captured new opportunities) to diversify their former pastoral economy, particularly by cultivating increasingly large parts of their remaining rangelands. But, following the logic of the paradox, this answer inevitably carries with it the assumption that Maasai have (as implied by "traditionally") always been pastoralists, i.e., not previously engaged in farming. Hence, the recent shift in the regional land use pattern can only be said to reflect a truly new political ecology or a drastic change in lifestyle and culture (i.e., whereby Maasai herders have become cultivators) if it is held against the image of a "traditional" (or "pure") Maasai pastoralism. Historically, Maasai, as well as other pastoralists in East African history, have however in general maintained a relatively high degree of flexibility and openness towards a diversified economy, and to farming in particular. Maasai pastoralists have in fact, over the last two centuries at least, survived as agro-pastoralists to a large extent. One aspect that is different, however, is that the increased dependence on farming by many Maasai households in recent times is contained within a Maasai ethnic identity. In precolonial times, Maasai who chose to cultivate crops as an important livelihood strategy would more likely have become members of peoples now self-identified as Chagga, Arusha, or drift into any of the other agricultural oriented ethnic groups in the region. Hence, in Maasai land use history, there are two processes that stand out as exceptional in terms of being examples of specialized forms of production (i.e., in contrast to a more diversified local economy): 1) the dominance of specialized pastoralism during the mid and latter half of the nineteenth century, by which the political identity of "the Maasai" was also consolidated, and 2) the recent rapid expansion and investments in large-scale cultivation.

Concluding Discussion – Historical Path Dependence of Recent Land Cover Changes in Northeast Tanzania

As documented by analyses of satellite image data, the conversion of extensive rangelands and savanna vegetation to agricultural land on the Maasai Plains during the last three decades of the twentieth century represents a typical "rapid change" scenario of land cover change.[91] This changing land use pattern coincides with a number of prominent political and economic driving forces that are associated with the late twentieth century, such as modernist development regimes, state pressures for increased productivity, rapid urbanization, changing market opportunities, the privatization of land-rights and population growth. Hence, the late twentieth century land transition process on the Maasai Plains can easily be seen as a product of such recent driving forces, which has also been

[91] See Erika Lepers, E.F. Lambin, A.C. Janetos, R. Defries, F. Achard, N. Ranankutty, and R.J. Scholes, "A Synthesis of Information on Rapid Land-Cover Change for the Period 1981–2000," *BioScience* 55, 2 (2005), 115–24. See also Sachedina, "Wildlife Is Our Oil," 264–312.

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the case in recent studies of land change in the region.[92] But, the temporal conjuncture of remote sensing data with rapid processes of societal change, which is common for studies of landscape change in Africa and elsewhere, also poses methodological and analytical problems regarding the historical baseline used (implicitly or explicitly) for tracing recent land changes.[93]

As the analysis above has shown it is evident that even if recent driving forces can explain much of the rapid land use changes in northeast Tanzania, these factors and recent processes of change are not independent from the political ecological changes of the colonial and late precolonial periods. The question, as posed in the introduction, is how (or to what extent) historical processes in earlier periods have shaped recent processes of landscape change in the region?

The expansion of Maasai specialized pastoral production as a dominant social and political factor in the region during the nineteenth century (before the disasters) represents a rather brief and quite unique historical situation, but one that has had decisive influence on the politics of land use on the Maasai Plains ever since. What the colonial policies effectively achieved, through the attempt to contain Maasai pastoralism within a reserve and the policies of land alienation and promotion of increased land use productivity, was to transform the refined Maasai pastoralist ideology of the late nineteenth century into a politics of cultural essentialism, marginalization and discrimination of Maasai pastoralism.

The British were correct that Maasai and Maa-speaking groups had been pastoralists for a long time. However, the British policies did not account for the fluidity of the regional economies and social identities that existed prior to the nineteenth century when pastoralist Maa-speakers would exit and enter into the pastoralist sector as their fortunes changed. The history prior to the consolidation of specialized Maasai pastoralism—characterized by a regional mix of both specialized subsistence strategies (including specialized pastoralism) and diversified (mixed) strategies, but also by a high degree of flexibility in terms of subsistence strategies and porous ethnic boundaries—has thus largely been left in the shadows by the politics of the twentieth century.[94] Instead, the British assumed a kind of fixed and primordial pastoralist Maasai identity, implying that Maasai could not and should not change their economic activities. The basis for this conclusion was in turn set by the heightened articulation of pastoralist ideals among Maasai during the mid- and late-nineteenth century. In other words, as the idea of Maasai

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[92] See for example: McCabe, "Sustainability and Livelihood Diversification;" Yanda and William, "Livelihoods Diversifications;" Yanda and Williams, "Changing Livelihoods." See also K. Homewood, E.F. Lambin, E. Coast, A. Kuriaki, I. Kikula, J. Kivelia, M. Said, S. Serneels, and M. Thompson, "Long-Term Changes in Serengeti-Mara Wildebeest and Land Cover: Pastoralism, Population, or Policies?" *PNAS* 98, 22 (2001), 12544–49; and Suzanne Serneels and Eric F. Lambin, "Proximate Causes of Land-Use Change in Narok District, Kenya: A Spatial Statistical Model," *Agriculture, Ecosystems and Environment* 85 (2001), 65–81.

[93] Börjeson, "Using a Historical Map."

[94] Hodgson, *Once Intrepid Warriors*. See Navaya o. Ndaskoi, "The Roots Causes of Maasai Predicament," *Fourth World Journal* 7, 1 (2006), 28–61.

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as "pure" pastoralists was embraced by the British colonial administration, the brief history of Maasai specialized pastoral production was condensed into a fundamental organizing principle of colonial politics.

Another important historical event was the disaster of the late nineteenth century. This also had a critical effect on colonial policies (both the German and British) as their initial experience of Maasai pastoralism and the landscapes of eastern Africa largely coincided with the disasters and its aftermath, when herds and the number of Maasai who made a living from pastoralism had been greatly reduced. To the colonial administration the lands which Maasai claimed as theirs clearly seemed to be unnecessary large, an observation that in turn justified policies of land alienation. Hence, also this rather brief historical event had a profound impact on the historical trajectory of land change in the region.

As a reaction to the land policies during the colonial period, Maasai have diversified their livelihoods, returning to a mode of production that in a way is more akin to the situation prior to, rather than after, the brief period of exceptional expansion and "prosperity" of Maasai specialized pastoralism during the mid- to late-nineteenth century. The process of livelihood diversification has continued and rapidly intensified in recent years as new pressures and opportunities have emerged.

For several hundred years, exchange between complementary and specialized modes of production centered on the accumulation of cattle as the chief social, political and economic capital, have structured relations in the region.[95] But, as pastoralism has become an increasingly marginalized livelihood strategy, this regional economic integration of specialized pastoral and agricultural production has consequently eroded. Regional integration has instead over the twentieth century largely become a matter of rural-urban relations mediated by a cash based rather than a barter and exchange economy. If we look beyond the region it is evident that more distant forces shaped land use in the nineteenth century as well as during the twentieth century (e.g., the caravan trade in the nineteenth century and colonial land use policies in the twentieth century). However, the intensity of both national and international investments and interventions that directly influence local land use has intensified during the twentieth century, both during the colonial and post-independence periods. Hence, after independence, national policies and new economic incentives have been key forces shaping land use on the Maasai Plains. As confirmed by other studies of recent land cover change in East African rangelands and savannas the expansion of commercial farming stands out as a particularly influential driving force.[96]

At the same time, however, it is clear that agriculture has a much longer history in the plains through Maasai efforts to diversify their household economies as well as by colonial initiatives at commercial agriculture (tied in some cases to land alienation or to arguments about productivity). Hence, the trajectory of recent land change (including the two parallel processes of economic diversification by individual households and

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[95] Håkansson, "The Decentralized Landscape."

[96] Homewood et al., "Long-Term Changes." Serneels and Lambin, "Proximate Causes."

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specialization on large-scale commercial agriculture) follows in the path of colonial policies and land use. We can thus conclude that the recent rapid transformation of the pastoral rangelands of the Maasai Plains follows a historical trajectory that, by way of colonial ideology and land policies, connects the recent expansion of agriculture on the plains with the expansion of Maasai specialized pastoralism in the mid- and late-nineteenth century. A critical momentum of this historical trajectory of land change is the way in which the rather brief historical period of Maasai specialized pastoralism, followed by the disasters, came to structure colonial policies of land use. This suggests that even if an analysis of a recent time span yields a number of strong causal links between observed land changes and various recent societal and environmental factors, it is still possible to enhance the understanding of land change processes by adding a longer time perspective to the analysis.

In the case of the Maasai Plains, the impact of colonial policies on recent land use change may, for example, be overlooked if the time frame is limited to the post-independence period. If colonial land use politics in this way is normalized into a narrative of recent change there is of course also a risk that a discriminating and essentialist attitude towards pastoralism is perpetuated and even practiced as part of a political agenda that pushes the marginalization of pastoralism further. Judging from how the post-independence state and other influential actors have handled the issue of land use on the Maasai Plains, that is by continued policies of land alienation and pressures for increased productivity, it cannot be ruled out that historically-myopic and stereotypical narratives of Maasai livelihoods have had an influence on the land use policies that have been implemented. Hence, Maasai have not only become marginalized and vulnerable as a consequence of expanding commercial cultivation on their former rangelands, as argued by the FAO GIAHS program (see above). They have also become vulnerable and marginalized as a consequence of being regarded as "pure" pastoralists with neither significant interest in, nor historical experience of, farming.

Studies of land change commonly differentiate between proximate (or direct) and underlying (or indirect) factors. Proximate causes are direct physical actions by people that affect land cover. For example, agricultural expansion is a proximate factor. Underlying causes relate to the complex relations of different factors (societal and environmental) that constitute the initial conditions or those factors that set various proximate factors in motion. Hence, proximate causes generally imply a spatial proximity to the process of landscape change (i.e., operating at a local scale), while underlying factors commonly work from a distance (i.e., at regional, national and global scales of interaction).[97] Likewise, this principle can be applied to temporal scale, implying that underlying (or distal) causes also operate through history, that is, as suggested by the concept of path-dependence.

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[97] E.F. Lambin, H.J. Geist, and E. Lepers, "Dynamics of Land-Use and Land-Cover Change in Tropical Regions," *Annual Review of Environment and Resources,* 28 (2003), 205–41. Seernels and Lambin, "Proximate Causes."

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Clearly, our investigation of landscape change patterns and historical political ecology in northeast Tanzania suggest that it is important to consider past land use politics and regional economic interactions as underlying causes in studies of recent rapid landscape change. Hence, historical analysis of landscape change can do more than just provide comparative examples or an analogue to present events. By adding a deeper understanding of history we also stand a better chance to understand and reveal critical driving forces underlying recent or ongoing processes of landscape change.

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