

project. A data management system in form of a geodatabase was built for the facilities in the institute using ArcGIS software. The geodatabase contained spatial and non-spatial data for underground and surface facilities. These facilities were buildings, roads, pavements, trees, sewage ponds, wire fence, steam pipe, foul water pipe, electricity cable, cold water pipe, horse reel, fire hydrant.

Analyses were then performed on the data in the geodatabase. The main facilities in the institute were identified as buildings (4.2%), roads & pavements (7.2%), open spaces (22.3%), wet & bushy area (8.2%) and the grazing area (57.8%). Analysis performed on the grazing area showed that it was bigger than what the animals kept needed by approx. 34 acres.

Furthermore, there was a proposal on how paddocking would be done on the grazing area and a proposal for locations of fire assembly points. Results of the analysis performed to assess space use in rooms showed that 14.9% were over-utilized, 48.5% were correctly utilized, 30.7% were under-utilized while 5.9% were vacant.

We recommend the use of a three dimensional (3-D) model for the management of ILRI facilities. 3-D visual if modeled and animated for ILRI facilities can enable facilities managers to effectively visualize, plan, analyze, and design spatial data. A 3-D virtual tour of ILRI can enable users to view a facility from multiple viewpoints and walk around or fly through digitally. In addition, users can use the 3-D visual for analysis of evacuation routes or crime patterns in the institute [9]. This would provide the best visual interpretation for planners and decision makers.

References

- [1] Management Guide, Department of Army Pamphlet, February 1987.
- [2] A. Bingaith, "Implementing GIS for Facilities Management at the California Institute of Technology" (Master's thesis, University of Redlands), 2010.
- [3] J.M Rector, "Utilities, In: Profiting From a Geographic Information System," Edited by G.H. Castle, Fort Collins, CO: GIS World, Inc., pp. 193-208, 1993.
- [4] J.F. Xia, "Library space management: a GIS proposal" *Library High-Tech.*, 22(4): 375-382, 2004.
- [5] R. Pournaghi, "Applying Geospatial Information System in Space Management of Academic Libraries" *World Appl. Sci. J.*, 3 (Supple 1): 155-160, 2008.
- [6] International Livestock Research Institute (ILRI), Cornell University, 2008.
- [7] J. Craig Williams, "Four steps to rotational grazing" *Agronomy Facts* 43, The Pennsylvania State University, 1994.
- [8] Workplace (Health, Safety and Welfare) Regulations, Approved Code of Practice and guidance, 1992.
- [9] M. Parkin, "GIS for Facilities Management," 2008. Retrieved May 10, 2010, from ESRI: <http://www.esri.com/industries/facilities/management/index.html>

Author Profile

Marion W. Mwaniki received her B.Sc. in Geomatic Engineering and Geospatial Information Systems from Jomo Kenyatta University of Agriculture and Technology in 2012 and is currently pursuing her M.Sc. degree in the same university. She has worked in Mapsurveys (K) Ltd as a GIS Technician/Surveyor from 2012 to date.

Patroba A. Odera is a lecturer in the Department of Geomatic Engineering and Geospatial Information Systems of Jomo Kenyatta University of Agriculture and Technology (Kenya). He holds a B.Sc. in Surveying with Honors and a M.Sc. in Surveying from the University of Nairobi (Kenya) and a PhD from Kyoto University (Japan). His research interests are; establishment of modern horizontal and vertical reference frames, satellite and terrestrial gravimetry, planning and monitoring of engineering structures, effective application of GNSS in local and regional positioning, and environmental monitoring using geospatial technologies.