**Supplement 1. Scientific literature**

Abate, T. 2016. Contribution of Indigenous Knowledge to Climate Change and Adaptation Response in Southern Ethiopia. *Journal of Earth Science & Climatic Change* 7(11). doi: 10.4172/2157-7617.1000377

Aerts, R., Nyssen, J., & Haile M. 2009. On the difference between “exclosures” and “enclosures” in ecology and the environment. *Journal of Arid Environments73*:762-763. doi:10.1016/j.jaridenv.2009.01.006

Angassa, A., & Oba, G. 2010. Effects of grazing pressure, age of enclosures and seasonality on bush cover dynamics and vegetation composition in southern Ethiopia. *Journal of Arid Environments74*: 111-120. <http://dx.doi.org/10.1016/j.jaridenv.2009.07.015>

Angassa, A., Oba, G.; Treydte, A.C. & Weladji R.B. 2010. Role of traditional enclosures on the diversity of herbaceous vegetation in a semi-arid rangeland, southern Ethiopia. *Livestock Research for Rural Development* 22(9): 163-163.

Angassa, A., Sheleme, B. Oba, G., Treydte, A. C., Linstädter A., & Sauerborn, J. (2012). Savanna land use and its effect on soil characteristics in southern Ethiopia. *Journal of Arid Environments* 81: 67-76. <https://doi.org/10.1016/j.jaridenv.2012.01.006>

Angassa, A. 2014. Effects of grazing intensity and bush encroachment on herbaceous species and rangeland conditions in southern Ethiopia. *Land Degradation & Development* 25(5): 438-451. doi: 10.1002/ldr.2160

Angassa, A. 2016. Vegetation responses to site, elevation and land use in semi-arid rangeland of southern Ethiopia. *African Journal of Agricultural Research 11*: 379-391. doi:10.5897/ajar2014.9025

Ardö, J. & Olsson, L. 2003. Assessment of soil organic carbon in semi-arid Sudan using GIS and the CENTURY model. *Journal of Arid Environments* 54 (4): 633-651. <https://doi.org/10.1006/jare.2002.1105>

Asefa, D., T., Oba, G., Weladji, R., B., & Colman, J., E. 2003. An assessment of restoration of biodiversity in degraded high mountain grazing lands in northern Ethiopia. *Land Degradation & Development14*: 25-38. doi:10.1002/ldr.505

Asfaha, T., G., Frankl, A., Haile, M., & Nyssen. J. 2016. Catchment Rehabilitation and Hydro-geomorphic Characteristics of Mountain Streams in the Western Rift Valley Escarpment of Northern Ethiopia. *Land Degradation & Development27*: 26-34. doi:10.1002/ldr.2267

Assefa, E. & Hans-Rudolf, B. 2015. Farmers' Perception of Land Degradation and Traditional Knowledge in Southern Ethiopia—Resilience and Stability. *Land Degradation & Development*: 27: 1552-1561. doi: 10.1002/ldr.2364

Augustine, D. J. & McNaughton, S. J. 2006. Interactive Effects of Ungulate Herbivores, Soil Fertility, and Variable Rainfall on Ecosystem Processes in a Semi-arid Savanna. *Ecosystems* 9(8): 1242-1256. <https://doi.org/10.1007/s10021-005-0020-y>

Ayana, A. 2016. "Vegetation responses to site, elevation and land use in semi-arid rangeland of southern Ethiopia." *African Journal of Agricultural Research* ***11****(5):* 379-391.

Baudron, F., Mamo, A., Tirfessa, D., & Argaw, M. 2015. Impact of farmland exclosure on the productivity and sustainability of a mixed crop-livestock system in the Central Rift Valley of Ethiopia. *Agriculture Ecosystems & Environment* 207: 109-118. <https://doi.org/10.1016/j.agee.2015.04.003>

Beyene, F. 2009. Exploring incentives for rangeland enclosures among pastoral and agropastoral households in eastern Ethiopia. *Global Environmental Change-Human and Policy Dimensions19*: 494-502. doi:10.1016/j.gloenvcha.2009.07.002

Beyene, F. 2010. Driving forces in the expansion of enclosure among pastoral and agropastoral herders in Ethiopia. *Quarterly Journal of International Agriculture* 49(2): 127-146.

Beyene, F. 2010. Locating the adverse effects of rangeland enclosure among herders in eastern Ethiopia. *Land Use Policy27*: 480-488. <http://dx.doi.org/10.1016/j.landusepol.2009.07.001>

Beyene, F. 2014. Institutional arrangements in mutually beneficial grazing systems: an example from herding communities in Ethiopia. *Journal of Land Use Science9*:438-452. doi:10.1080/1747423x.2013.807311

Beyene, F. 2016. Land use change and determinants of land management: Experience of pastoral and agro-pastoral herders in eastern Ethiopia. *Journal of Arid Environments* 125: 56-63. <https://doi.org/10.1016/j.jaridenv.2015.10.001>

Bikila, N. G., Zewdu-Kelkay, T. & Ebro, G.A. 2016. Carbon sequestration potentials of semi-arid rangelands under traditional management practices in Borana, Southern Ethiopia. *Agriculture Ecosystems & Environment* 223: 108-114. <https://doi.org/10.1016/j.agee.2016.02.028>

Bostedt, G., Hornell, A., & Nyberg, G. 2016. "Agroforestry extension and dietary diversity - an analysis of the importance of fruit and vegetable consumption in West Pokot, Kenya. *Food Security8*: 271-284. doi:10.1007/s12571-015-0542-x

Butt, B. 2009. Seasonal space-time dynamics of cattle behavior and mobility among Maasai pastorlists in semi-arid Kenya. *Journal of Arid Environments* 74:403-43. doi:10.1002/ldr.989

Campbell, B. M., Gordon, I. J., Luckert, M. K., Petheram, L. & Vetter, S. 2006. In search of optimal stocking regimes in semi-arid grazing lands: One size does not fit all. *Ecological Economics* 60(1): 75-85. <https://doi.org/10.1016/j.ecolecon.2006.05.010>

de Mûelenaere, S., Frankl, A., Haile, M., Poesen, J., Deckers, J., Munro, N., Veraverbeke, S. & Nyssen, J. 2014. Historical landscape photographs for calibration of Landsat land use/cover in the northern Ethiopian highlands. *Land Degradation & Development* 25(4): 319-335. doi: 10.1002/ldr.2142

Descheemaeker, K., Nyssen, J., Poesen, J., Raes, D., Haile, M., Muys, B., & Deckers, S. 2006. Runoff on slopes with restoring vegetation: A case study from the Tigray highlands, Ethiopia. *Journal of Hydrology331*: 219-241. doi:10.1016/j.jhydrol.2006.05.015

Descheemaeker, K., Raes, D., Nyssen, J., Poesen, J., Haile, M., & Deckers, J. 2009. Changes in water flows and water productivity upon vegetation regeneration on degraded hillslopes in northern Ethiopia: A water balance modelling exercise. *The Rangeland Journal 31*: 237-249. doi:10.1111/j.1526-100X.2007.00346.x

Descheemaeker, K., Mapedza, E., Amede, T. & Ayalneh, W. 2010. Effects of integrated watershed management on livestock water productivity in water scarce areas in Ethiopia. *Physics and Chemistry of the Earth*, Parts A/B/C 35(13-14): 723-729. <https://doi.org/10.1016/j.pce.2010.06.006>

Driscoll, D. A., Felton, A., Gibbons, P., Felton, A. M., Munro, N. T. & Lindenmayer, D. B. 2012. Priorities in policy and management when existing biodiversity stressors interact with climate-change. *Climatic Change* 111(3): 533-557. <https://doi.org/10.1007/s10584-011-0170-1>

Elhadi, A. Y., Nyariki, D.M., Wasonga, V.O. & Ekaya, W.N. 2012. Factors influencing transient poverty among agro-pastoralists in semi-arid areas of Kenya. *African Crop Science Journal*, 20(s1): 113-122.

Etefa, G. & Raj, A. J. 2013. Assessment of biodiversity in cropland agroforestry and its role in livelihood development in dryland areas: a case study from Tigray region, Ethiopia. *International Journal of Agricultural Technology* 9(4): 829-844.

Feyisa, K., Beyene, S., Angassa, A., Said, M.Y., de Leeuw, J., Abebe, A. & Megersa, B. 2017. Effects of enclosure management on carbon sequestration, soil properties and vegetation attributes in East African rangelands. *Catena* 159: 9-19. [https://doi.org/10.1016/j.catena.2017.08.002](https://doi.org/10.1016/j.catena.2017.08.002" \t "_blank" \o "Persistent link using digital object identifier)

Girmay, G., Singh, B. R., Mitiku, H., Borresen, T. & Lal, R. 2008. Carbon stocks in Ethiopian soils in relation to land use and soil management. *Land Degradation & Development* 19(4): 351-367. doi:10.1002/ldr.844

Gonin, A., & Gautier, D. 2015. Shift in herders’ territorialities from regional to local scale: the political ecology of pastoral herding in western Burkina Faso. *Pastoralism: Research, Policy and Practice5*. doi:10.1186/s13570-015-0023-z

Goodhue, R., E., & McCarthy, N. 2009. Traditional property rights, common property, and mobility in semi-arid African pastoralist systems. *Environment and Development Economics14*: 29-50. doi:10.1017/S1355770X08004555,

Greiner, C. 2016. Land-use change, territorial restructuring, and economies of anticipation in dryland Kenya. *Journal of Eastern African Studies10*: 530-547.doi:10.1080/17531055.2016.1266197

Haftay, H., Yayneshet, T., Animut, G. & Treydte, A. C. 2013. Rangeland vegetation responses to traditional enclosure management in eastern Ethiopia. *The Rangeland Journal* 35(1): 29-36. <https://doi.org/10.1071/RJ12054>

Hailu, T., A. 2016. The Contribution of Grazing Enclosures for Sustainable Management and Enhancing Restoration of Degraded Range Lands in Ethiopia: Lessons and Forward. *Journal of Environment and Earth Science* 6(8).

Haregeweyn, N., Tsunekawa, A., Nyssen, J., Poesen, J., Tsubo, M., Tsegaye, M., D., Schütt, B., Adgo, E., & Tegegne. F. 2015. Soil erosion and conservation in Ethiopia: A review. *Progress in Physical Geography39*, 750-774. doi:10.1177/0309133315598725

Haregeweyn, N., Tsunekawa, A., Tsubo, M., Meshesha, D., Adgo, E., Poesen, J. & Schütt, B. 2015. Analyzing the hydrologic effects of region-wide land and water development interventions: a case study of the Upper Blue Nile basin. *Regional Environmental Change* 16(4): 951-966. <https://doi.org/10.1007/s10113-015-0813-2>

Hejcmanová, P., Hejcman, M., Camara, A. A., & Antonínová, M. 2010. Exclusion of livestock grazing and wood collection in dryland savannah: an effect on long-term vegetation succession. *African Journal of Ecology* 48(2): 408-417. <https://doi.org/10.1111/j.1365-2028.2009.01127.x>

Hobbs, N., T., Galvin, K., A., Stokes, C., J., Lackett, J., M., Ash, A., J., Boone, R., B., Reid, R., S., & Thornton, P., K. 2008. Fragmentation of rangelands: Implications for humans, animals, and landscapes. *Global Environmental Change18*: 776-785. doi:10.1016/j.gloenvcha.2008.07.011

Jeddi, K. & Chaieb, M. 2010. Changes in soil properties and vegetation following livestock grazing exclusion in degraded arid environments of South Tunisia. *Flora* 205(3): 184-189. <https://doi.org/10.1016/j.flora.2009.03.002>

Jordan, S., M. 1957. Reclamation and Pasture Management in the semi-arid areas of Kitui District. *East Africa Agronomy and Forestry Journal* 23: 84-88. <https://doi.org/10.1080/03670074.1957.11665124>

Karmeback, V., N., Wairore, J., N., Jirstrom, M., & Nyberg, G. 2015. Assessing gender roles in a changing landscape: Diversified agro-pastoralism in drylands of West Pokot, Kenya. *Pastoralism: Research, Policy and Practice* 5. doi:10.1186/s13570-015-0039-4

Kgosikoma, O. E. & Batisani, N. 2014. Livestock population dynamics and pastoral communities? adaptation to rainfall variability in communal lands of Kgalagadi South, Botswana. *Pastoralism: Research, Policy and Practice* 4(19). <https://doi.org/10.1186/s13570-014-0019-0>

Kigomo, J., N., & Muturi, G., M. 2013. Impacts of enclosures in rehabilitation of degraded rangelands of Turkana County, Kenya. *Journal of Ecology and the Natural Environment5*: 165-171. doi:10.5897/jene2013.0366

Kima, S. A., Okhimamhe, A. A., Kiema, A., Zampaligre, N. & Sule, I. 2015. Adapting to the impacts of climate change in the sub-humid zone of Burkina Faso, West Africa: Perceptions of agro-pastoralists. *Pastoralism: Research, Policy and Practice* 5(1). <https://doi.org/10.1186/s13570-015-0034-9>

Kitchell E., Turnner, M.D. & McPeak, J.G. 2014. Mapping of pastoral corridors: practices and politics in eastern Senegal. *Pastoralism: Research, Policy and Practice* 4(17). doi: <https://doi.org/10.1186/s13570-014-0017-2>

Koech, O.K,, Kinuthia, R.N., Karulu, G.N., Mureithi, S.M. & Wanjogu, R. 2015. Water Stress Tolerance of Six Rangeland Grasses in the Kenyan Semi-arid Rangelands. *American Journal of Agriculture and Forestry* 3(5): 222-229. doi: 10.11648/j.ajaf.20150305.18

Lambin, E., F., Geist, H., J., & Lepers, E. 2003. Dynamics of land-use and land-cover change in tropical regions. *Annual Review of Environment and Resources* 28: 205-241. doi:10.1146/annurev.energy.28.050302.105459

Le Houerou, H. N. 2000. Restoration and Rehabilitation of Arid and Semi-arid Mediterranean Ecosystems in North Africa and West Asia: A Review. *Arid Soil Research and Rehabilitation14*: 3-14. doi: 10.1080/089030600263139

Linstaedter, A. & Baumann, G. 2013. Abiotic and biotic recovery pathways of arid rangelands: Lessons from the High Atlas Mountains, Morocco. *Catena* 103: 3-15. <https://doi.org/10.1016/j.catena.2012.02.002>

Lovschal, M., Bocher, P., K., Pilgaard, J., Amoke, I., Odingo, A., Thuo, A., & Svenning, J., C. 2017. Fencing bodes a rapid collapse of the unique Greater Mara ecosystem. *Scientific Reports7*: 41450. doi:10.1038/srep41450

Lugusa, K. O., Wasonga, O. V., Elhadi, Y. A. & Crane, T. A. 2016. Value chain analysis of grass seeds in the drylands of Baringo County, Kenya: A producers’ perspective. *Pastoralism: Research, Policy and Practice* 6(1). https://doi.org/10.1186/s13570-016-0053-1

Macharia, P., N., & Ekaya, W., N. 2005. The impact of rangeland condition and trend to the grazing resources of a semi-arid environment in Kenya. *Journal of Human Ecology17*: 143-147. <https://doi.org/10.1080/09709274.2005.11905769>

McGahey, D. J. 2011. Livestock mobility and animal health policy in southern Africa: the impact of veterinary cordon fences on pastoralists. *Pastoralism: Research, Policy and Practice* 1(14). https://doi.org/10.1186/2041-7136-1-14

Meaza, H., Tsegaye, D. & Nyssen, J. 2016. Allocation of degraded hillsides to landless farmers and improved livelihoods in Tigray, Ethiopia. *Norsk Geografisk Tidsskrift - Norwegian Journal of Geography* 70(1): 1-12. <https://doi.org/10.1080/00291951.2015.1091033>

Mekuria, W., Veldkamp, E., Halle, M., Nyssen, J., Muys, B., & Gebrehiwota, K. 2007. Effectiveness of exclosures to restore degraded soils as a result of overgrazing in Tigray, Ethiopia. *Journal of Arid Environments69*: 270-284. doi:10.1016/j.jaridenv.2006.10.009

Mekuria, W., Veldkamp, E., Tilahun, M. & Olschewski, R. 2011. Economic valuation of land restoration: The case of exclosures established on communal grazing lands in Tigray, Ethiopia. *Land Degradation & Development* 22(3): 334-344. <https://doi.org/10.1002/ldr.1001>

Mekuria, W. & Veldkamp, E. 2012. Restoration of native vegetation following exclosure establishment on communal grazing lands in Tigray, Ethiopia. *Applied Vegetation Science* 15(1): 71-83. <https://doi.org/10.1111/j.1654-109X.2011.01145.x>

Mekuria, W. 2013. Conversion of Communal Grazing Lands into Exclosures Restored Soil Properties in the Semi-Arid Lowlands of Northern Ethiopia. *Arid Land Research and Management* 27(2): 153-166. <https://doi.org/10.1080/15324982.2012.721858>

Mekuria, W. & Aynekulu, E. 2013. Exclosure land management for restoration of soils in degraded communal grazing lands in northern Ethiopia. *Land Degradation & Development* 24(6): 528-538. <https://doi.org/10.1002/ldr.1146>

Mekuria, W. & Yami, M. 2013. Changes in woody species composition following establishing exclosures on grazing lands in the lowlands of Northern Ethiopia. *African Journal of Environmental Science and Technology 7*. doi:10.5897/AJEST11.378

Mekuria, W., Langan, S., Noble, A. & Johnston, R. 2017. Soil Restoration after seven Years of Exclosure Management in Northwestern Ethiopia. *Land Degradation & Development* 28(4): 1287-1297. <https://doi.org/10.1002/ldr.2527>

Mengistu, T., Teketay, D., Hulten, H., & Yemshaw, Y. 2005. The role of enclosures in the recovery of woody vegetation in degraded dryland hillsides of central and northern Ethiopia. *Journal of Arid Environments60*: 259-281. doi:10.1016/j.jaridenv.2004.03.014

Miehe, S., Kluge, J., von Wehrden, H. & Retzer, V. 2010. Long-term degradation of Sahelian rangeland detected by 27 years of field study in Senegal. *Journal of Applied Ecology* 47(3): 692-700. <https://doi.org/10.1111/j.1365-2664.2010.01815.x>

Mureithi, S. M., Verdoodt, A., Gachene, C. K. K., Njoka, J. T., Wasonga, V. O., De Neve, S., Meyerhoff, E. & E. Van Ranst 2014. Impact of enclosure management on soil properties and microbial biomass in a restored semi-arid rangeland, Kenya. *Journal of Arid Land* 6(5): 561-570. <https://doi.org/10.1007/s40333-014-0065-x>

Mureithi, S. M., Verdoodt, A., Njoka, J. T., Gachene, C. K. K., Warinwa, F. & Van Ranst, E. 2014. Impact of community conservation management on herbaceous layer and soil nutrients in a Kenyan semi-arid savannah. *Land Degradation & Development*. doi: 10.1002/ldr.2315

Mureithi, S., M., Verdoodt, A,, Njoka, J., T., Gachene, C., K., K., &Van Ranst, E. 2015. Benefits derived from rehabilitating a degraded semi-arid rangeland in communal enclosures, Kenya. *Land Degradation and Development 27*: 1853-1862. doi:10.1002/ldr.2341

Muricho, D.N., Otieno, D.J., Oluoch-Kosura, W. and Jirstrom, M., 2018. Building Pastoralists’ Resilience to Shocks for Sustainable Disaster Risk Mitigation: Lessons from West Pokot County, Kenya. *International Journal of Disaster Risk Reduction*. <https://doi.org/10.1016/j.ijdrr.2018.12.012>

Mussa, M., Hashim, H. & Teha, M. 2016. Rangeland degradation: extent, impacts, and alternative restoration techniques in the rangelands of Ethiopia. *Tropical and Subtropical Agroecosystems*. 19.

Mussa, M., Ebro, A., & Nigatu, L. 2017. Soil organic carbon and total nitrogen stock response to traditional enclosure management in eastern Ethiopia. *Journal of Soil Science and Environmental Management 8*: 37-43. doi:10.5897/jssem2015.0545

Mwangi, E., & Dohrn, S. 2008. Securing access to drylands resources for multiple users in Africa: A review of recent research. *Land Use Policy25*: 240-248. <http://dx.doi.org/10.1016/j.landusepol.2007.07.002>

Mwilawa, A., J., Komwihangilo, D., M., & Kusekwa, M., L. 2008. Conservation of forage resources for increasing livestock production in traditional forage reserves in Tanzania. *African Journal of Ecology46*: 85-89. <https://doi.org/10.1111/j.1365-2028.2008.00934.x>

Mworia, J. K., Mnene, W. N., Musembi, D. K. & Reid, R. S. 1997. Resilience of soils and vegetation subjected to different grazing intensities in a semi‐arid rangeland of Kenya. *African Journal of Range & Forage Science* 14(1): 26-31. <https://doi.org/10.1080/10220119.1997.9647915>

Niamir-Fuller, M., Kerven, C., Reid, R. & Milner-Gulland, E. 2012. Co-existence of wildlife and pastoralism on extensive rangelands: competition or compatibility? *Pastoralism: Research, Policy and Practice.* 2(8). <https://doi.org/10.1186/2041-7136-2-8>

Nkedianye D., de Leeuw, J., Ogutu, J.O., Said, M.Y., Saidimu, T.L., Kifugo, S.C., Dickson, S.K. & Reid, R.S. 2011. Mobility and livestock mortality in communally used pastoral areas: the impact of the 2005-2006 drought on livestock mortality in Maasailand. *Pastoralism: Research, Policy and Practice.* 1(17). <https://doi.org/10.1186/2041-7136-1-17>

Notenbaert, A., M., O., Davies, J., De Leeuw, J., Said, M., Herrero, M., Manzano, P., Waithaka, M., Aboud, A., & Omondi. S. 2012. Policies in support of pastoralism and biodiversity in the heterogeneous drylands of East Africa. *Pastoralism: Research, Policy and Practice2*. doi:10.1186/2041-7136-2-14

Nyberg, G., Knutsson, P., Ostwald, M., Oborn, I., Wredle, E., Otieno, D., J., Mureithi, S., M., Mwangi, P., Said, M., Y., Jirstrom, M., Gronvall, A., Wernersson, J., Svanlund, S., Saxer, L., Geutjes, L., Karmeback, V., Wairore, J., N., Wambui, R., De Leeuw, J., & Malmer, A. 2015. Enclosures in West Pokot, Kenya: Transforming land, livestock and livelihoods in drylands. *Pastoralism: Research, Policy and Practice5*. doi:10.1186/s13570-015-0044-7

Nyssen, J., Poesen, J., Descheemaeker, K., Haregeweyn, N., Haile, M., Moeyersons, J., Frankl, A., Govers, G., Munro, N. & Deckers, J. 2008. Effects of region-wide soil and water conservation in semi-arid areas: the case of northern Ethiopia. *Zeitschrift Fur Geomorphologie* 52(3): 291-315. <https://doi.org/10.1127/0372-8854/2008/0052-0291>

Nyssen, J., Poesen, J., Haile, M., Moeyersons, J., Deckers, J., & Hurni, H. 2009. Effects of land use and land cover on Sheet and rill erosion rates in the Tigray highlands, Ethiopia. *Zeitschrift Fur Geomorphologie 53*: 171-197. doi:10.1127/0372-8854/2008/0052-0291

Nyssen, J., Frankl, A., Zenebe, A., Deckers, J., & Poesen, J. 2015. Land Management in the Northern Ethiopian Highlands: Local and Global Perspectives; Past, Present and Future. *Land Degradation & Development26*: 759-764. doi:10.1002/ldr.2336

Olsen, J. L., Miehe, S., Ceccato, P. & Fensholt, R. 2015. Does EO NDVI seasonal metrics capture variations in species composition and biomass due to grazing in semi-arid grassland savannas? *Biogeosciences* 12(14): 4407-4419. <https://doi.org/10.5194/bg-12-4407-2015>

Plaza-Bonilla, D., Arrúe, J. L., Cantero-Martínez, C., Fanlo, R., Iglesias, A. & Álvaro-Fuentes, J. 2015. Carbon management in dryland agricultural systems. A review. *Agronomy for Sustainable Development* 35(4): 1319-1334. <https://doi.org/10.1007/s13593-015-0326-x>

Pratt, D., J. 1964. Reseeding denuded lands in Baringo District, Kenya. 11- Techniques for dry alluvial sites. *East Africa Agronomy and Forage Journal29*: 243-260. <https://doi.org/10.1080/00128325.1964.11661931>

Quillérou, E. & Thomas, R. J. 2012. Costs of land degradation and benefits of land restoration: A review of valuation methods and suggested frameworks for inclusion into policy-making. *CAB Reviews: Perspectives in Agriculture, Veterinary Science, Nutrition and Natural Resources* 7: 1-12.

Reid, R., S., Fernández-Giménez, M., E., & Galvin, K., A. 2014. Dynamics and resilience of rangelands and pastoral peoples around the globe. *Annual Review of Environment and Resources39*: 217-242. doi:10.1146/annurev-environ-020713-163329

Robinson, L. W., Ericksen, P. J., Chesterman, S. & Worden, J. S. 2015. Sustainable intensification in drylands: What resilience and vulnerability can tell us. *Agricultural Systems* 135: 133-140. <https://dx.doi.org/10.1016/j.agsy.2015.01.005>

Selemani, I., S., Eik, L., O., Holand, O., Adnoy, T., Mtengeti, E., Mushi, D. 2013. The effects of a deferred grazing system on rangeland vegetation in a north-western, semi-arid region of Tanzania. *African Journal of Range and Forage Science30*: 141-148. doi:10.2989/10220119.2013.827739.

Selemani, I. S. 2015. Influence of ngitili management on vegetation and soil characteristics in semi-arid Sukumaland, Tanzania. *Livestock Research for Rural Development* 27(2): 37-Article 37.

Stelfox, B., J. 1986. Effects of Livestock Enclosures (Bomas) on the Vegetation of the Athi Plains, Kenya. *African Journal of Ecology24*: 41-45. <https://doi.org/10.1111/j.1365-2028.1986.tb00340.x>

Tefera, S., Snyman, H. A., & Smit, G. N. 2007. Rangeland dynamics in southern Ethiopia: (1) Botanical composition of grasses and soil characteristics in relation to land-use and distance from water in semi-arid Borana rangelands. *Journal of Environmental Management* 85(2): 429-442. doi:[10.1016/j.jenvman.2006.10.007](https://doi.org/10.1016/j.jenvman.2006.10.007)

Teshome, A., Abule, E. & Lisanework, N. 2012. Evaluation of woody vegetation in the rangeland of Southeast Ethiopia. *International Research Journal of Agricultural Science and SoilScience* 2(3): 113-126.

Tessema, W., K., Ingenbleek, P., T., M., & Van Trijp, H., C., M. 2014. Pastoralism, sustainability, and marketing. A review. *Agronomy for Sustainable Development34*: 75-92. doi:10.1007/s13593-013-0167-4

Tully, K., Sullivan, C., Weil, R. & Sanchez, P. 2015. The State of soil degradation in sub-Saharan Africa: Baselines, trajectories, and solutions. *Sustainability (Switzerland)* 7(6): 6523-6552. <https://doi.org/10.3390/su7066523>

Turner, M., D., McPeak, J., G., & Ayantunde, A. 2014. The role of livestock mobility in the livelihood strategies of rural peoples in semi-arid West Africa. *Human Ecology42*: 231-247. doi:10.1016/j.foreco.2005.08.025

Ubuy, M., H., Kindeya, G., & Raj, A., J. 2014. Biomass estimation of exclosure in the Debrekidan watershed, Tigray Region, northern Ethiopia. *International Journal of Agriculture and Forestry* 4: 88-93. doi:10.5923/j.ijaf.20140402.07.

van Oudenhoven, A. P. E., Veerkamp, C. J., Alkemade, R. & Leemans, R. 2015. Effects of different management regimes on soil erosion and surface runoff in semi-arid to sub-humid rangelands. *Journal of Arid Environments* 121: 100-111. <https://doi.org/10.1016/j.jaridenv.2015.05.015>

Verdoodt, A., Mureithi, S. M., Ye, L. & Van Ranst, E. 2009. Chronosequence analysis of two enclosure management strategies in degraded rangeland of semi-arid Kenya. *Agriculture Ecosystems & Environment* 129(1-3): 332-339. <https://doi.org/10.1016/j.agee.2008.10.006>

Vetter, S. 2005. Rangelands at equilibrium and non-equilibrium: recent developments in the debate. *Journal of Arid Environments* 62(2): 321-341. <https://doi.org/10.1016/j.jaridenv.2004.11.015>

Verdoodt, A., Mureithi, S., M., & Van Ranst, E. 2010. Impacts of management and enclosure age on recovery of the herbaceous rangeland vegetation in semi-arid Kenya. *Journal of Arid Environments74*: 1066-1073. doi:10.1016/j.jaridenv.2010.03.007. <https://doi.org/10.1016/j.jaridenv.2010.03.007>

Vrieling, A., de Leeuw, J. & Said, M. 2013. Length of Growing Period over Africa: Variability and Trends from 30 Years of NDVI Time Series. *Remote Sensing* 5(2): 982-1000. doi:10.3390/rs5020982

Wairore, J., N., Mureithi, S., M., Wasonga, O., V. & Nyberg, G. 2015. Benefits derived from rehabilitating a degraded semi-arid rangeland in private enclosures in West Pokot County, Kenya. *Land Degradation & Development27*: 532-541. doi:10.1002/ldr.2420

Wairore, J. N., Mureithi, S. M., Wasonga, O. V. & Nyberg, G. 2015. Characterization of enclosure management regies and factors influencing their choice among agropastoralists in North-Western Kenya. *Pastoralism: Research, Policy and Practice* 5(14). <https://doi.org/10.1186/s13570-015-0036-7>

Wairore, J. N., Mureithi, S. M., Wasonga, O. V. & Nyberg, G. 2015. Enclosing the commons: reasons for the adoption and adaptation of enclosures in the arid and semi-arid rangelands of Chepareria, Kenya. *Springerplus* 4. doi: 10.1186/s40064-015-1390-z.

Watete, P. W., Makau, W-K., Njoka, J. T., AderoMacOpiyo, L. & Mureithi, S. M. 2016. Are there options outside livestock economy? Diversification among households of northern Kenya. *Pastoralism: Research, Policy and Practice* 6(1). <https://doi.org/10.1186/s13570-016-0050-4>

Weber, K. & Horst, S. 2011. Desertification and livestock grazing: The roles of sedentarization, mobility and rest. *Pastoralism: Research, Policy and Practice* 1(19). https://doi.org/10.1186/2041-7136-1-19

Woodhouse, P. 2003. African enclosures: A default mode of development. *World Development31*: 1705-1720. doi:10.1016/s0305-750x(03)00140-2

Yayneshet, T., Eik, L., O., & Moe, S., R. 2009. The effects of exclosures in restoring degraded semi-arid vegetation in communal grazing lands in northern Ethiopia. *Journal of Arid Environments73*: 542-549. doi:10.1016/j.jaridenv.2008.12.002

Yayneshet, T. 2011. Restoration of Degraded Semi-Arid Communal Grazing Land Vegetation Using the Exclosure Model. *International Journal of Water Resources and Arid Environments* 1(5): 382-386.

Yayneshet, T., & Treydte, A., C. 2015. A meta-analysis of the effects of communal livestock grazing on vegetation and soils in sub-Saharan Africa. *Journal of Arid Environments116*: 18-24. doi:10.1016/j.jaridenv.2015.01.015

Young, H. S., McCauley, D. J., Helgen, K. M., Goheen, J. R., Otarola-Castillo, E., Palmer, T. M., Pringle, R. M., Young, T. P. & Dirzo, R. 2013. Effects of mammalian herbivore declines on plant communities: observations and experiments in an African savanna. *Journal of Ecology* 101(4): 1030-1041. <https://doi.org/10.1111/1365-2745.12096>

Yusuf, H. M., Treydte, A. C. & Sauerborn, J. 2015. Managing Semi-Arid Rangelands for Carbon Storage: Grazing and Woody Encroachment Effects on Soil Carbon and Nitrogen. *Plos One* 10(10).  <https://doi.org/10.1371/journal.pone.0109063>

Zucca, C., Wu, W., Dessena, L. & Mulas, M. 2015. Assessing the Effectiveness of Land Restoration Interventions in Dry Lands by Multitemporal Remote Sensing – A Case Study in Ouled DLIM (Marrakech, Morocco). *Land Degradation & Development* 26(1): 80-91. <https://doi.org/10.1002/ldr.2307>

**Supplement 2. Grey Literature**

Aboudh A., Mutinda, M., &Obweyere, G. (2002). The endangered Lake Baringo and its ecosystem – An assessment of the socioeconomic factors that affect environmental status of Lake Baringo and its catchment, UNOPS.

Aklilu, Y. (2008). Livestock marketing in Kenya and Ethiopia: a review of policies and practice. Feinstein International Center, Addis Ababa, 38.

Alinovi, L., D’ Errico, M., Mane, E., & Romano, D. (2010). Livelihoods strategies and household resilience to food insecurity: An empirical analysis to Kenya. In conference organized by the European Report of Development, Dakar, Senegal, June (pp. 28-30).

Anderson, D. (1980). Grazing, goats and government: Ecological crises and colonial policy in Baringo, 1918-1939. Dept. of History, Staff Seminar Paper No. 6, Univ. of Nairobi.

Barrow, E., &Mlenge, W. (2003). Trees as key to pastoralist risk management in semi-arid landscapes in Shinyanga, Tanzania and Turkana, Kenya. Paper presented at International Conference on Rural Livelihood, Forests and Biodiversity 19-23 May 2003, Bonn, Germany.

Barrow, E., & Shah, A. (2011). TEEB Case: Traditional forest restoration in Tanzania.TEEBweb.org. Restoring woodlands, sequestering carbon and benefiting livelihoods in Shinyanga, Tanzania.

Benhke, R. 1986. The implications of spontaneous range enclosure for African livestock development policy. Network Paper No.12, September 1986. International Livestock Centre for Africa (ILCA). Addis Ababa, Ethiopia.

Bermejo, L. A., Mata J., Hernandez, l. S., De Nascimento L., & Camacho, A. 2002 & 2004. Effects of goats grazing on vegetation cover in natural protected areas. Canary Islands.

Betru, N., Jawad, A., & Ingrid, N. (2005). Exploring ecological and socio-economic issues for improvement of Area Enclosure (EA) Management. Tigray, Ethiopia. DCG report No.38.

Biamah, E. K. (1986). Technical and socioeconomic considerations in rehabilitating and conserving an eroded /denuded catchment area: A case study of the Chemeron catchment area in Central Baringo, In: Thomas, D.B., Biamah E.K., Kilewe A.M., Lundgren L. and Mochoge B.O. (Eds.) Soil and Water Conservation in Kenya. Proceedings of the 3rd National Workshop, Kabete, Nairobi. 16th-19th Sept. 1986.

Biamah, E.K. (1988). Environmental degradation and rehabilitation in central Baringo, Kenya. In: Rinamwanich, J. (Ed.) Land Conservation for Future Generations. Proceedings of the 5th International Soil Conservation Conference, 18-29 January 1988, Bangkok Thailand. Vol. 1.

Bokutache, D. (2011). Range enclosures in southern Oromia, Ethiopia: An innovative response or erosion in the common property? Feinstein international centre. Paper presented at the international conference on the future of pastoralism, 21-23 March 2011.

Bonfiglioli, A. M. (1992). Pastoralists at a Cross Road: Survival and Development Issues in African Pastoralism. UNICEF/UNSO Project for Nomadic Pastoralists in Africa.

Bryan, R. B., & Sutherland, R. A. (1992). Accelerated Erosion in a Semi-arid Region: Baringo District, Kenya. In: Hurni H. &Kebede Tato. (eds.). Soil Conservation for Survival - Proceedings of the Sixth International Soil Conservation Conference, Addis Ababa.

Cleemput, S., Muys, B., Kleinn, C., &Janssens, M. J. J. (2004). Biomass estimation techniques for enclosures in a semi- arid area: a case study in Northern Ethiopia. Paper presented in DeutscherTropentag, 2004, Berlin, Germany.

Cotula, L(ed). (2007). Changes in Customary Land Tenure Systems in Africa. ISBN: 978-1-84369-657-5.

De Groot, P., Field-Juma, A., & Hall. D.O. (1992). Re-claiming the land: Revegetation in Semi-Arid Kenya. African Center for Technology Studies (ACTS) Press, Nairobi Kenya and Biomass Users Network (BUN), Harare Zimbabwe.

Dietz, T. (1987). Pastoralists in dire straits: Survival strategies and external interventions in a semi-arid region at the Kenya-Uganda border, western Pokot, 1900-1986. ISBN 90 6983 0188.

Dinucci, A., &Fre, Z. (2003). Understanding the indigenous knowledge and information systems of pastoralists in Eritrea. Communication for Development Case Study (FAO).

Duguma L. A., Minang, P. A., Mpanda, M., Kimaro A., &Alemagi D. (2015). Landscape restoration from a social-ecological system perspective.

Edmund B. (2014). Retrofitting Resilience to the Shinyanga Forest landscape restoration case study. Gland, Switzerland: IUCN.XXPP. Global Ecosystem Management.

EFAP. (1993). Ethiopian Forestry Action Programme (quoted in: Jagger and Pender, 2000. The role of trees for sustainable management of less-favored lands: The case of Eucalyptus in Ethiopia, No 65, IFPRI, Washington D.C., USA).

Eizabeth, M. (1991). Taking stock: Changing livelihoods in an agro-pastoral community. Baringo district, Kenya. Act Press, African Center for Technology studies; Harare, Zimbabwe: Biomass Users Network, 1991.ISB 9966-41-028-7.

Eli C. (2002). Land tenure and land degradation in Eastern Africa. The context of the United Nation Convention to Combat Desertification. Regional Land Management unit (RELMA). Regional land management unit, Swedish international development cooperation agency (SIDA). Working paper No.15.

Eriksson, A. (1992). The Revival of Soil Conservation in Kenya. RELMA, Technical report No 1. RELMA, Nairobi.

Eshetu Y., Mulualem T., Mulugota L., Mesele N., &Demel, T. (2001). Rehabilitation of degraded forest and woodland ecosystem in Ethiopia and ecosystem services. Part ii-Chapter 18. Case studies.

Farmer, E., &Mbwika, J. (2012). End market analysis of Kenyan livestock and meat: a desk study. Rep. no. Micro Report, 184. Project under USAID.

Flintan F. (2011). The causes, processes and impacts of land fragmentation in the rangelands of Ethiopia, Kenya and Uganda. Independent consultant. Regional learning and advocacy programme for vulnerable dryland communities.

Flintan, F. (2012). Protecting Livestock Mobility Routes: Lessons Learnt. Learn Initiative 2012 brief.

FoudM.,& Charles G. (2011). Land deal politics initiation (LDPI) Development by dispossession: land grabbing as new enclosures in contemporary Ethiopia.

Gachimbi, L.N. (1990). Land Degradation and its control in the Kibwezi area, Kenya. MSc Thesis, Faculty of Agriculture, University of Nairobi.

Geutjes&Knutsson, (2014). Coping with climate change variability in West Pokot, Kenya: The influences of land use on responses to climate variability. Master thesis in Global Studies. Gothenburg University.

GoK, Government of Kenya. (1997). Development policy for the Arid and Semi-arid Lands (ASALS). Government Printers, Nairobi.

GoK, Government of Kenya. Ministry of Finance and Planning. 2002. Baringo District Development Plan 2002-2008: Effective management of natural resources for sustainable economic growth and poverty reduction.

Graham, O. 1988. Enclosure of the East African rangelands: Recent trends and their impacts. Pastoral Development Network – Overseas Development Institute. London, UK. ISSN: 0951 1911.

Gronvall Antonio, (2015). Transition from nomadic pastoralism to livestock based agro-pastoralism - The case of animal husbandry in West Pokot, Kenya.

Harris, J. A., Birch, P. and Palmer, J. (1996). Land restoration and reclamation. Principle and Practice. Longman Publishers, Singapore.

IIRR, & CTA, (2013). Moving herds, moving markets: making markets work for African pastoralists. International Institute of Rural Reconstruction, Nairobi and the Technical Centre for Agricultural and Rural Cooperation, Wageningen, Netherlands.

Ismail Saidi, S., (2015). Influence of Ngitili management on vegetation and soil characteristics in semi-arid Sukumaland, Tanzania. Livestock research for rural development 27 (2) 2015. Department of Animal Science and Production, Sokoine University of Agriculture.

Jens B A, Rahel A, Denrye A T, Balesh T B. Zero tillage or reduced tillage: The key to intensification of crop livestock system in Ethiopia. Chapter 12, JENS B. AUNE ET. AL.

Jill Blockhus, (2005). Poverty forest linkages toolkn, CIFOR, IUCN, ODI, PROFOR, WINROCK, PRONATURA. The IIED poverty and conservation learning group, 13 December 2005. Profor Power point presentation.

John N. K.,& Gabriel N. M. (2013). Impact of enclosures in rehabilitation of degraded rangelands of Turkana County, Kenya. Full lengthreseach paper, Kalatum in Turkana County.

Jordan, S.M. 1957. Reclamation and Pasture Management in the semi-arid areas of Kitui District. E. Afr. Agr. For. J. 23: 84-88.

Kathleen B.,& Craig H. (2005). The restoration Diagnostic, Shinyanga region, Tanzania. World Recourses, 10G TREET NE, SUITE 800, Washington, DC20002, USA.

Keene F.B. (2008). Incentives and outcomes of rangeland enclosures: a comparative institutional analysis among three (agro-) pastoral districts in eastern Ethiopia. In: Proceedings of the 12th biennial conference of the international association for the study of commons (IASC), University of Gloucestershire, England.

Kawira, C. Lachat, C and Hornell, A. (2016). Assesing the Impact of Restorative Land Transformation on Household Nutrition: A qualitative study of Chepareria, West Pokot Kenya. Msc Nutrition and Rural Development Dissertation. Gent University.

KibretMamo B. (2008) Enclosure as a viable option for rehabilitation of degraded lands and biodiversity and conservation: The case of KalluWoreda, Southern Wello. Master’s thesis. Addis Ababa University.

Kitalyi A., Musili A., Suazo G., &Ogutu F. (2002). Enclosures to protect and conserve: for better livelohood of the west Pokot community. RELMA technical pamphelet series NO.2. Nairobi, Kenya. Regional land management cooperation Agency (sida). 24p.+vip.

Konyango, C. O. (2017). Land use planning and communal land tenure reforms in pastoral areas: the experience of Kenya. National Land Commission of Kenya. Paper presented at the 2017 World Bank conference on Land and Poverty, Washington D.C.

Little, P. D., &McPeak, J. G. (2014). Resilience and pastoralism in Africa South of the Sahara. Resilience for food and nutrition security, 75.2020 IFPRI Conference Paper 9.

Makokha W., Lonyakou S., Nyang M., Kareko K. K., Holding C., Njoka J. T., &Kitalyi A.W. (1999). Work together: land rehabilitation and household dyanamics in Chepareria Division, West Pokot District, Kenya. 1999. RELMA Technical Report Series 22. Nairobi, Kenya: Regional Land Management Unit (RELMA), Swedish International Development Cooperation Agency, (sida).81p. +xiiip. +8-p.plate section; includes bibliography.

Masanja Deogratias T. S. (2013). The contribution of agroforestry to household food security and income generation in Maswa district, Shinyanga region. Sokoine University of Agriculture.

Meyerhoff, E. (1991). Taking Stock; Changing Livelihoods in Agro-pastoralist Community.

Migot-Adholla, S. E., Place, F., &Oluoch-Kosura, W. (1994) ‘Security of tenure and land productivity in Kenya’, In Bruce J. W. and S. E. Migot-Adholla (Ed), Searching for land tenure security in Africa. Washington DC: World Bank.

Minang, P.A., Van Noondwijik, M., Freeman, O. E., Mbow, C., deleew, J., &Catacutan, D., (Eds) (2015). Climate-smart landscapes: Multi-functionality in practice, 63-73. Nairobi, Kenya: World Agroforestry centre (ICRAF).

Mohammed A., & Bobo F., Effects of enclosures on botanical composition, forage biomass and other range productivity parameters in a semi-arid area of El-khuwei locality, North Kordofan state, Sudan.

Mureithi, S. M. (2012). The effects of enclosures and land-use zoning on the restoration of degraded semi-arid rangeland in Kenya. Published PhD thesis, ISBN 978-9-4619708-4-8 Link: https://biblio.ugent.be/publication/3069166

Mureithi, S. M., Verdoodt, A., &Ranst, E. (2010). Effects and Implications of Enclosures for Rehabilitating Degraded Semi-arid Rangelands: Critical Lessons from Lake Baringo Basin, Kenya. In Land Degradation and Desertification: Assessment, Mitigation and Remediation. P. Zdruli, M. Pagliai, S. Kapur and A. Faz Cano (eds.), Springer Netherlands, Dordrecht, pp. 111-129.

Muricho, D. N., Otieno, D. J., &Oluoch-Kosura, W. (2017). Building Pastoralists’ Resilience: Strengthening Participation in Markets and Local Governance Institutions in West Pokot, Kenya. Paper presented at the 2017 World Bank conference on Land and Poverty, Washington D.C.

Napier andDesta, (2011). Review of Pastoral Rangeland in Ethiopia. Pastoralists Livelihoods Initiative, PLI Project.

Nick, A. (1993). Carrying capacity, rangeland degradation and livestock development policy for the communal rangelands of Botswana. Response to rangeland degradation in Botswana: Myth or Reality? (Paper 35b) by Joao s. de Queroz. The degradation debate is clarification possible? By Annika Dahiberg. Comments by Richard White.

Nssoko, E. (2015). Fire in Miombo woodlands: A case study of Bukombe district, Shinyanga, Tanzania. Communities in flame 117.

Östberg, W. (2017). Bringing back the trees. Kenya Past and Present, 44, pp.11-22.

Peter de G., Alison F. J., & David O. H. (1992). Taking Root: Revegetation in semi-arid Kenya: Act press, Africa centre for Technology Studies: Harare, Zimbabwe: Biomass users Network, 1992.

Pye S. C. (2010) A Rural revival in Tanzania: How agroforestry is helping farmers to restore the woodlands in Shinyanga Region. ICRAF Trees for change No. 7. Nairobi: World Agro-forestry Centre, Nairobi, Kenya, 2010. ISBN 978-92-9059-286-0

Rowntree, K. M. (1985). Soil survey of field 1, Meisori, Njemps location. Report to the Fuel and Fodder Project, Baringo District, Kenya.

Stewart M.,& William J. (2005). Balancing restoration and development. IUCN Gland, Switzerland.

Syagga, P. M. (2006). Land ownership and use in Kenya: policy prescriptions from an inequality perspective. Readings on Inequality in Kenya. Sectoral Dynamics and Perspectives, Nairobi, 289-344.