

THE SEARCH FOR INCLUSION IN KENYA'S FINANCIAL LANDSCAPE
ANNEX 3: MAPS AND VISUAL REPRESENTATIONS

MARCH 2012

THE SEARCH FOR INCLUSION IN KENYA'S FINANCIAL LANDSCAPE : THE RIFT REVEALED

By

Susan Johnson

With

Graham K. Brown and Cyril Fouillet



With support from Financial Sector Deepening Kenya



The Kenya Financial Sector Deepening (FSD) programme was established in early 2005 to support the development of financial markets in Kenya as a means to stimulate wealth creation and reduce poverty. Working in partnership with the financial services industry, the programme's goal is to expand access to financial services among lower income households and smaller enterprises. It operates as an independent trust under the supervision of professional trustees, KPMG Kenya, with policy guidance from a Programme Investment Committee (PIC). In addition to the Government of Kenya, funders include the UK's Department for International Development (DFID), the World Bank, the Swedish International Development Agency (SIDA), Agence Française de Développement (AFD) and the Bill and Melinda Gates Foundation.



Table of Contents

CHAPTER 1	
Methodology	1
CHAPTER 2	
Maps	2
CHAPTER 3	
Visual representations	42
REFERENCES	50

Chapter 1

METHODOLOGY

1.1 MAPS

Maps in Figure 1 come from previous work in which financial service usage patterns in Kenya were aggregated from the FinAccess survey data for 2009 using specific statistical techniques (FinAccess, 2011)¹. Five maps present spatial variation in estimated usage at a fine scale for the main formal, semi-formal and informal services in Kenya, namely, banks, M-PESA, MFIs, SACCOs and ROSCAs.

Maps in Figures 2 to 14 have been produced from the financial service providers and clients data acquired during the supply and demand side surveys in this study. These maps show the spatial location of providers and respondents in the three research sites. These are first presented in the context of population density data (left hand panel). The right hand set of two panels, presents this data by gender and poverty level against the topographical environment for each of the sub-sites where the sample was drawn from the research sites.

The data sources and software used to generate these maps are as follows. Boundary files have been adapted from the FAO-Global Land Cover Network data (www.glcn.org) and geo-localisation of main cities from the Global Rural-Urban Mapping Project (GRUMP) (IFPRI, 2004). Population density information is from a 100m spatial resolution population map for Kenya from the AfriPop project which is part of the Malaria Atlas Project (MAP) (Tatem *et al.*, 2007). To perform our mapping, spatial analysis and categorization of the data (the division of a statistical series into classes) we used the software

ArcGis 9.2. The layout of maps has been undertaken using Inkscape, a free and open-source vector graphics editor.

1.2. VISUAL REPRESENTATIONS

The purpose here is to present visually the complexity of financial service use in the three research sites in order to gain further insight into the data by turning the survey data and relationships between people and financial providers into graphics. Using ideas presented by Simmel (1908), Moreno (1935) and Harary, Norman and Cartwright (1965) we represent agents by points (nodes) connected by lines (edges) to nodes representing service providers. This produces a sociogram through which the relationship between people surveyed and the plurality of financial providers they use and which exist in these locations is represented.

Each person surveyed and type of financial provider is represented by a node and their potential relationship by an edge (line). Software used to provide visual representations is Gephi. Gephi is a free and open-source graph visualisation and manipulation software². Gephi comes with different algorithms for generating the visualisation of nodes and edges. For our purpose, we use Fruchterman and Reingold (1991) (Figure 16) and Yifan Yu (Figure 15) which are force based algorithms for graph visualisation. The layout of visual representations has been made using Inkscape, a free and open-source vector graphics editor.

¹ http://www.fsdkenya.org/finaccess/documents/11-06-27_finaccess_09_results_analysis.pdf

² Gephi is freely available at <http://gephi.org>.

Chapter 2

MAPS

Figure 1. Field works locations and estimated access to financial providers in Kenya (FinAccess 2009) (equal interval)

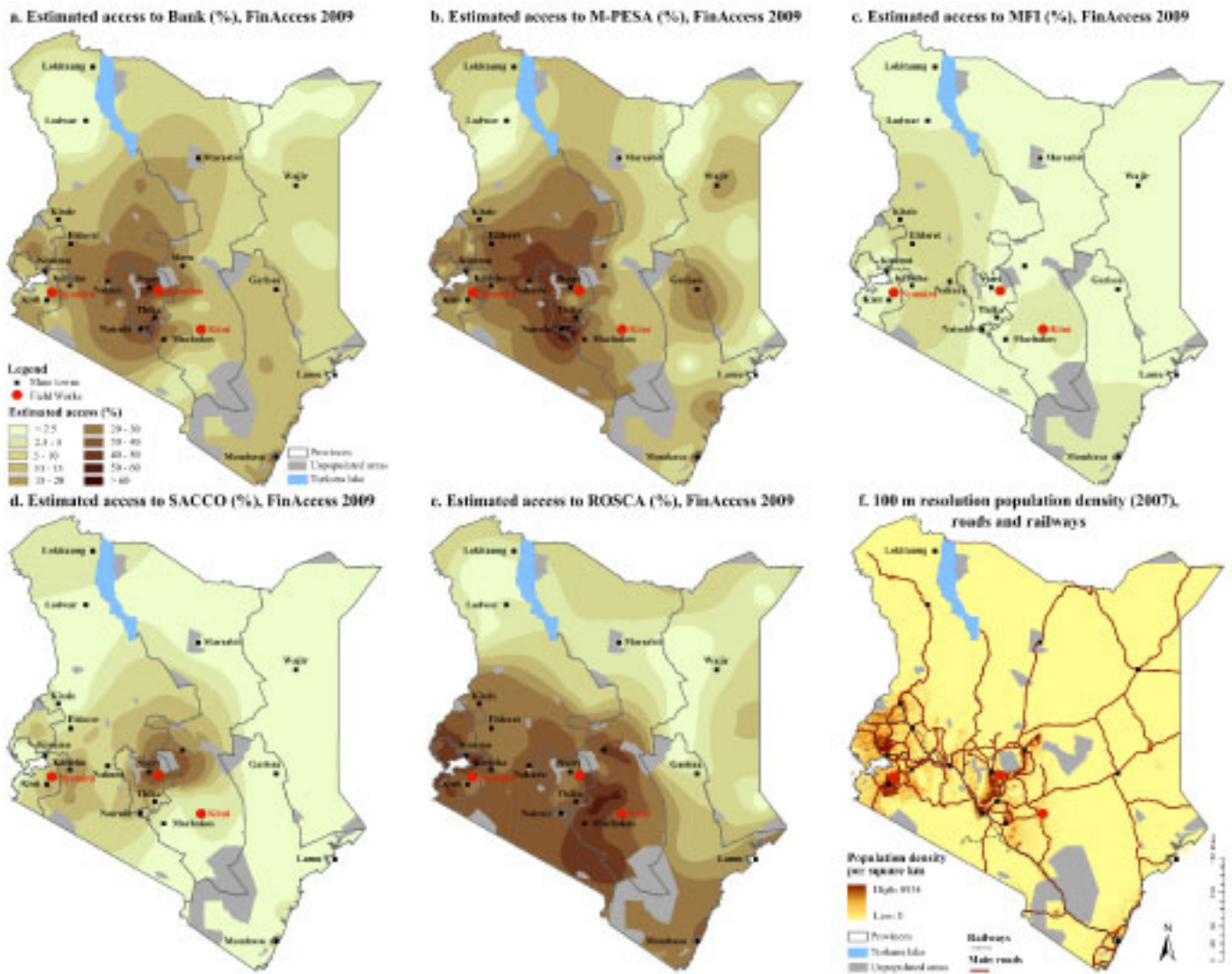


Figure 2 : Kitui, Kisasi, Mosa field works and bank access among people surveyed

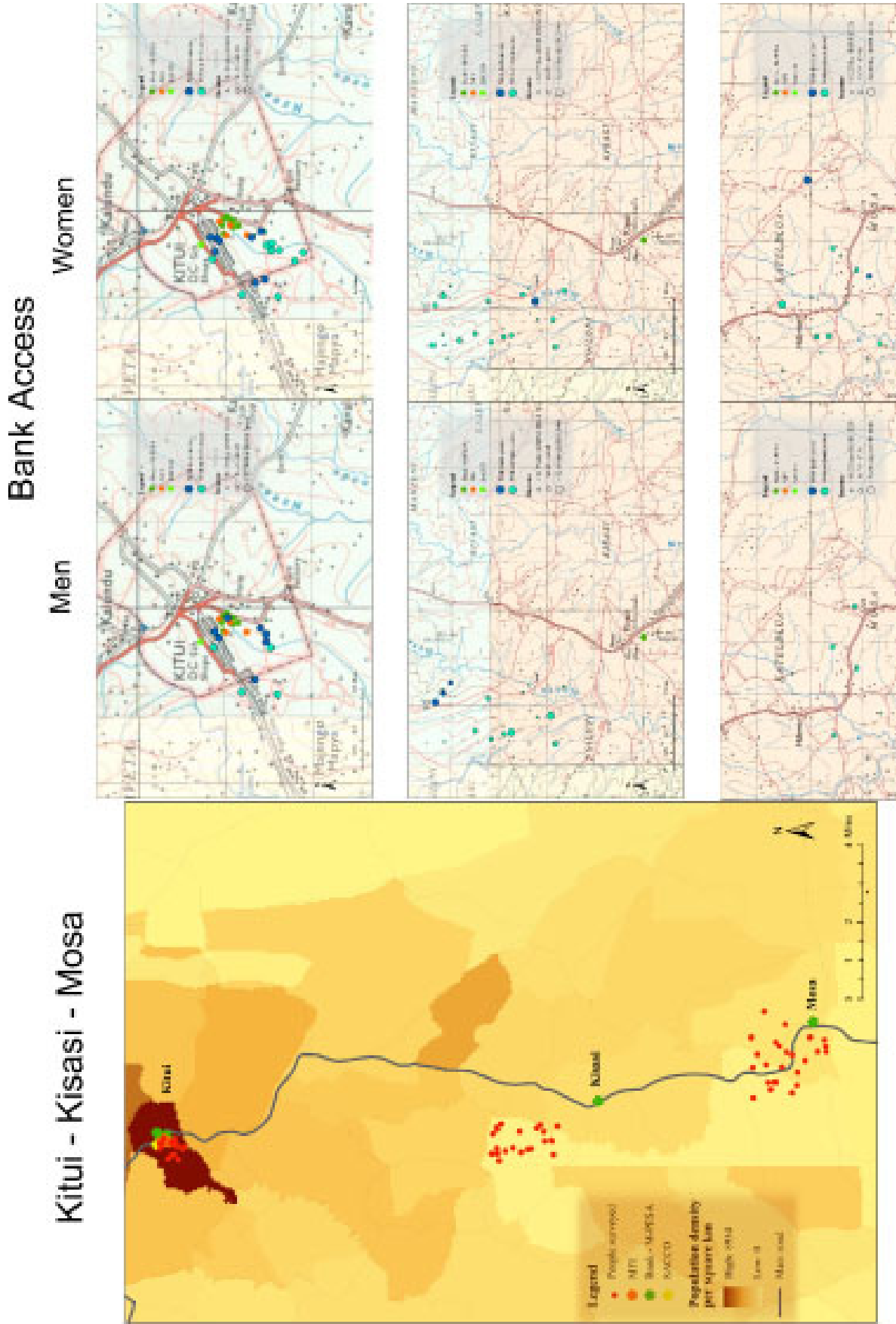
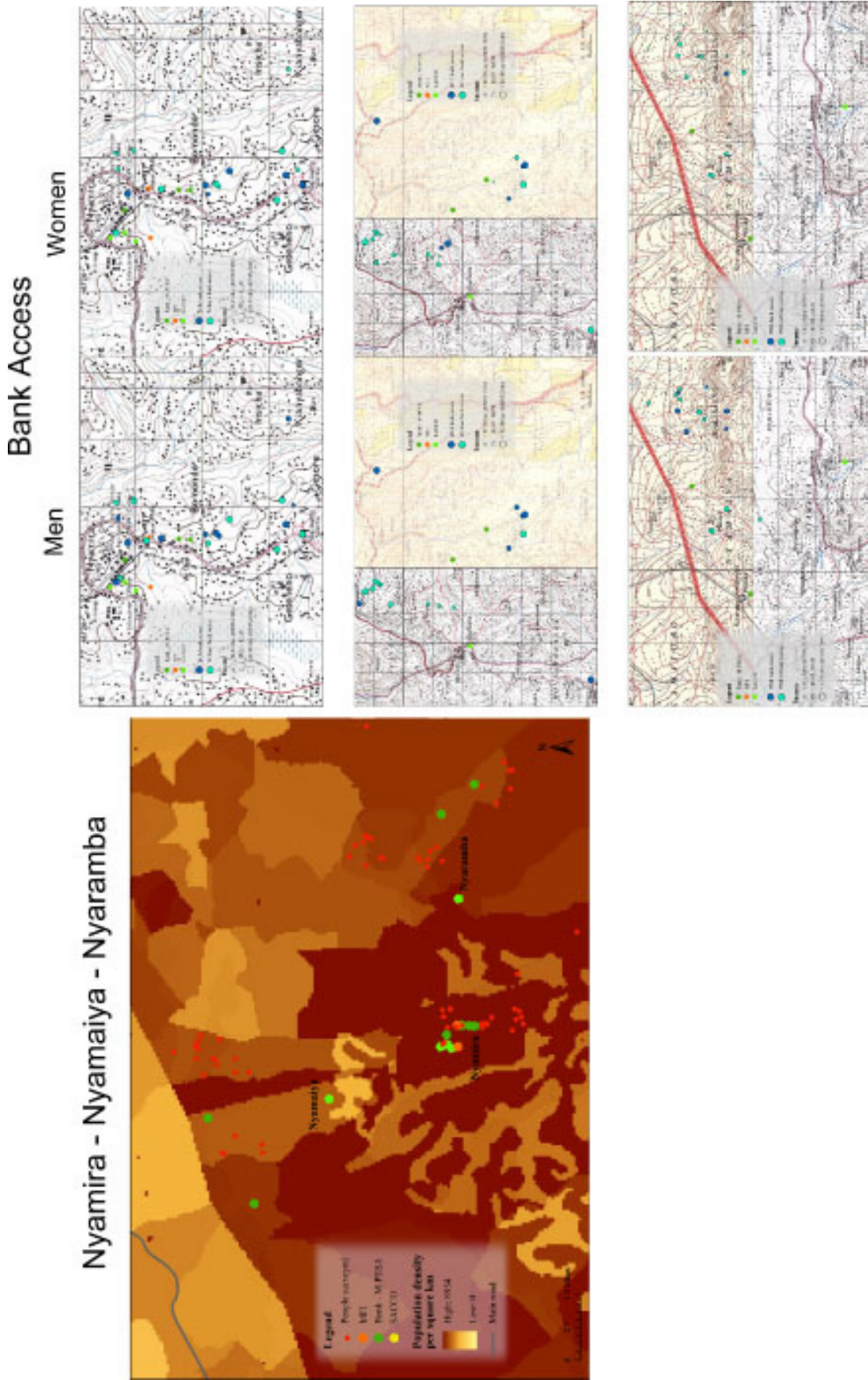


Figure 3: Nyamira, Kisasi, Mosa field works and bank access among people surveyed



Karatina - Kangocho - Itundu

Men

Women

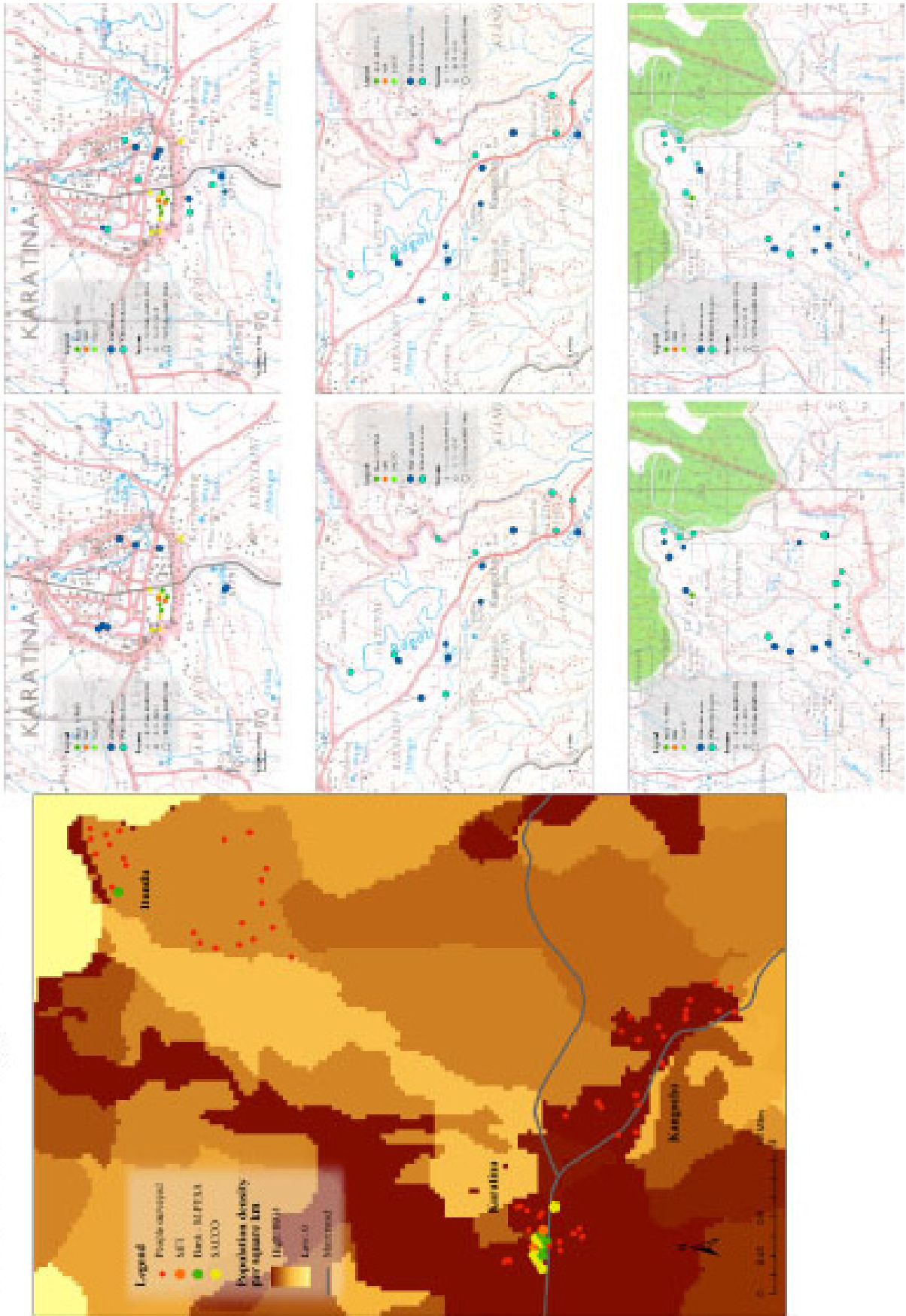


Figure 4: Karatina, Kisasi, Mosa field works and bank access among people surveyed

Figure 5: Bank access by income for men and women – Kitui

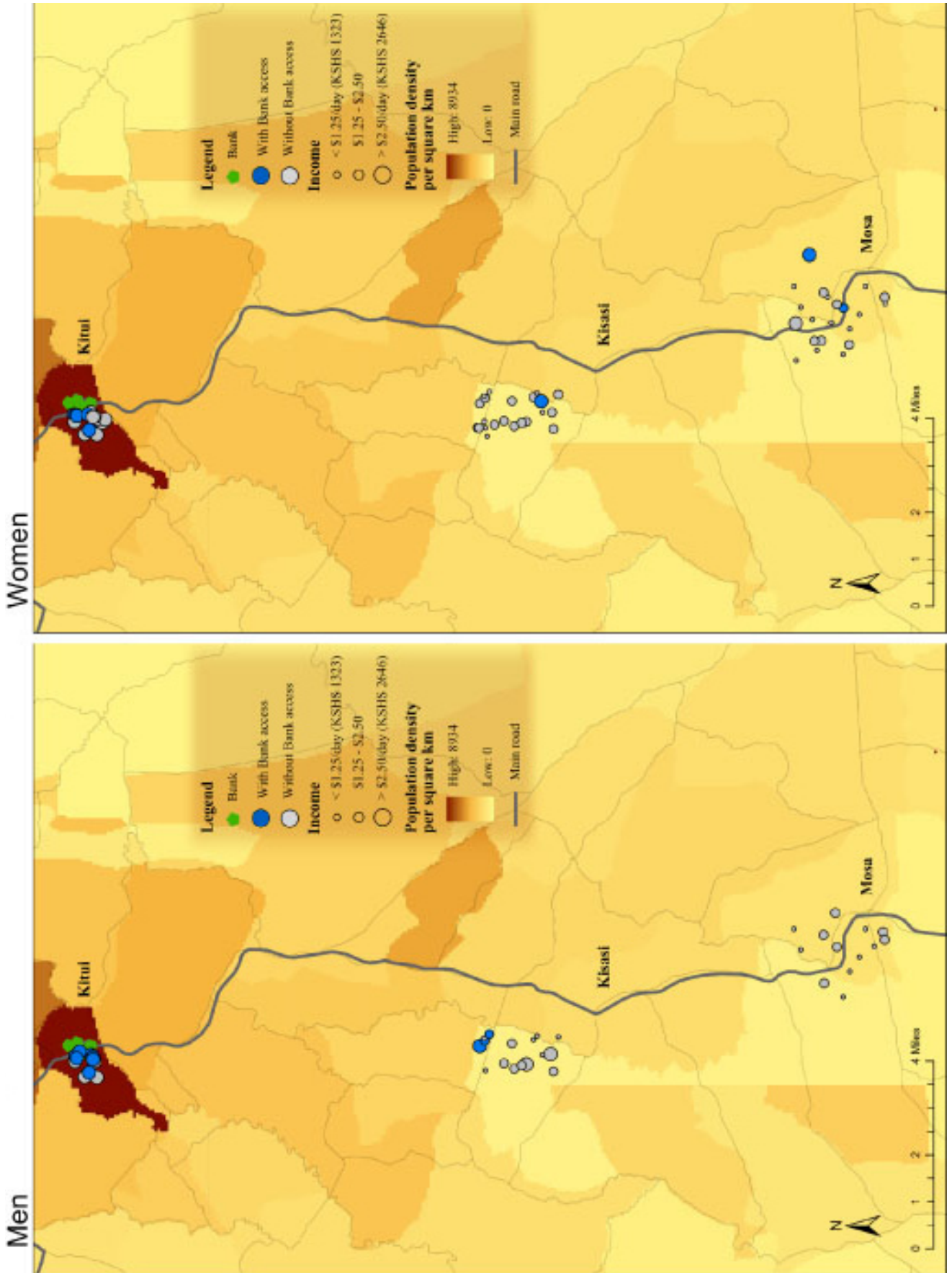


Figure 6: Bank access by education for men and women – Kitui

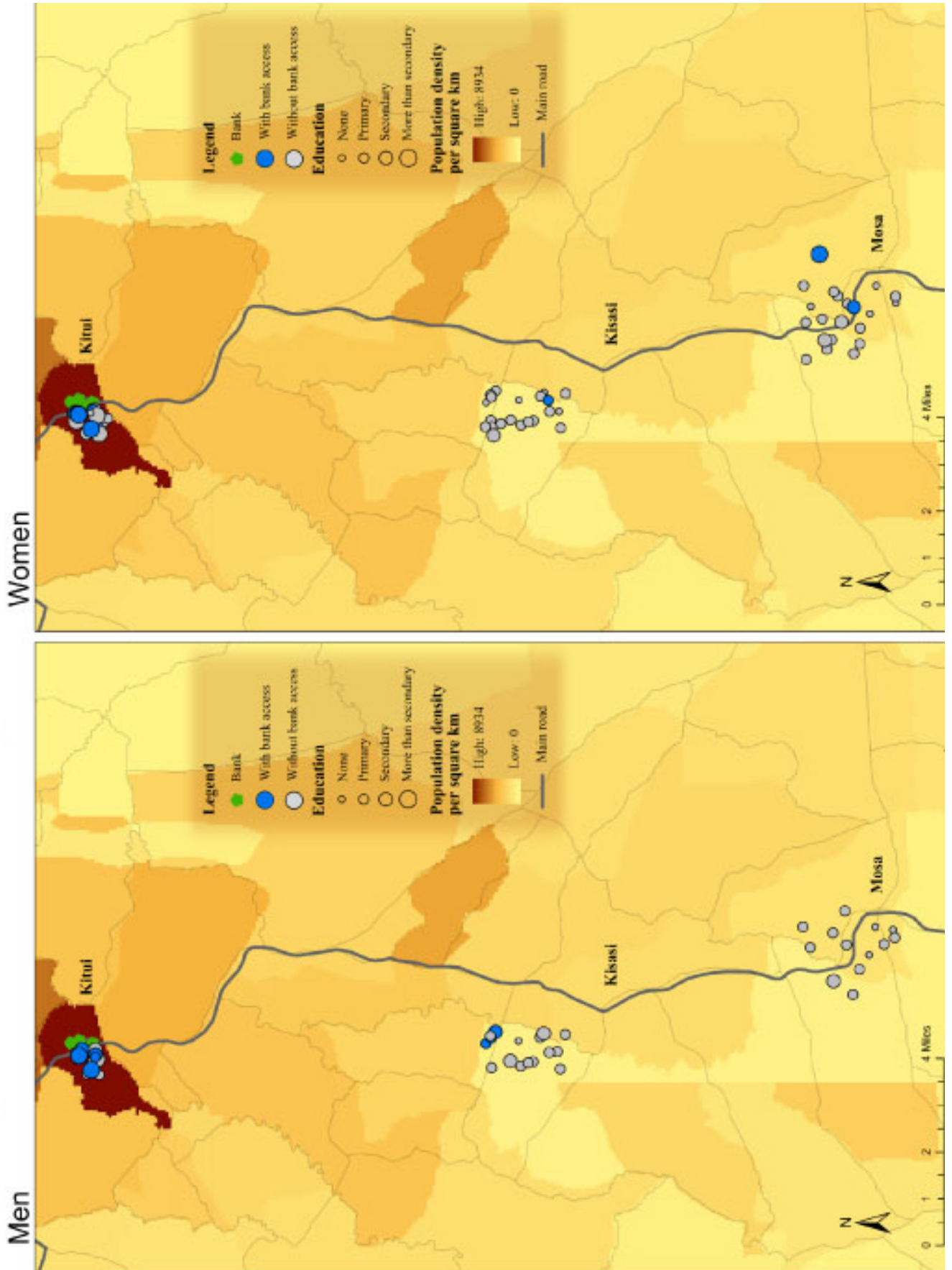


Figure 7: Bank access by use for men and women – Kitui

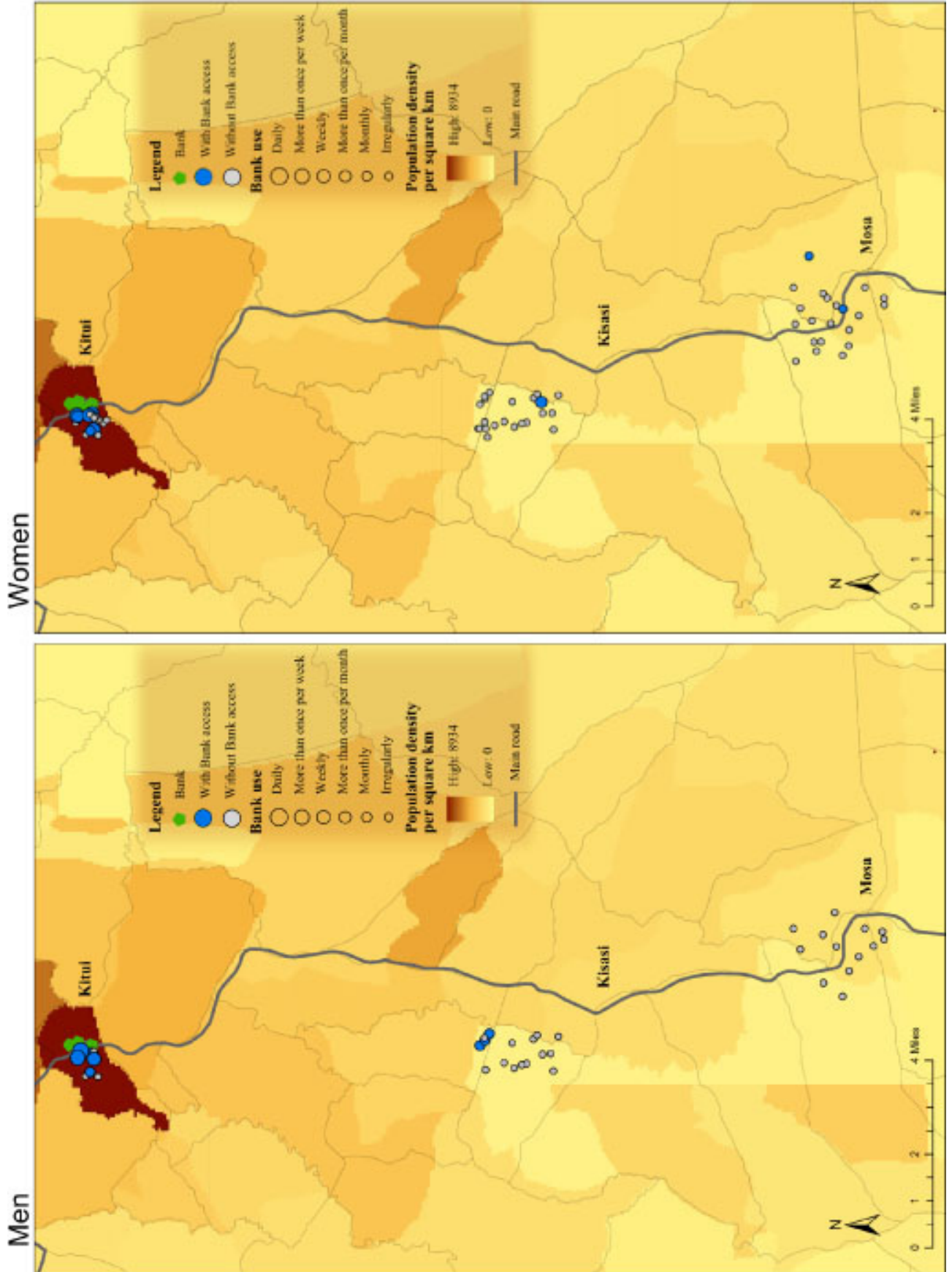


Figure 8: SACCO access by income for men and women – Kitui

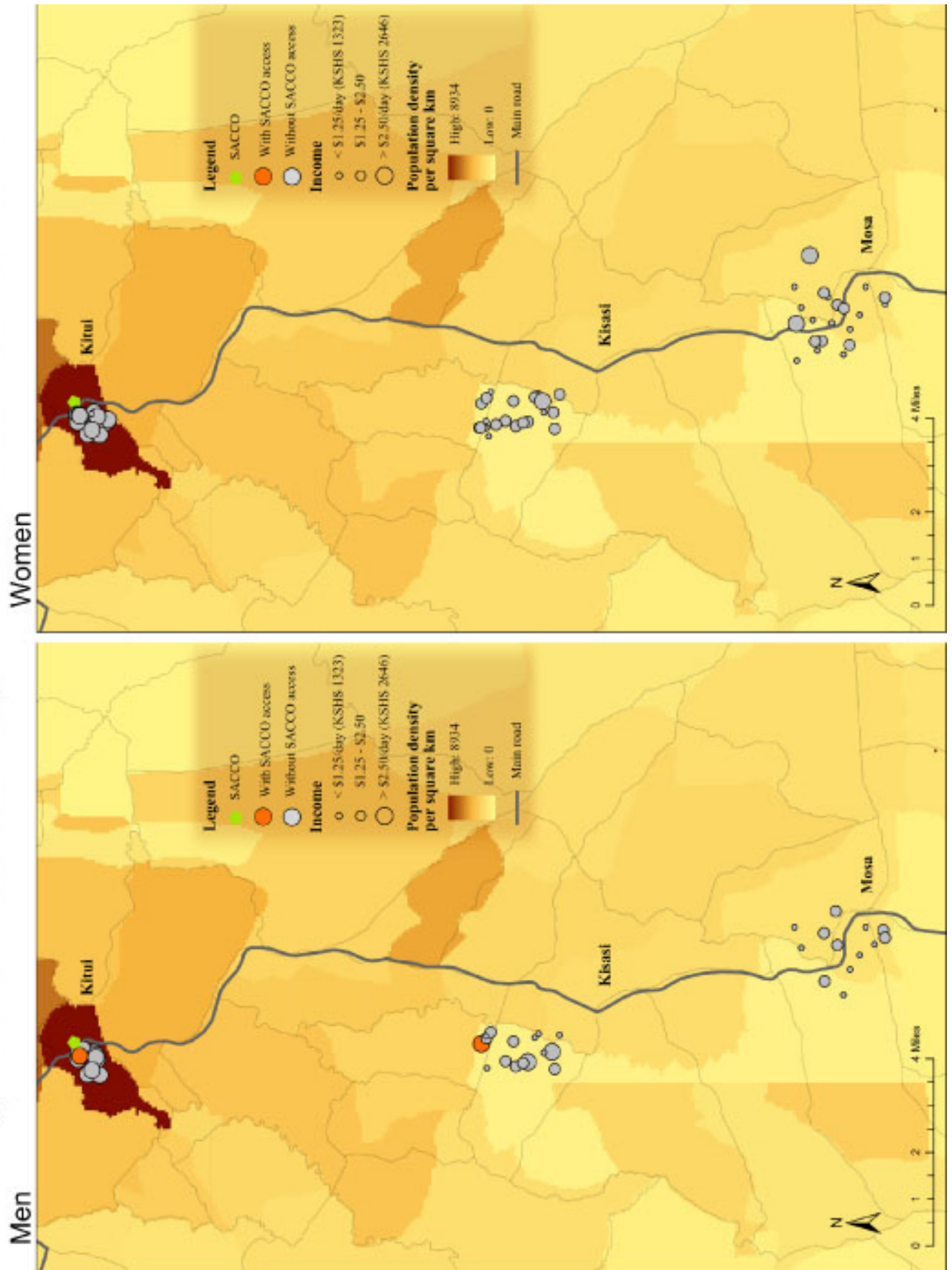


Figure 9: SACCO access by education for men and women – Kitui

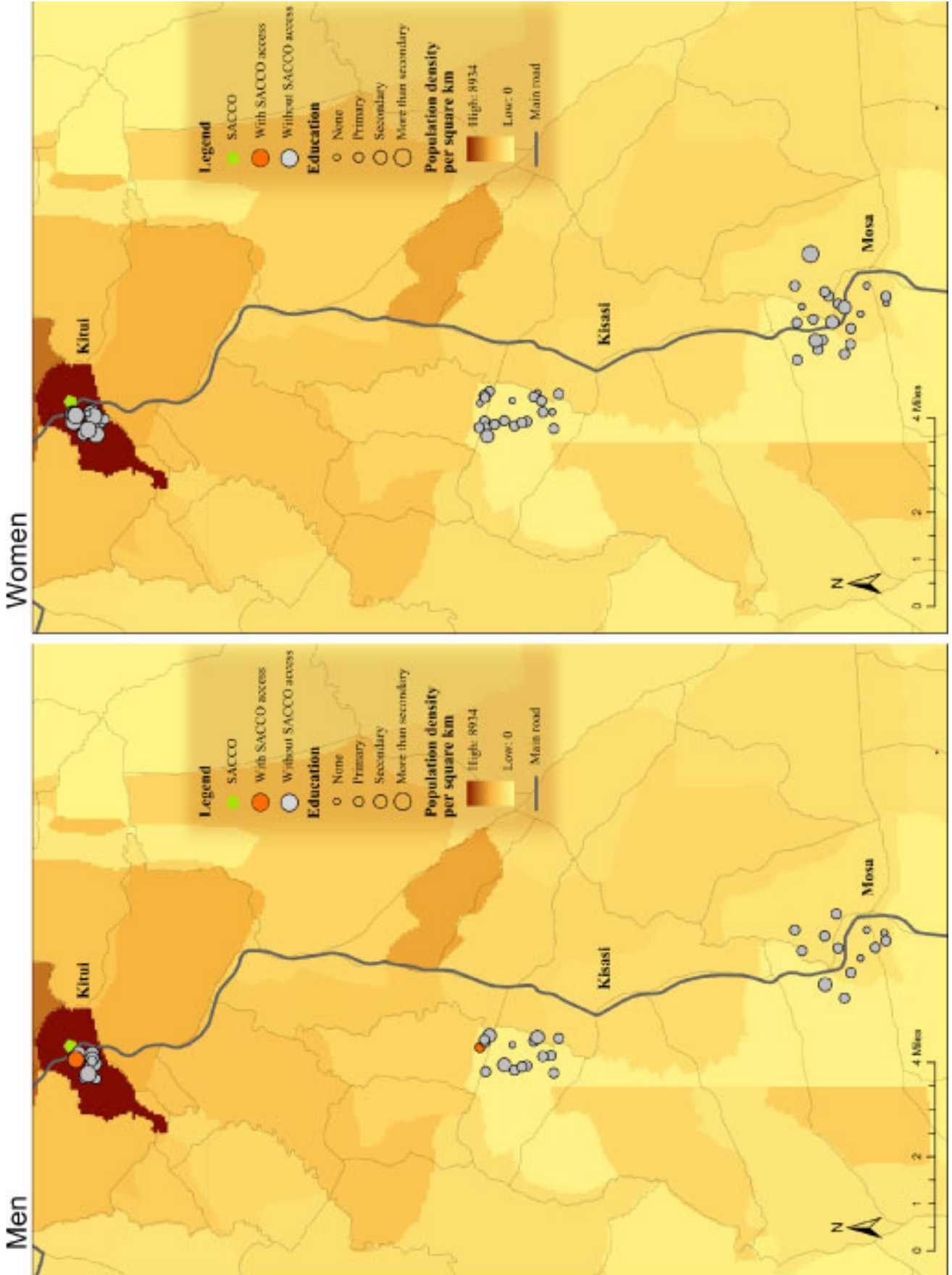


Figure 10: SACCO access by use for men and women – Kitui

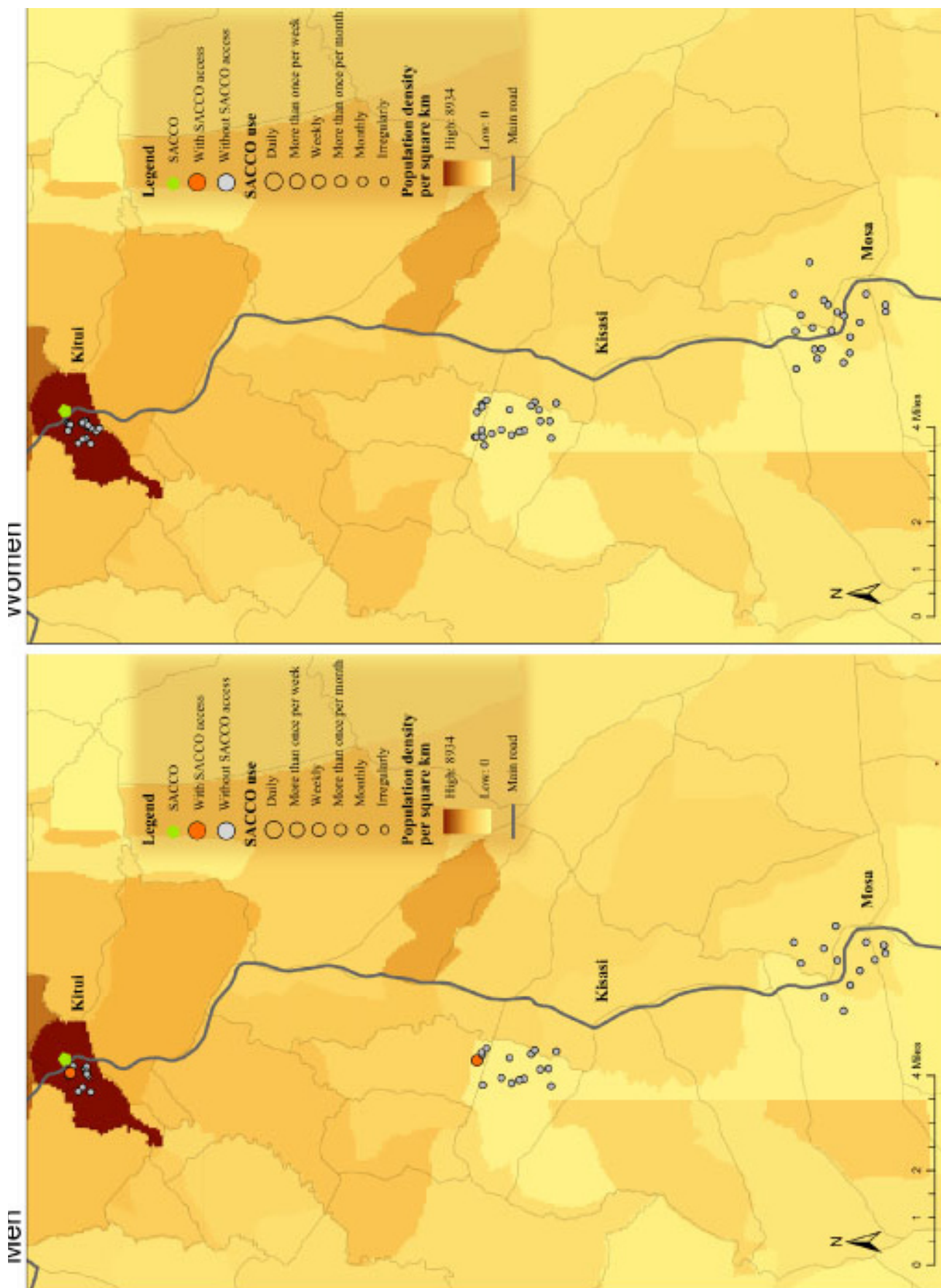


Figure 11: Mobile Money Transfer access by income for men and women – Kitui

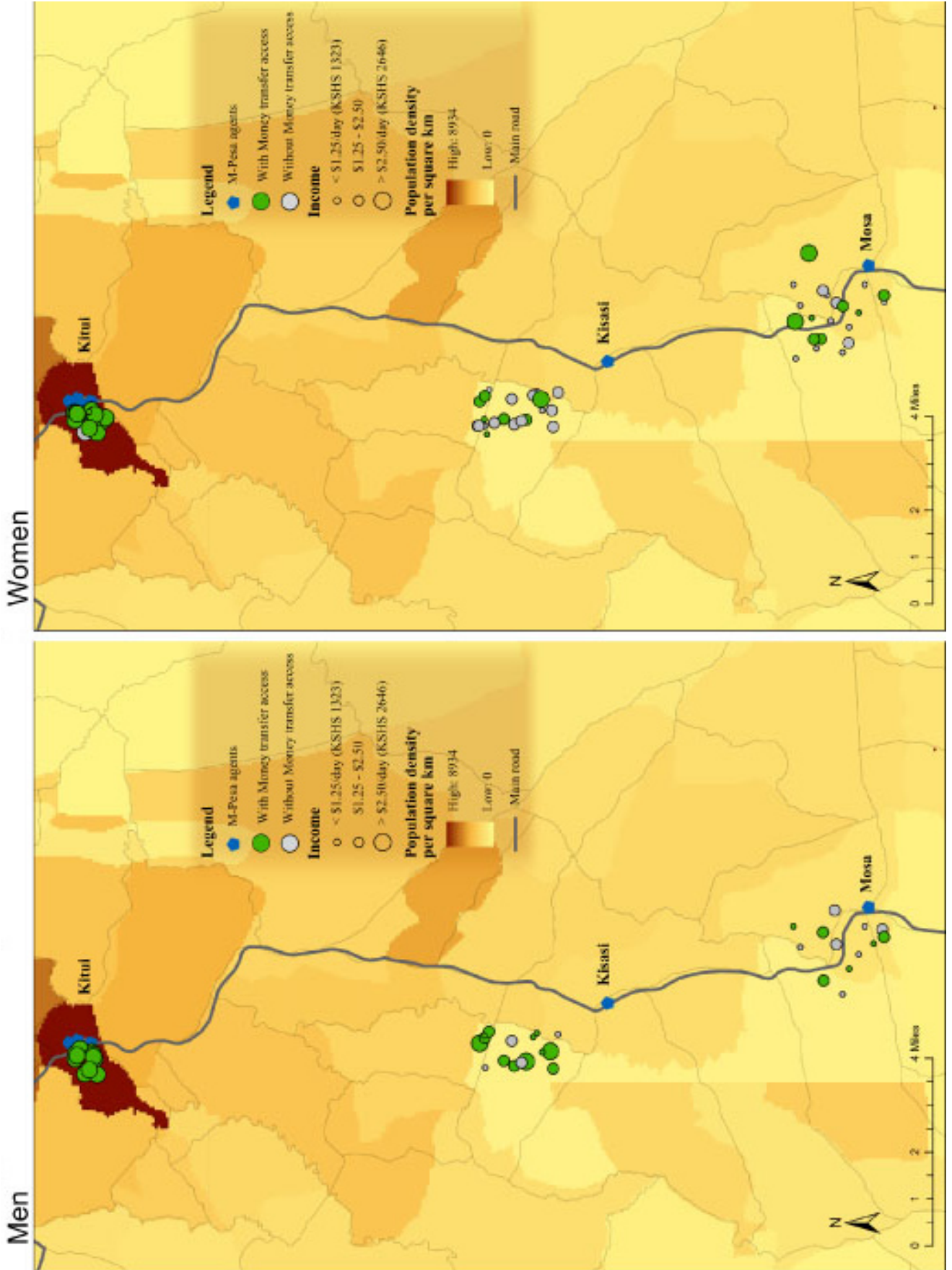


Figure 12: Mobile Money Transfer access by education for men and women – Kitui

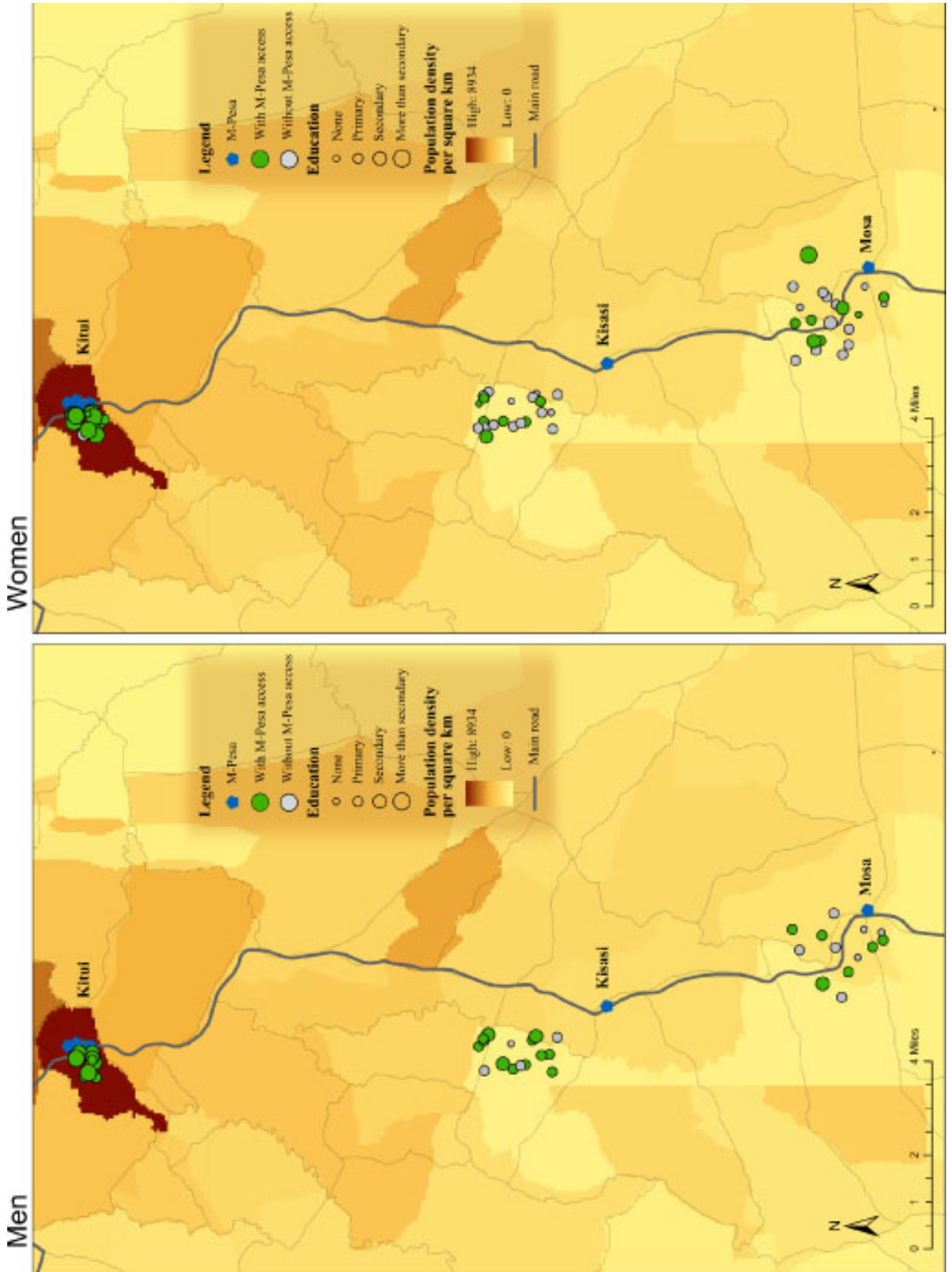


Figure 13: Mobile Money Transfer access by use for men and women – Kitui

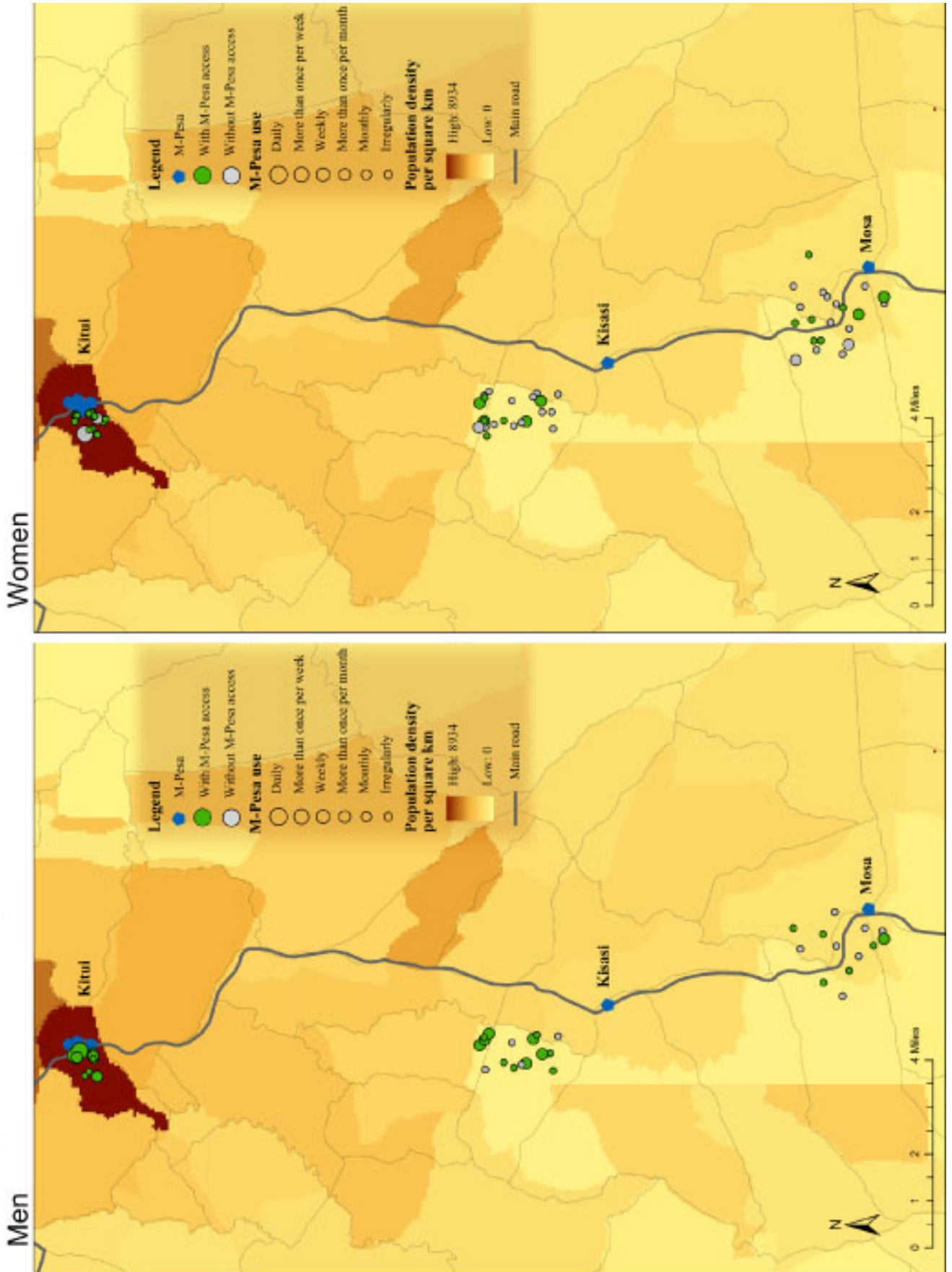


Figure 14: Financial Group access by income for men and women – Kitui



Figure 15: Financial Group access by education for men and women – Kitui

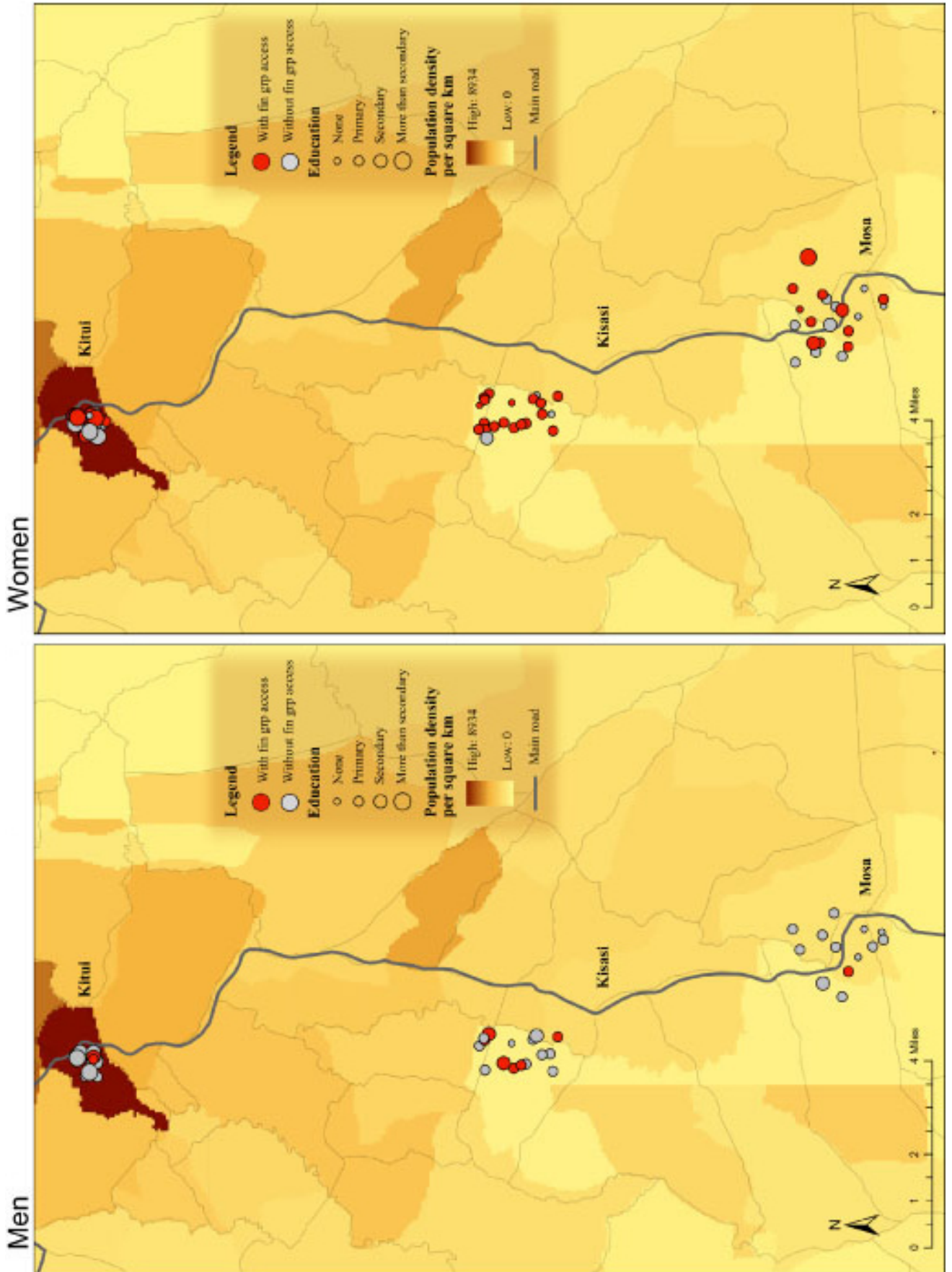


Figure 16: Financial Group access by use for men and women – Kitui

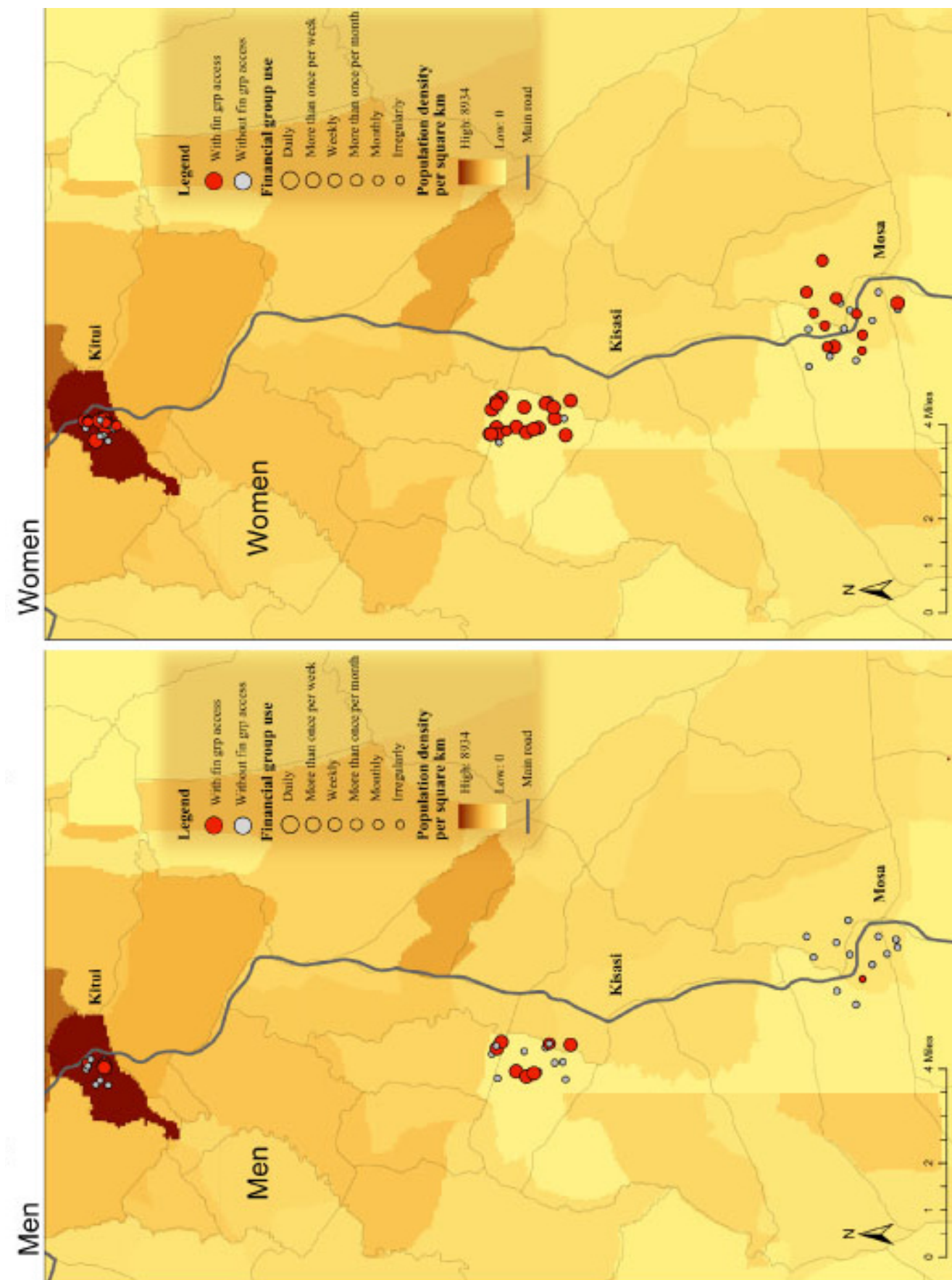


Figure 19: Bank access by income for men and women – Nyamira

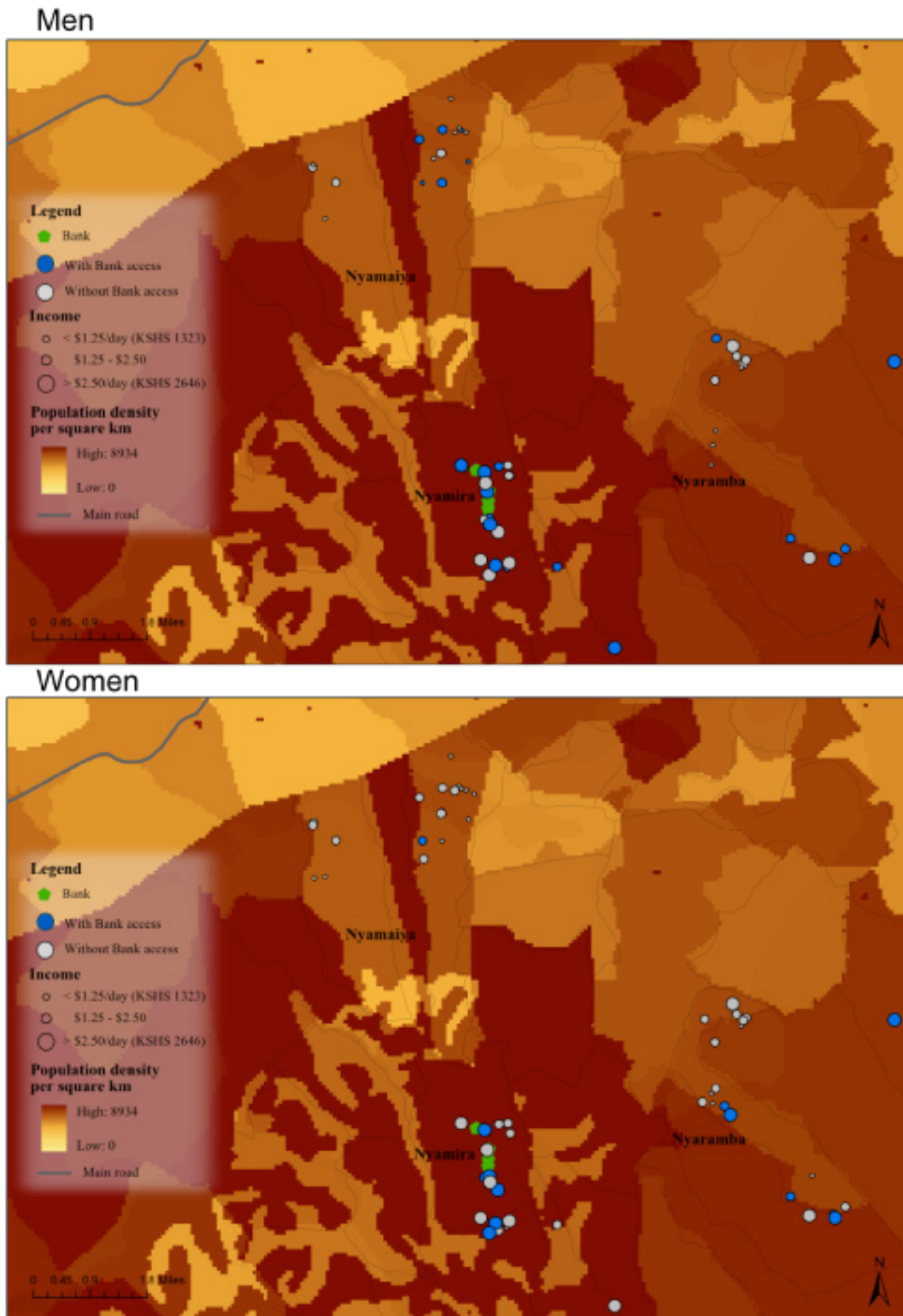


Figure 20: Bank access by education for men and women – Nyamira

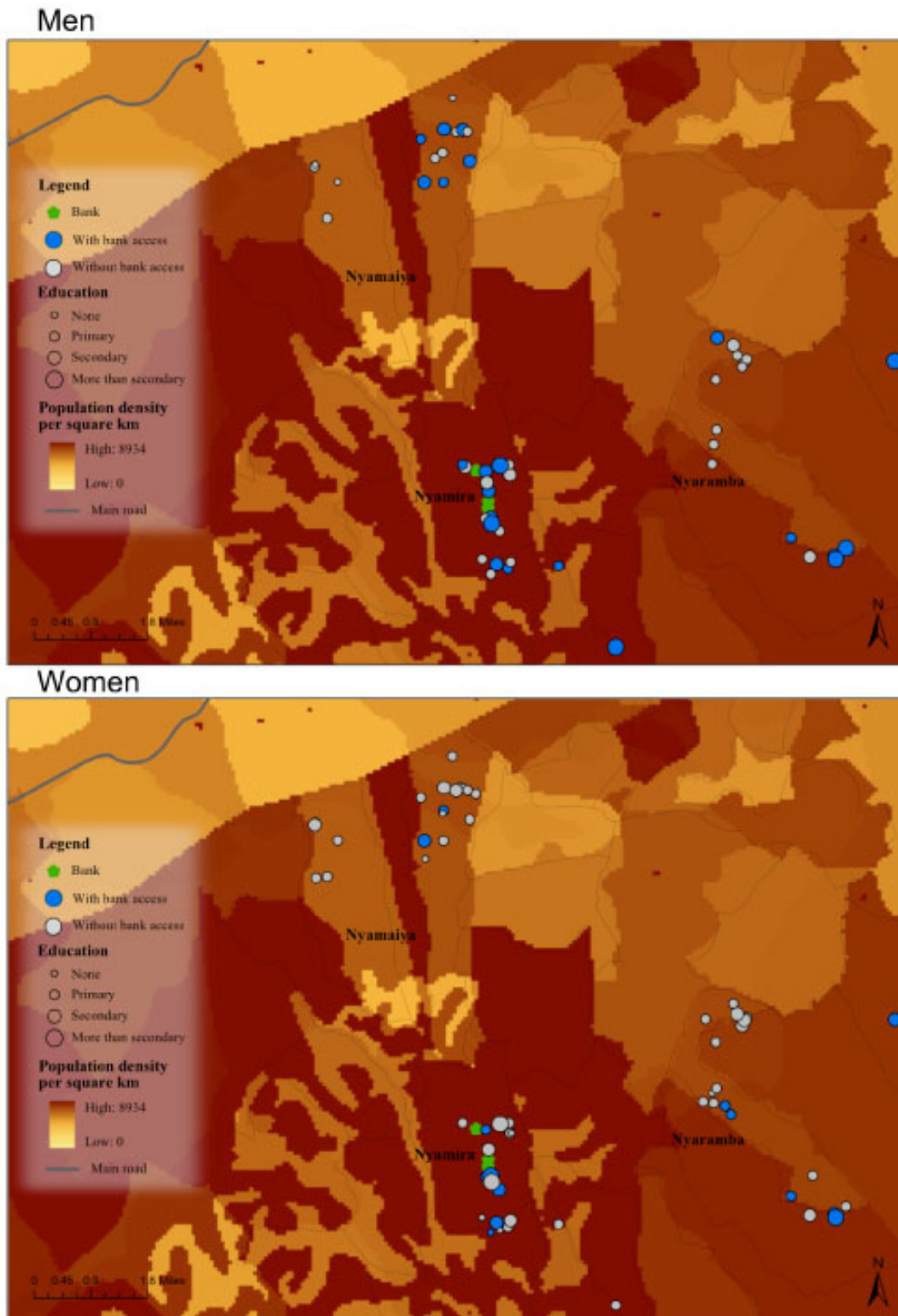


Figure 21: Bank access by use for men and women – Nyamira

Men



Women



Figure 22: Bank access by income for men and women – Nyamira

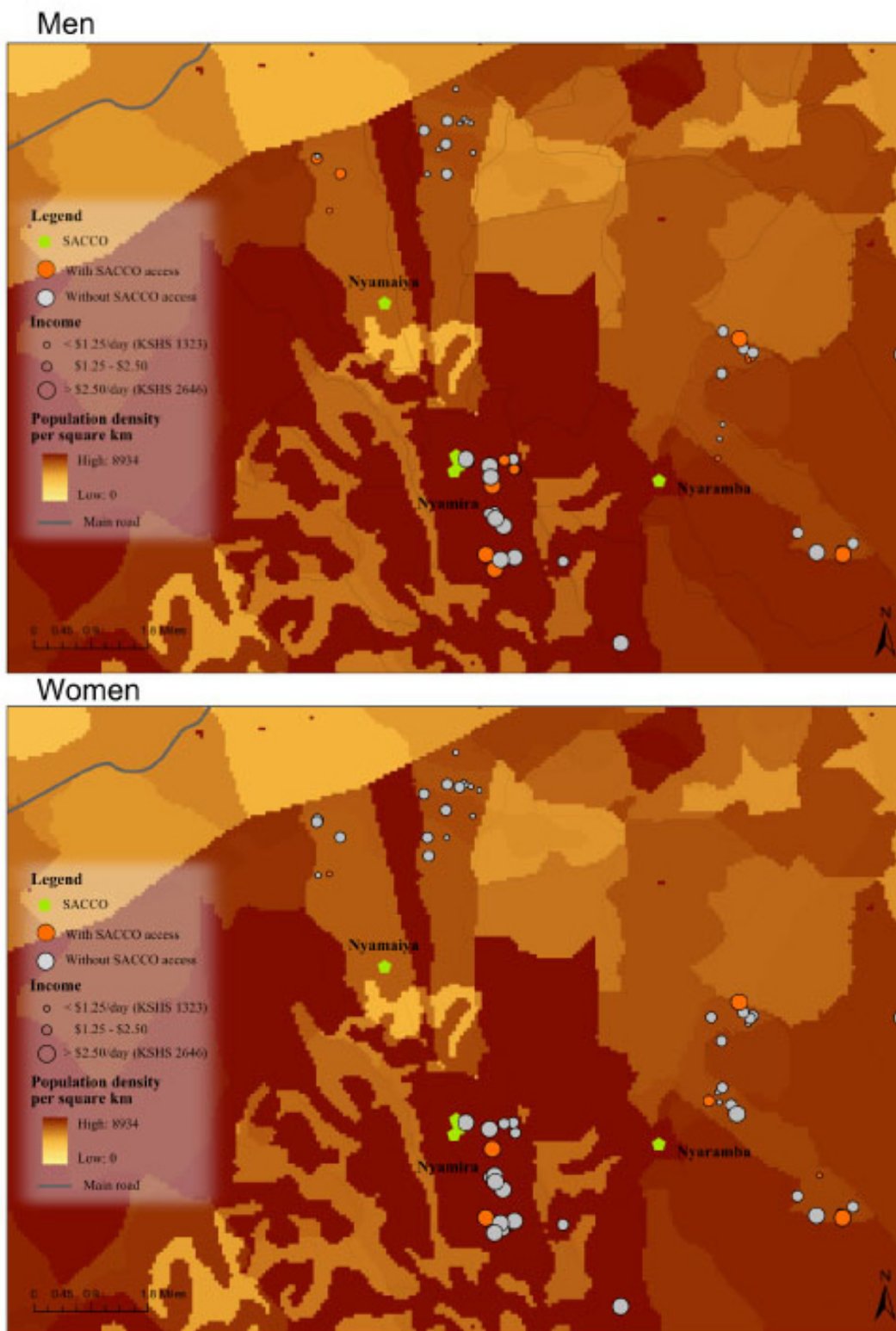


Figure 23: SACCO Access by use for men and women – Nyamira

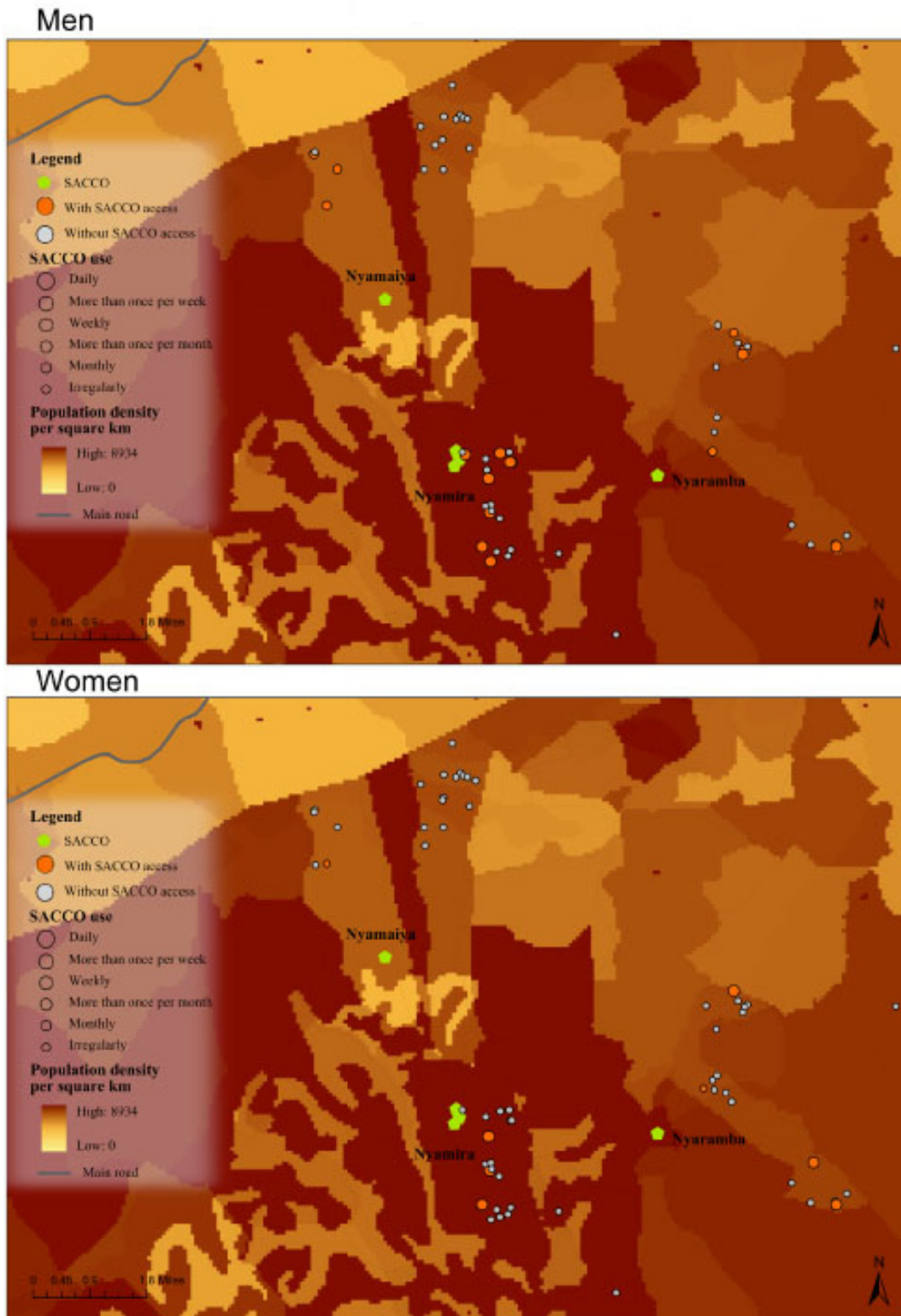


Figure 24: Mobile Money Transfer access by income for men and women – Nyamira

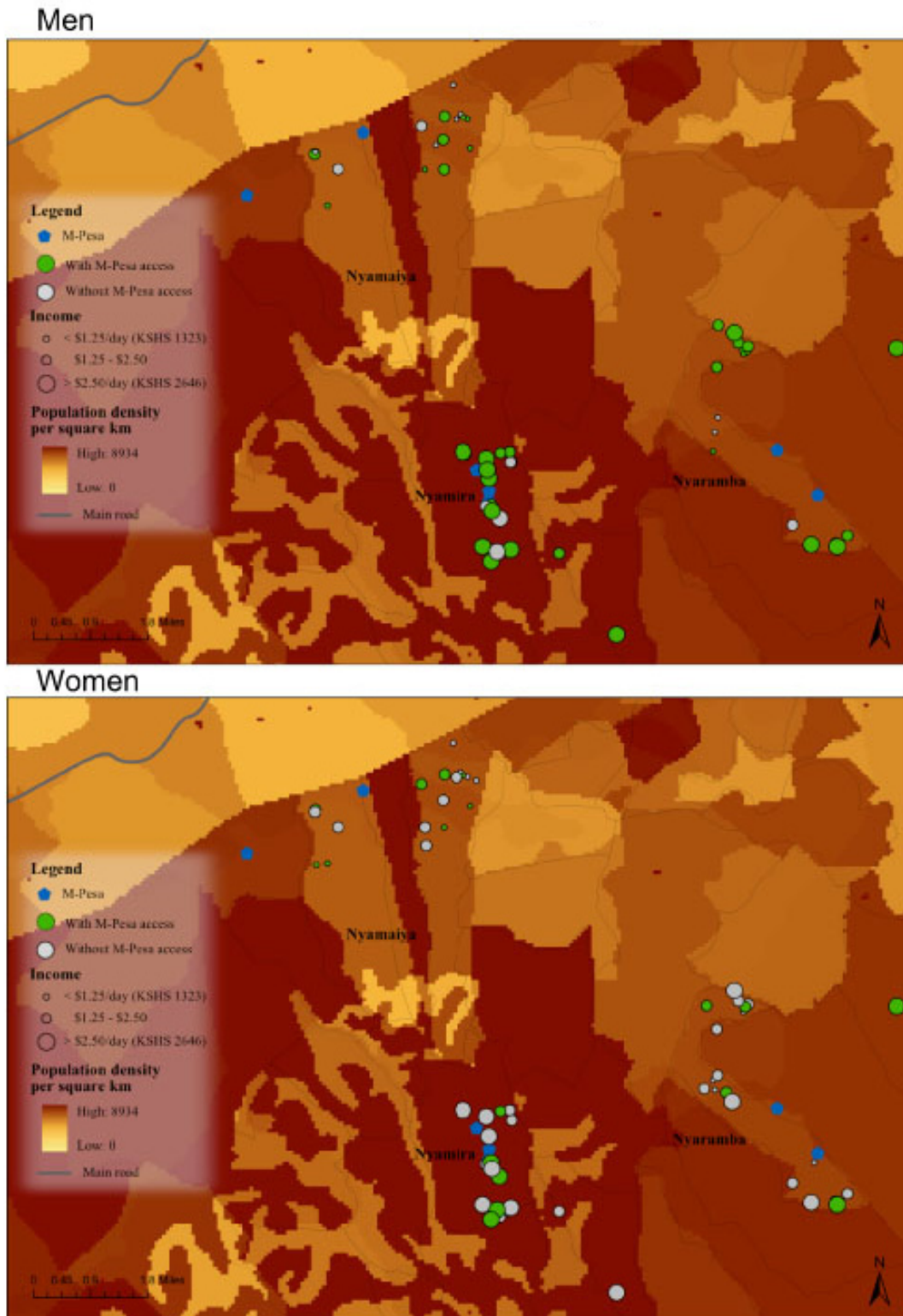


Figure 25: Mobile Money Transfer access by education for men and women – Nyamira

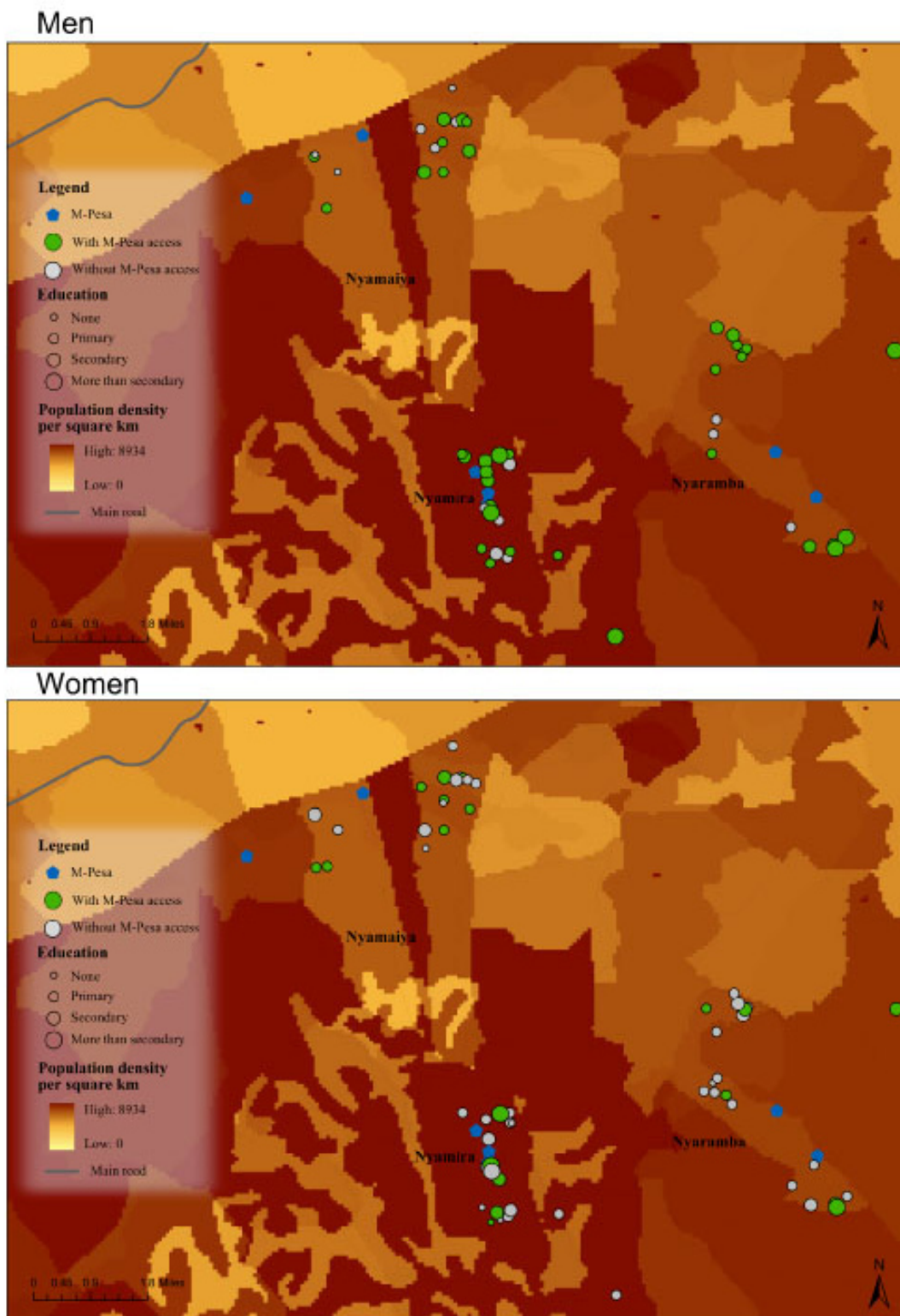


Figure 26: Money Transfer access by use for men and women – Nyamira

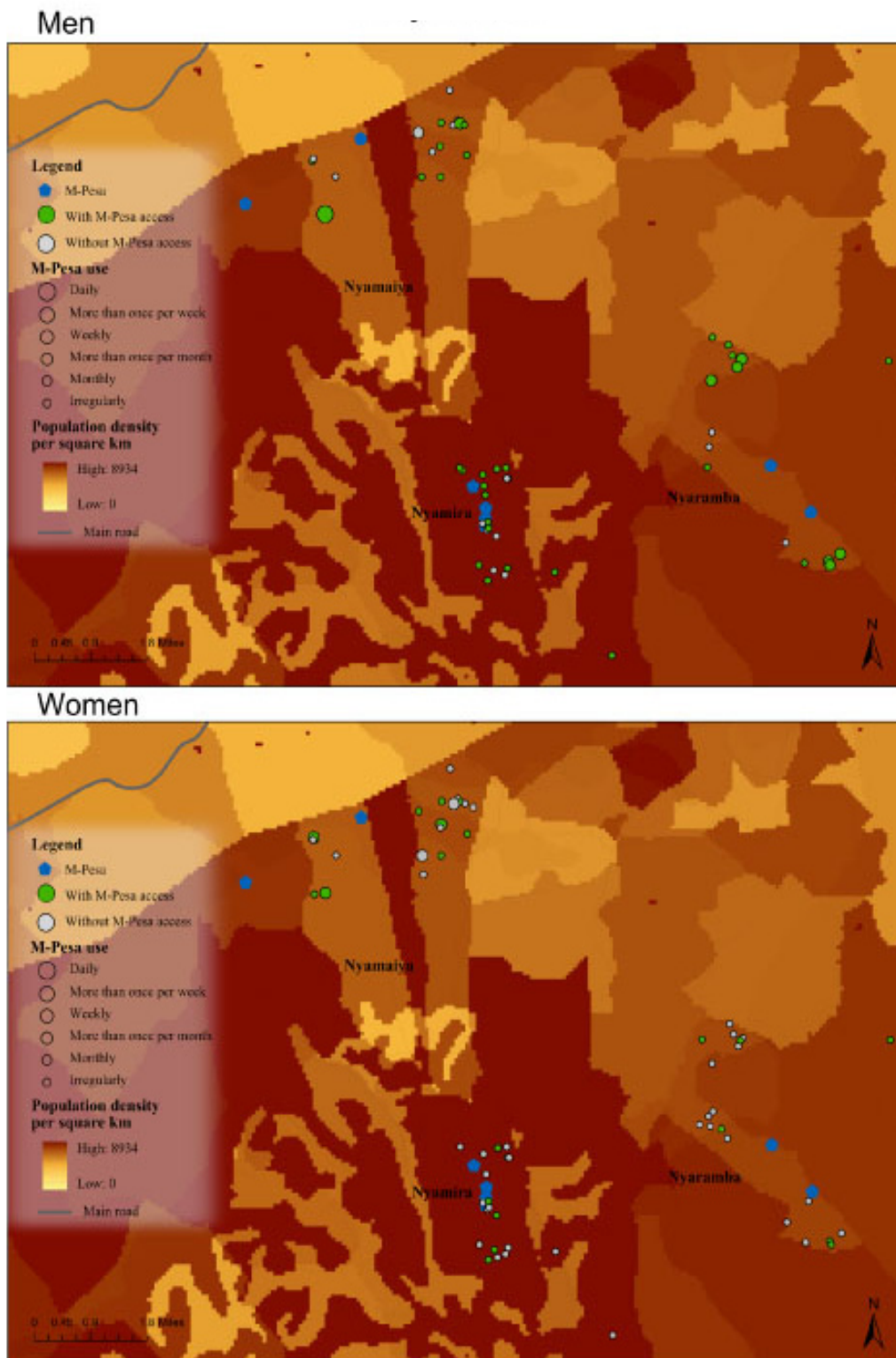


Figure 27: Financial Group access by use for men and women – Nyamira

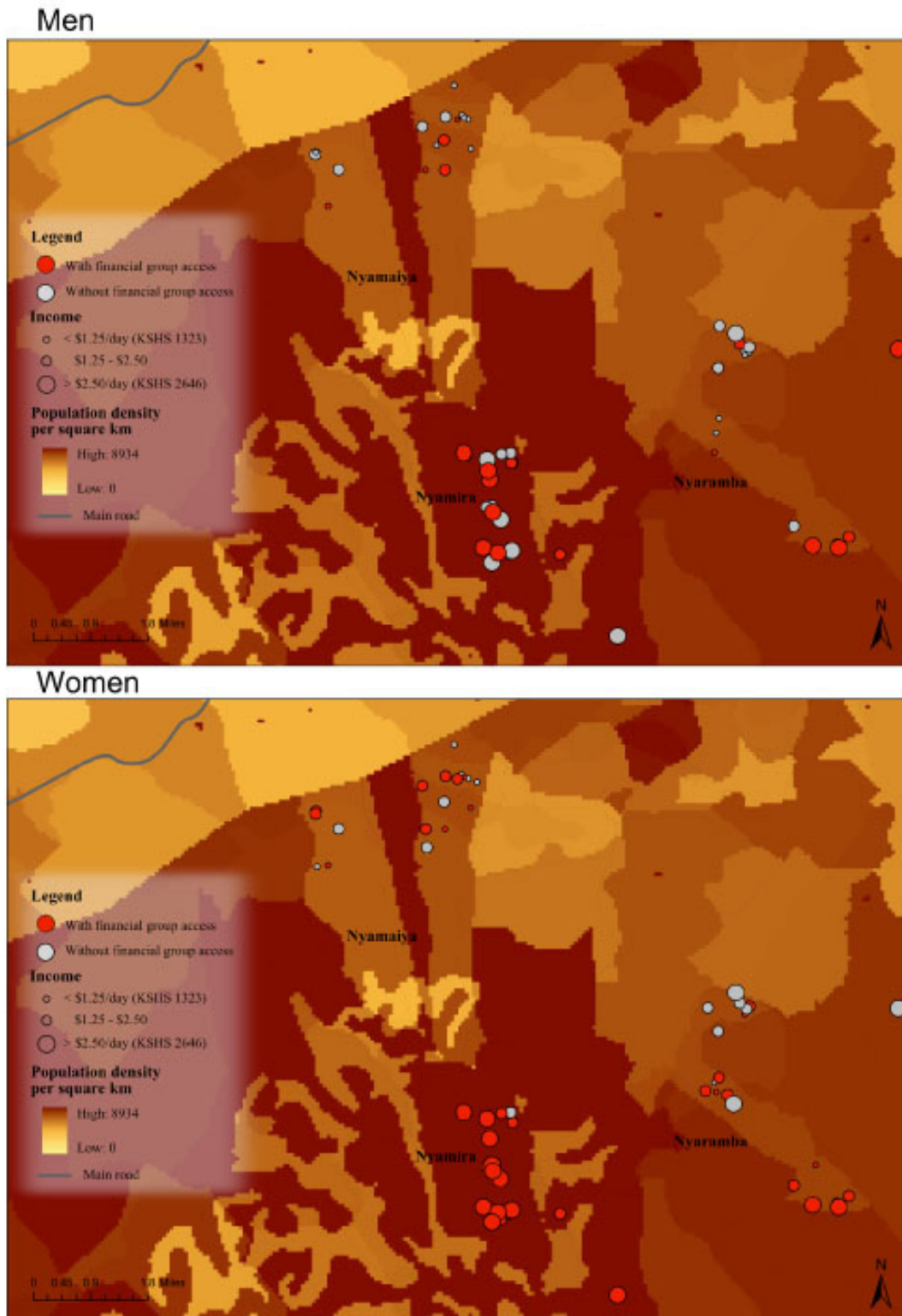


Figure 28: Financial group access by education for men and women – Nyamira

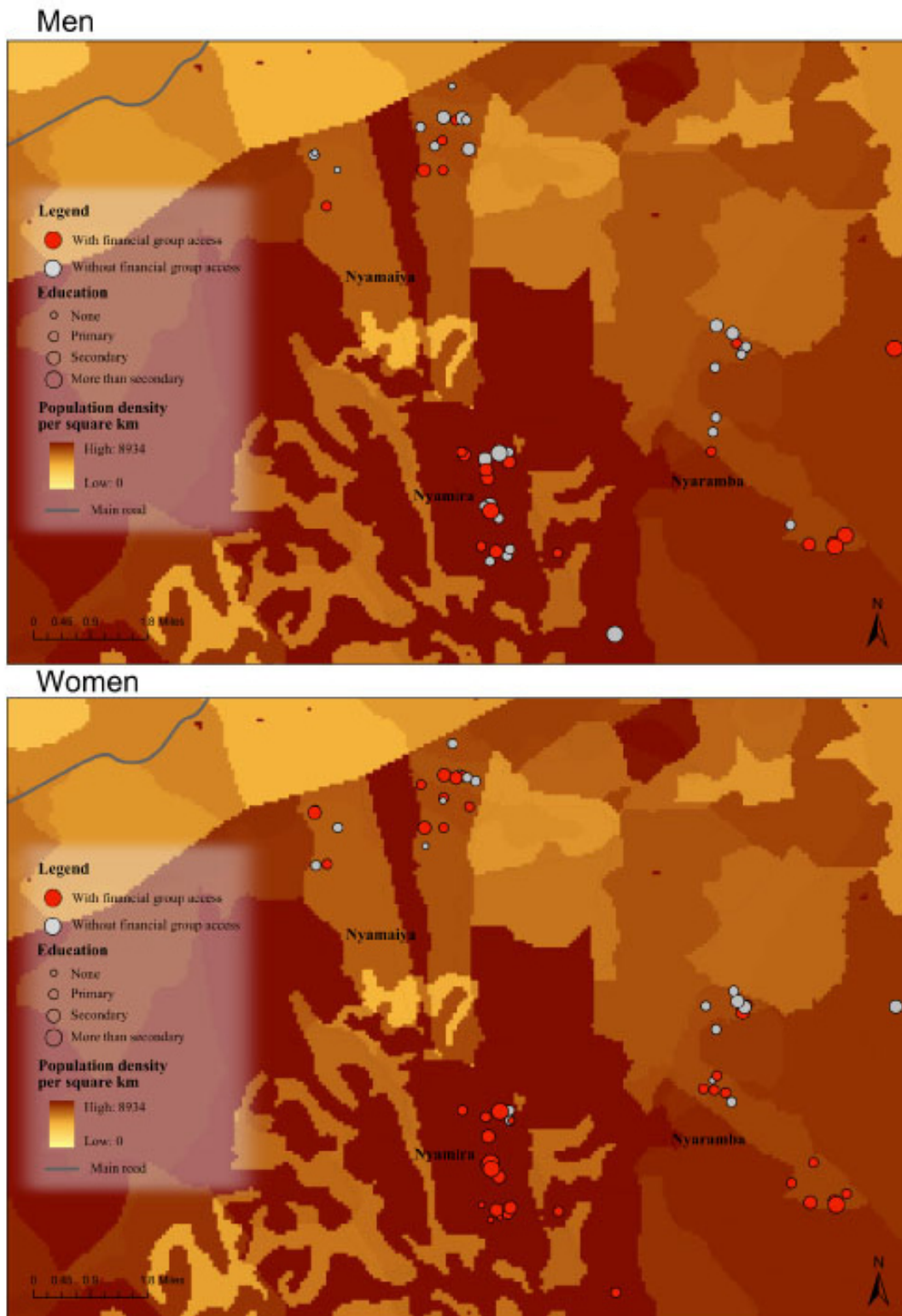


Figure 29: Financial Group access by use for men and women – Nyamira

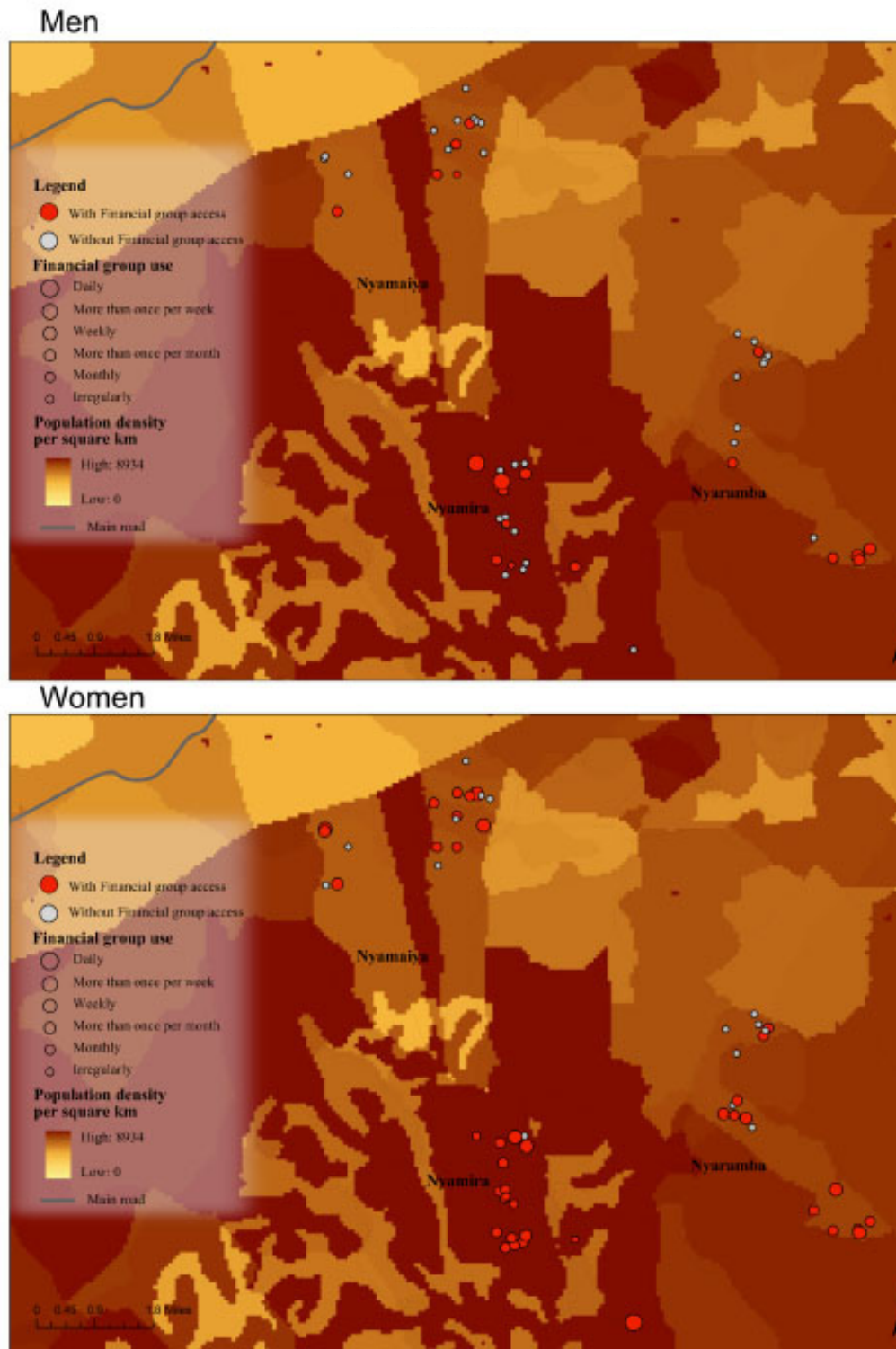


Figure 30: Bank access by education for men and women – Kitui

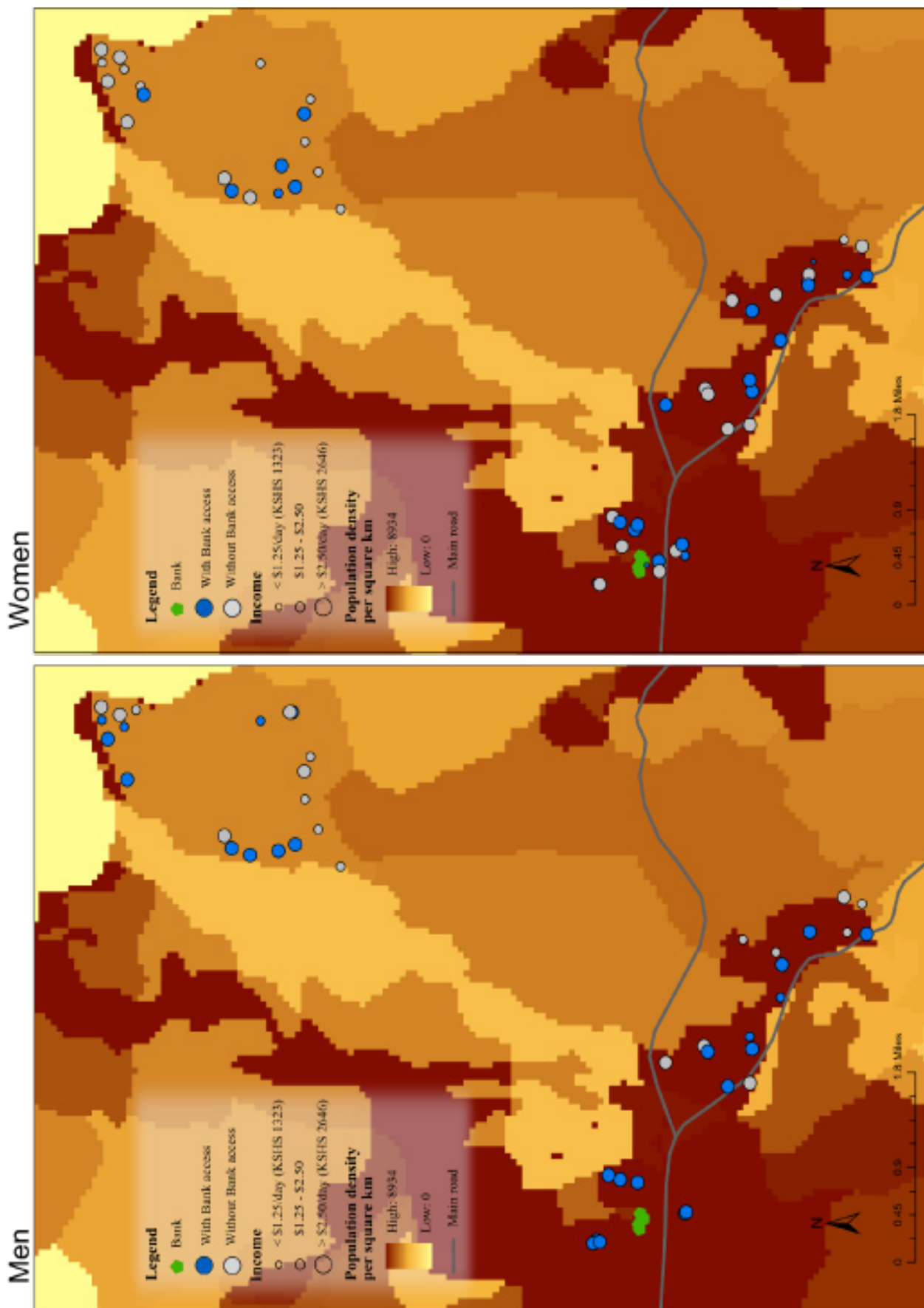


Figure 31: Bank access by education for men and women – Karatina

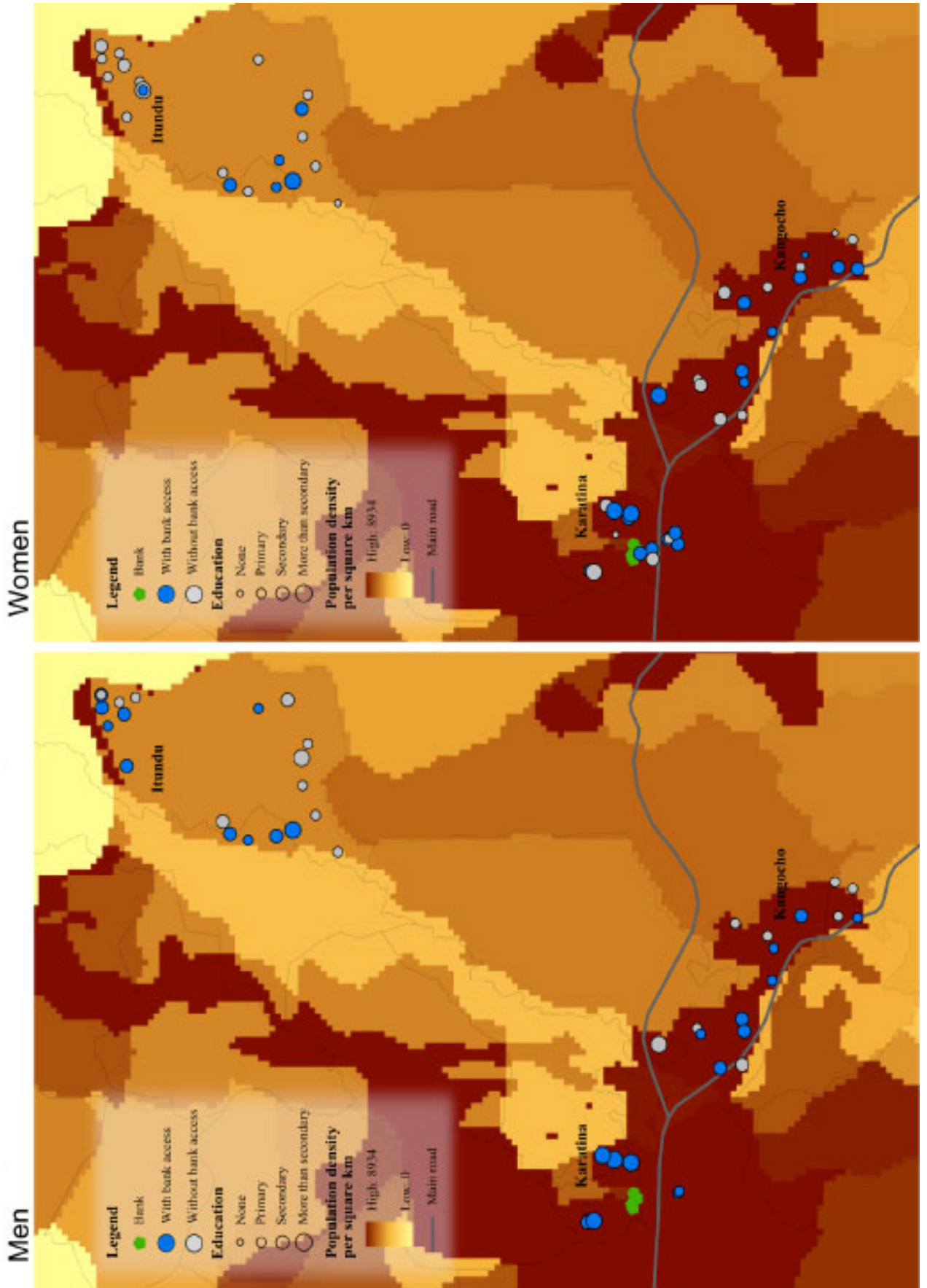


Figure 32: Bank access by use for men and women – Karatina

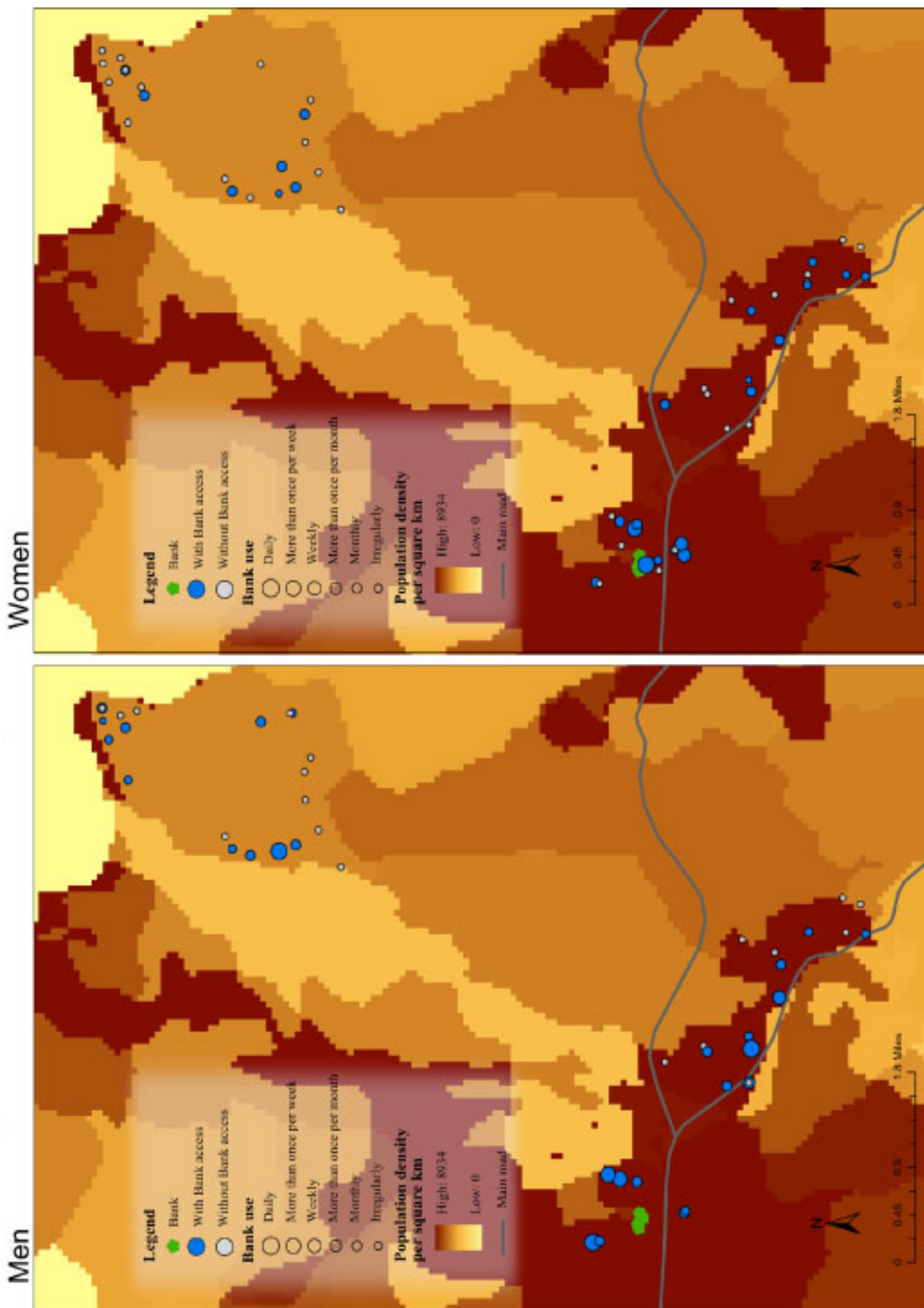


Figure 33: SACCO access by income for men and women – Karatina

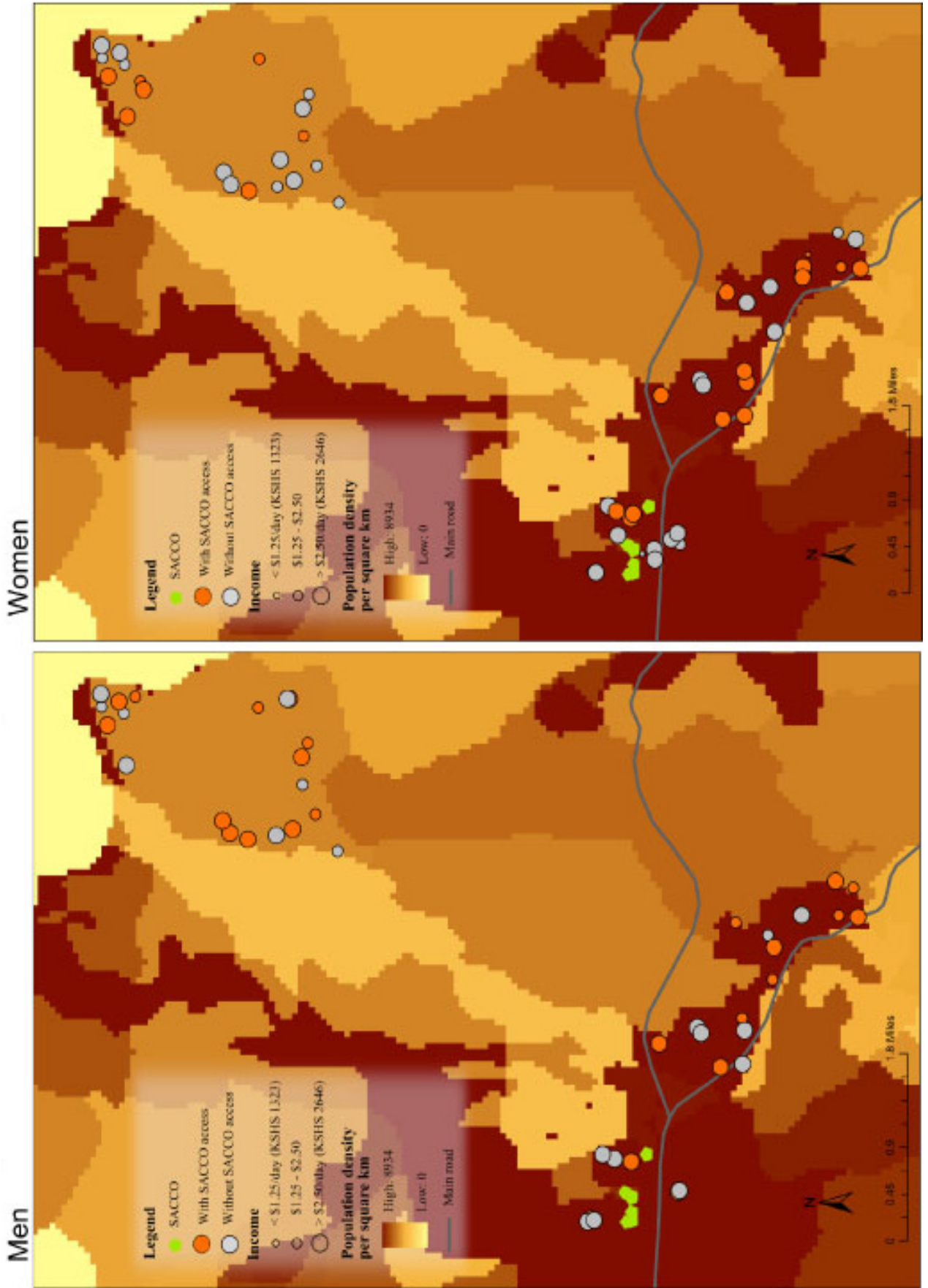


Figure 34: SACCO access by education for men and women – Karatina

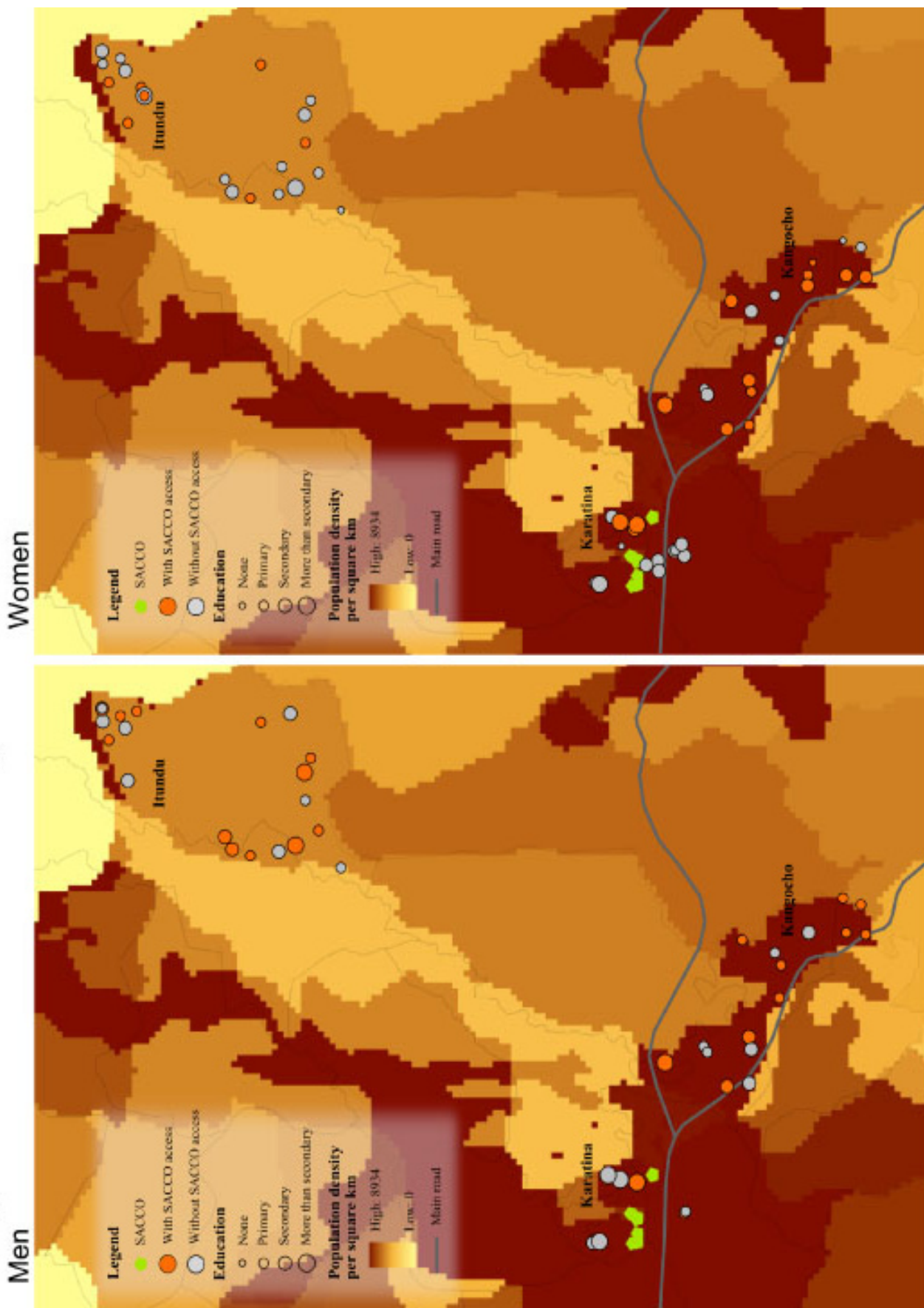


Figure 35: SACCO access by use for men and women – Karatina

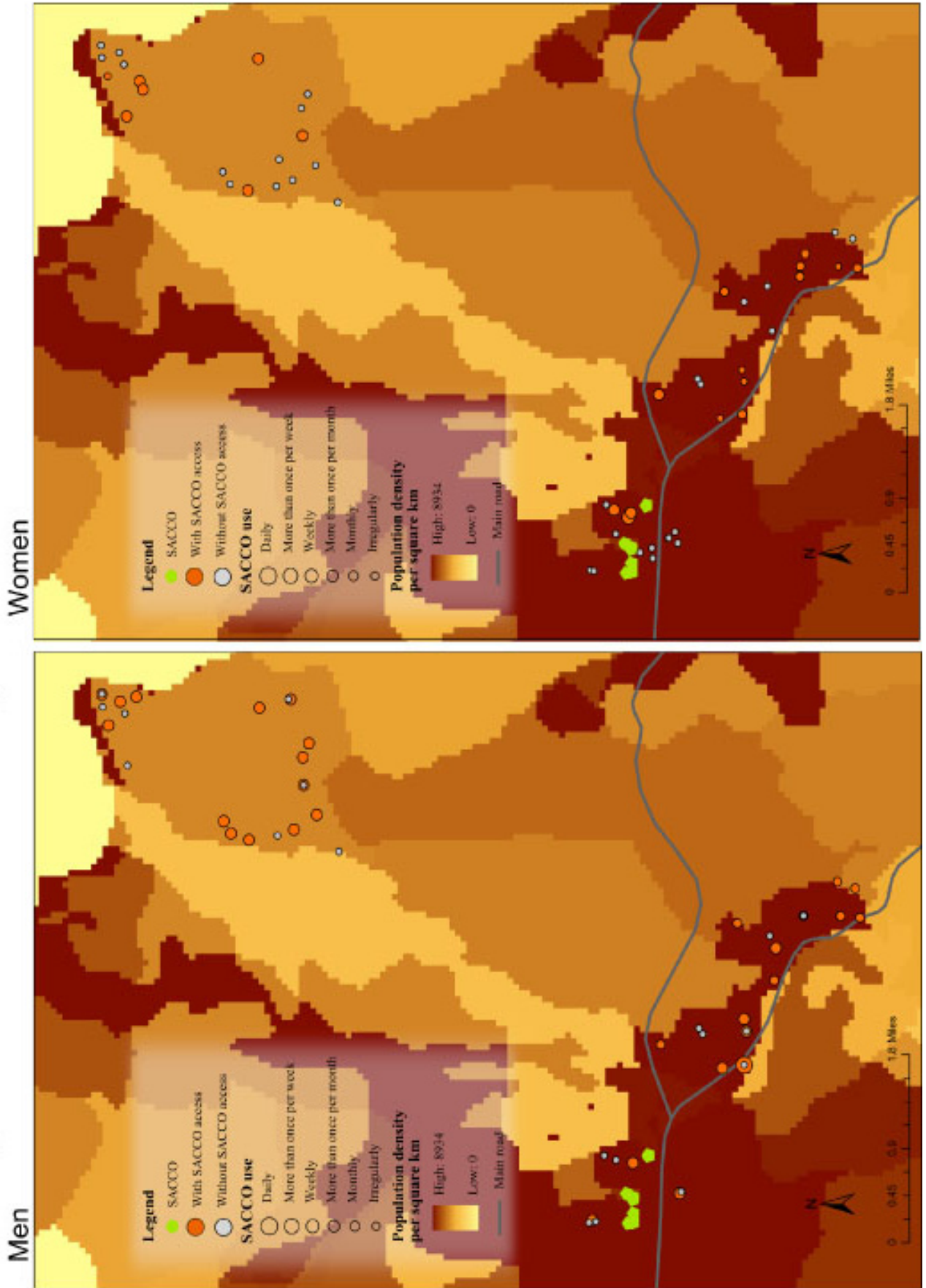


Figure 36: FMobile Money Transfer access by income for men and women – Karatina

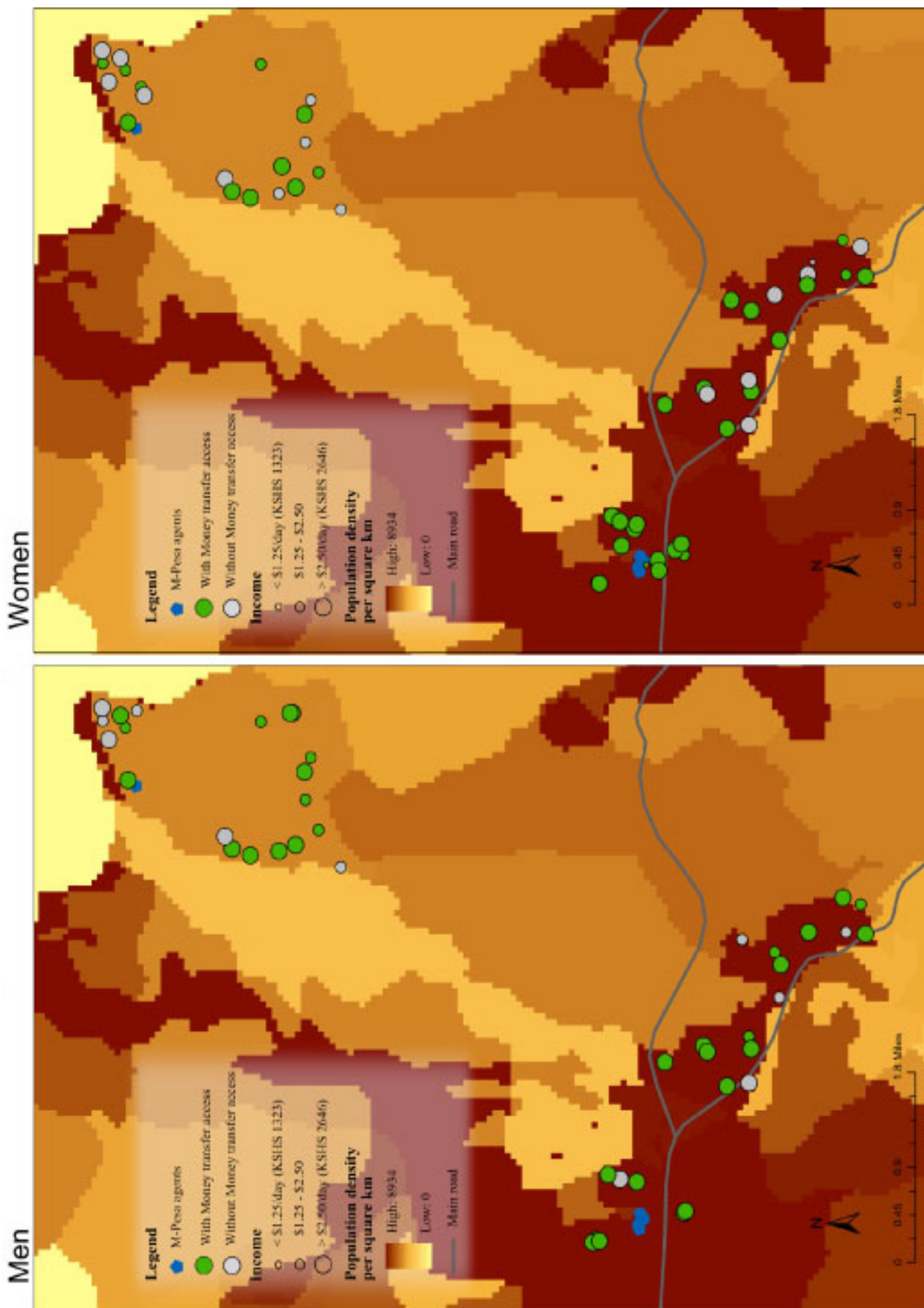


Figure 37: Mobile Money Transfer access by education for men and women – Karatina

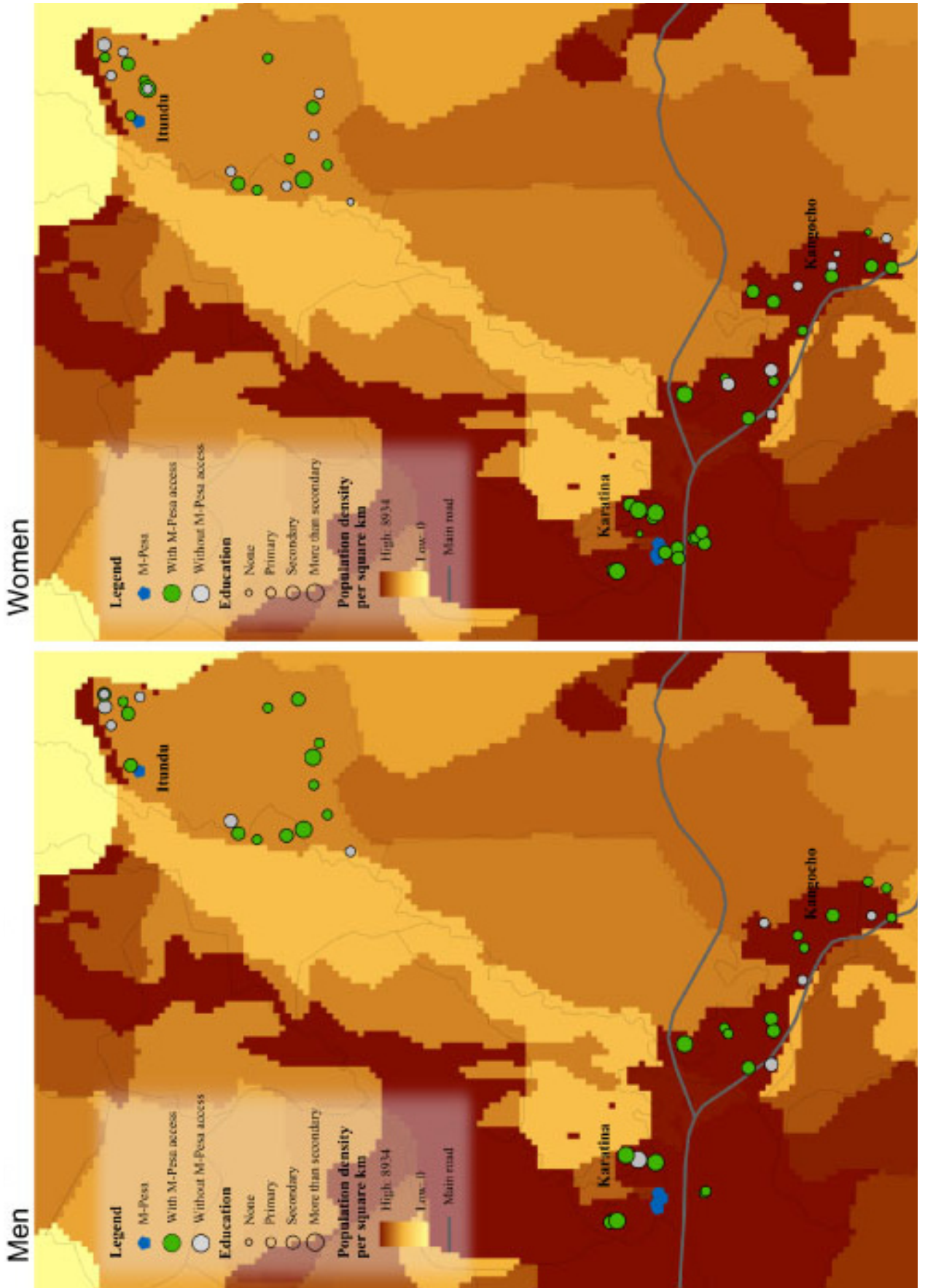


Figure 38: FMobile Money Transfer access by education for men and women – Karatina

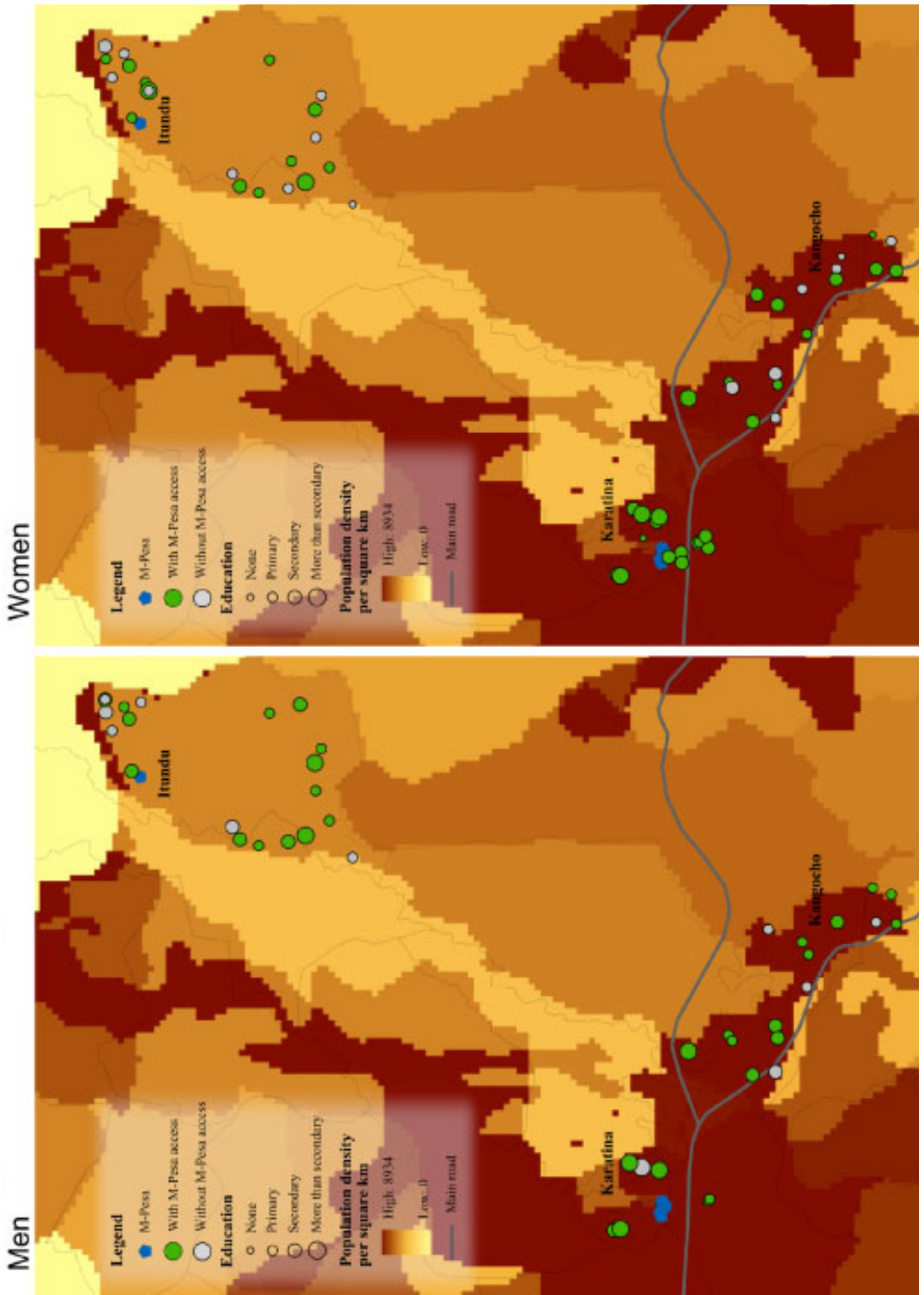


Figure 39: Mobile Money Transfer access by use for men and women – Karatina

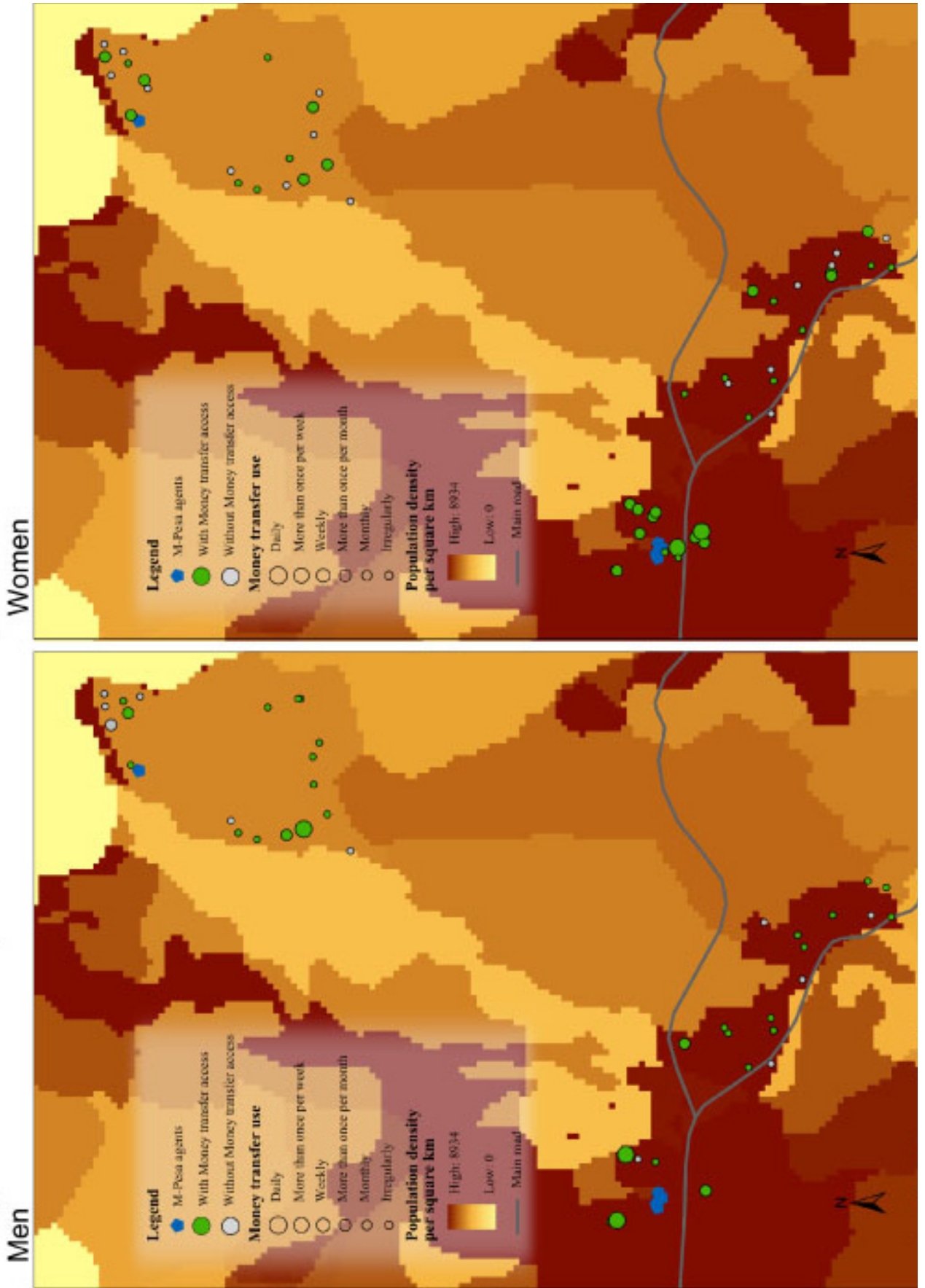


Figure 40: Financial group access by income for men and women – Karatina

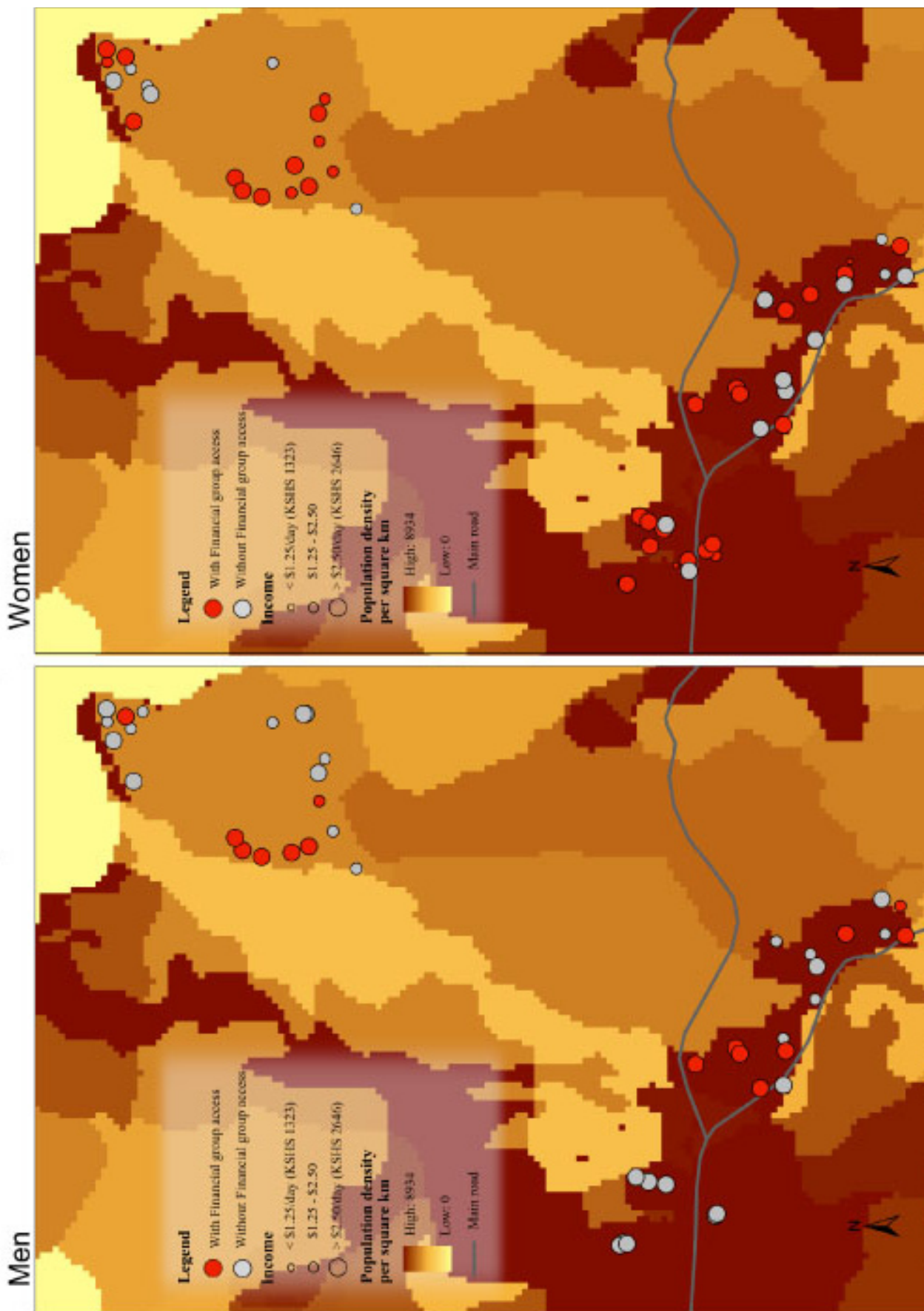


Figure 41: Financial group access by education for men and women – Karatina

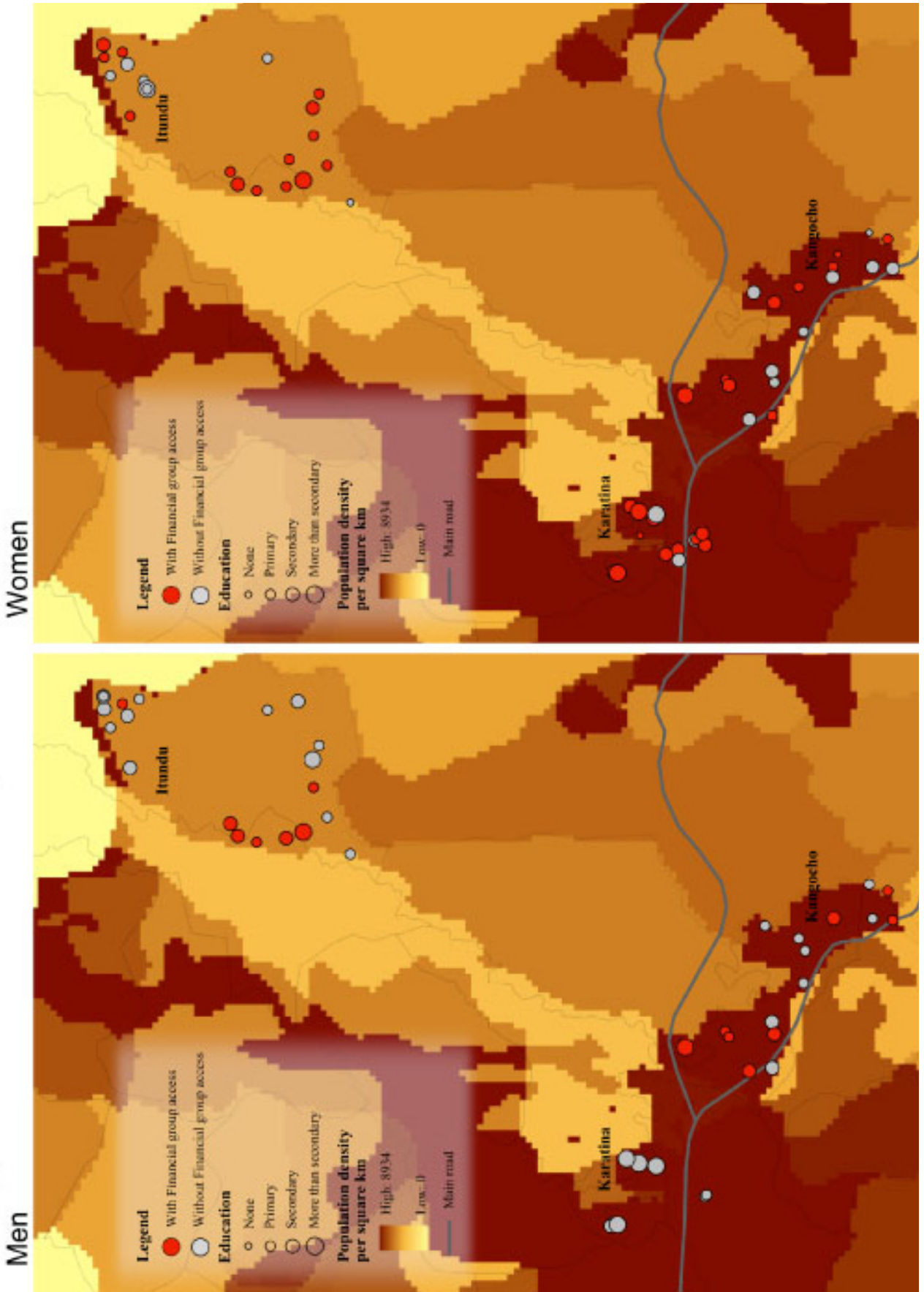
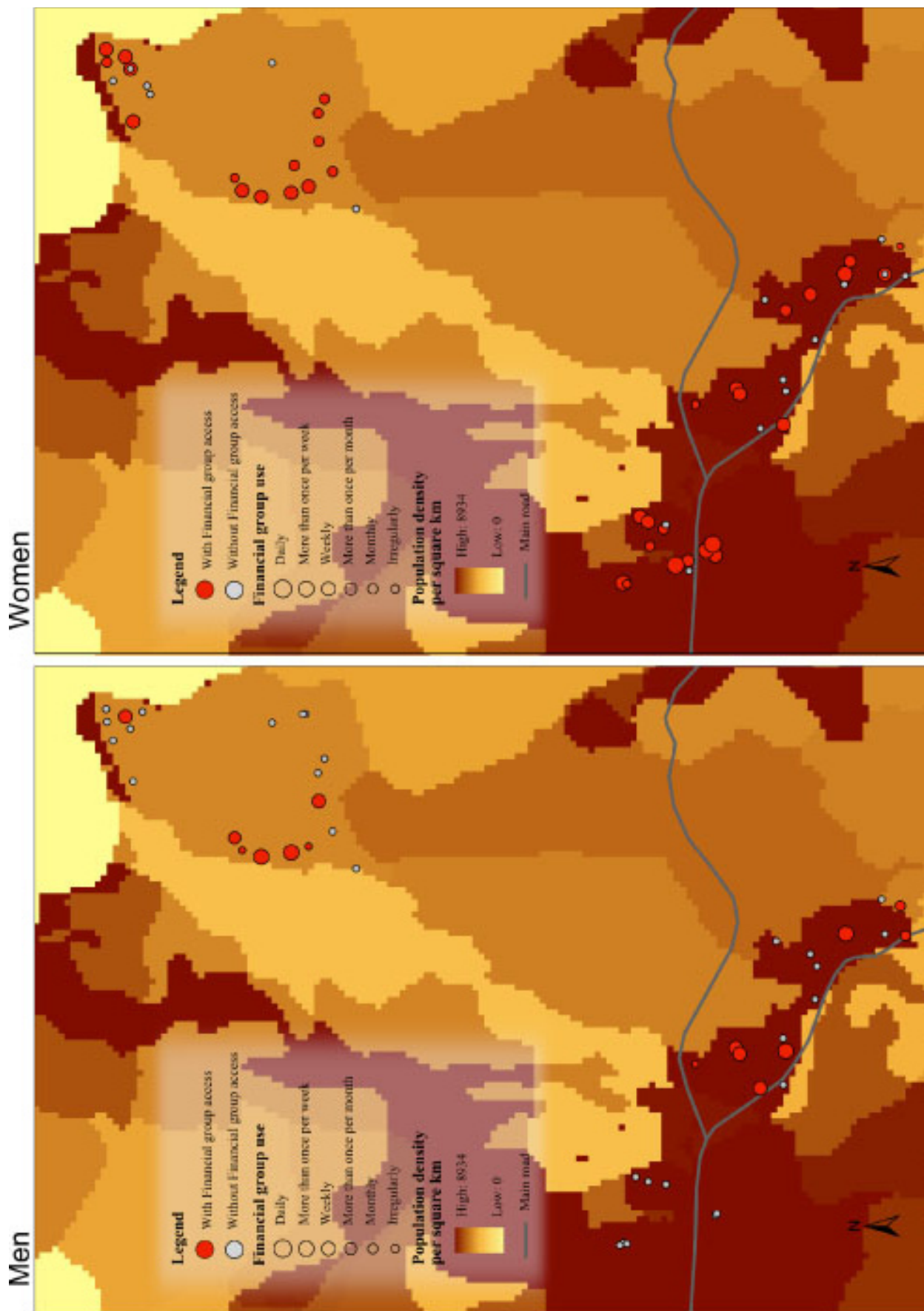


Figure 42: Financial group access by use for men and women – Karatina



Chapter 3

VISUAL REPRESENTATIONS

Figure 43: Visual representation of multiple use of financial services – Kitui

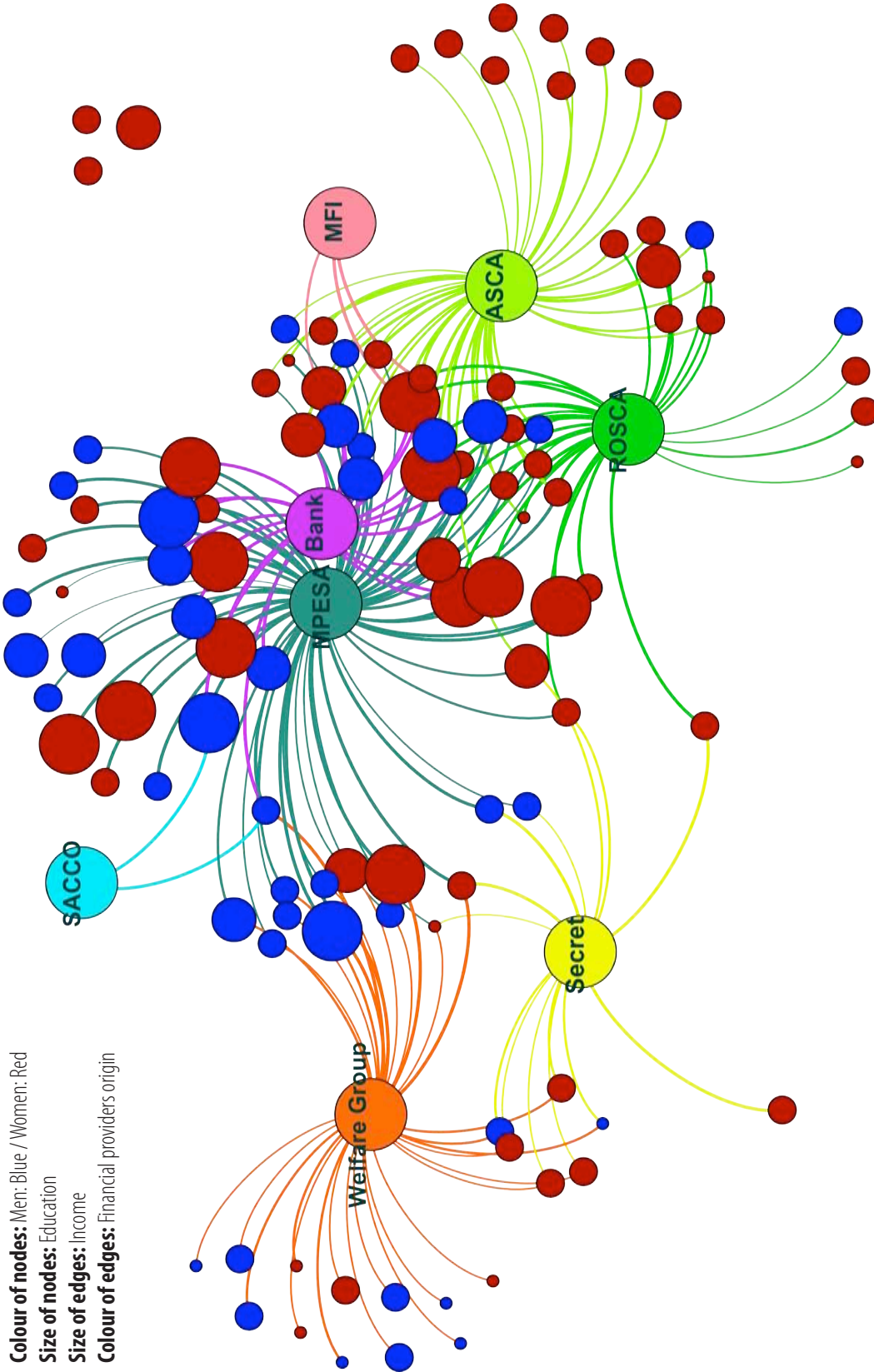


Figure 44: Visual representation of multiple use of financial services – Nyamira

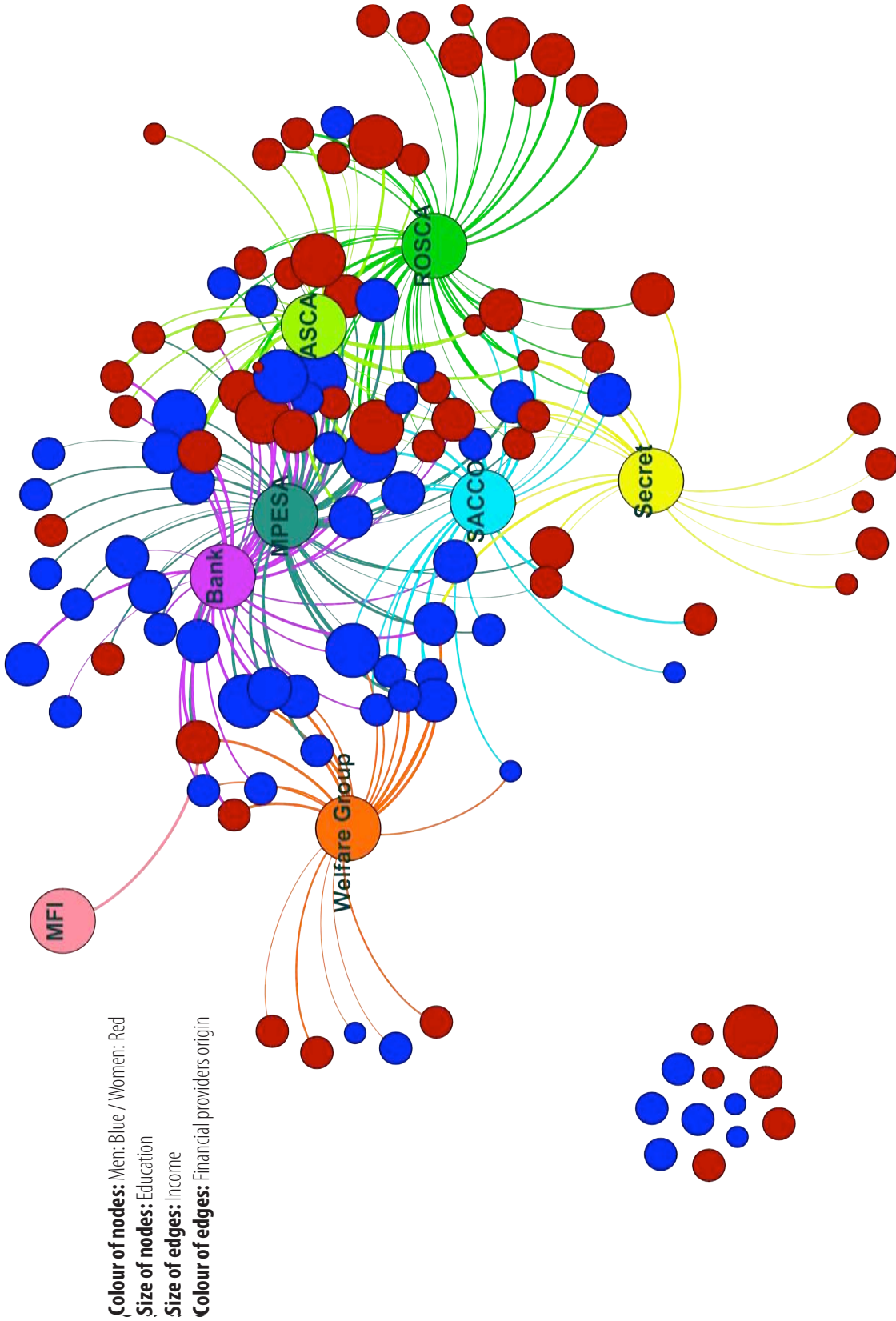


Figure 45 : Visual representation of multiple use of financial services – Karatina

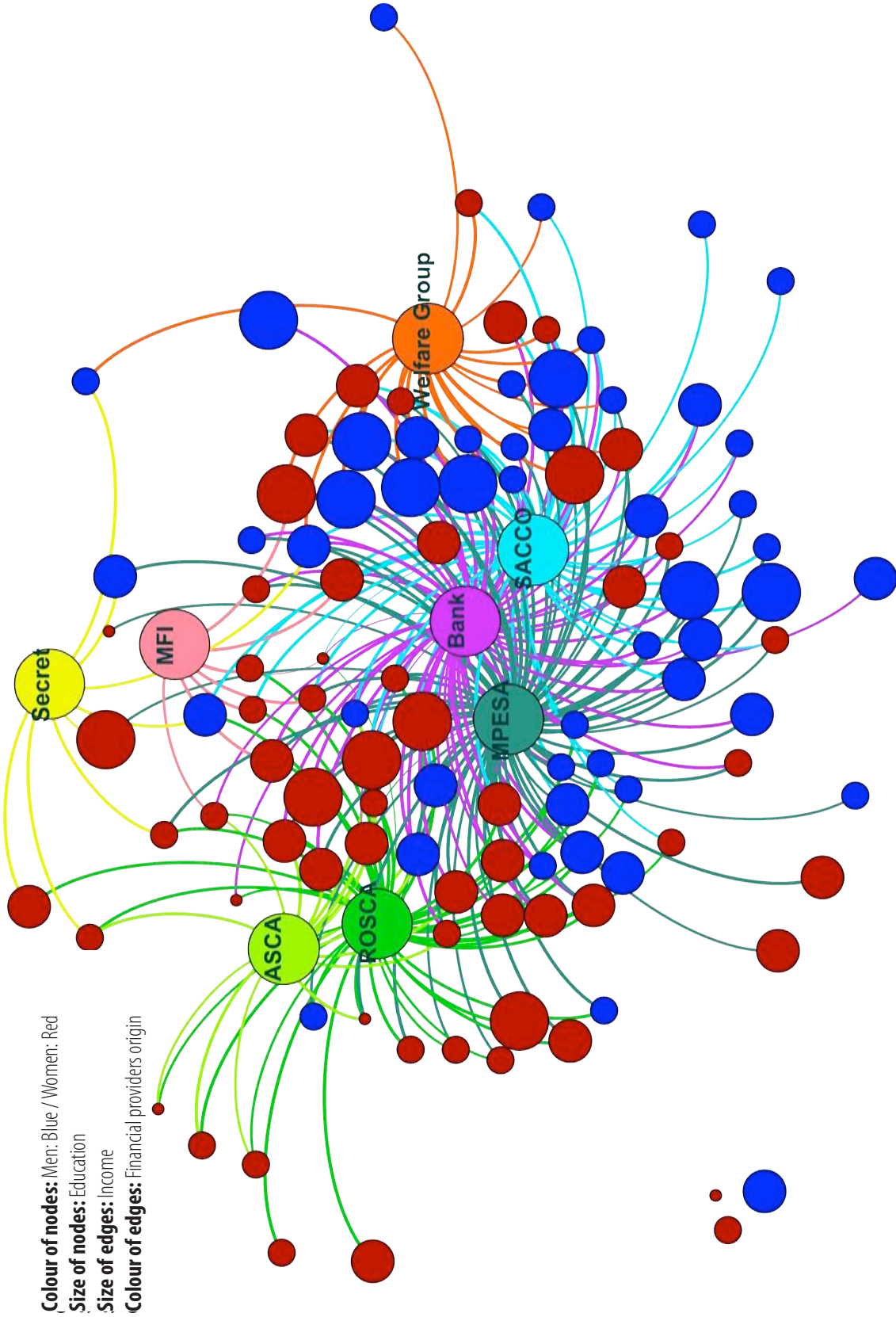


Figure 46: Visual representation of multiple use of financial services – Karatina/Kitui/Nyamira

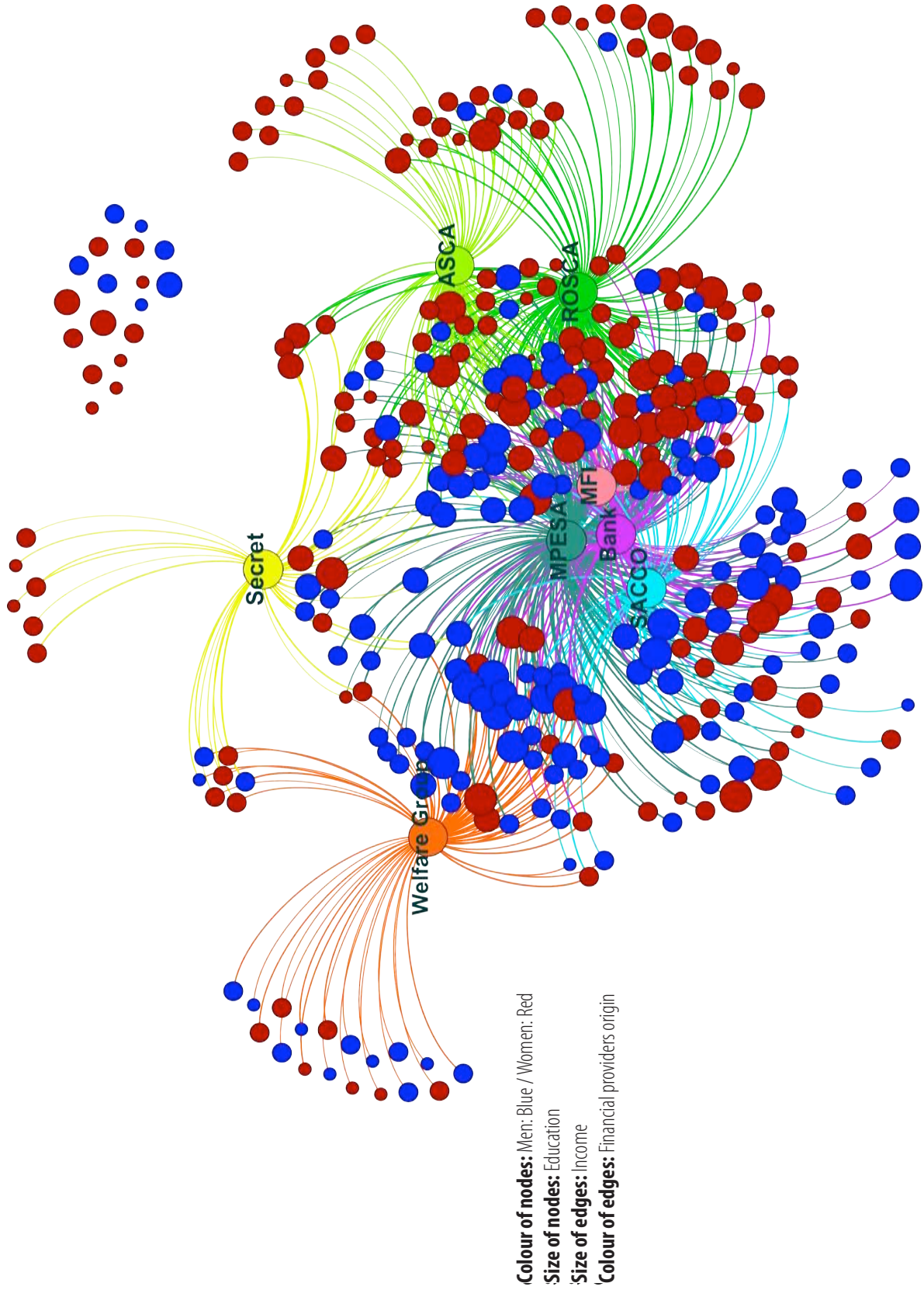


Figure 47: Visual representation of multiple use of financial services – Kitui

Colour of nodes: Men: Blue / Women: Red
Size of nodes: Education
Size of edges: Income
Colour of edges: Financial providers origin

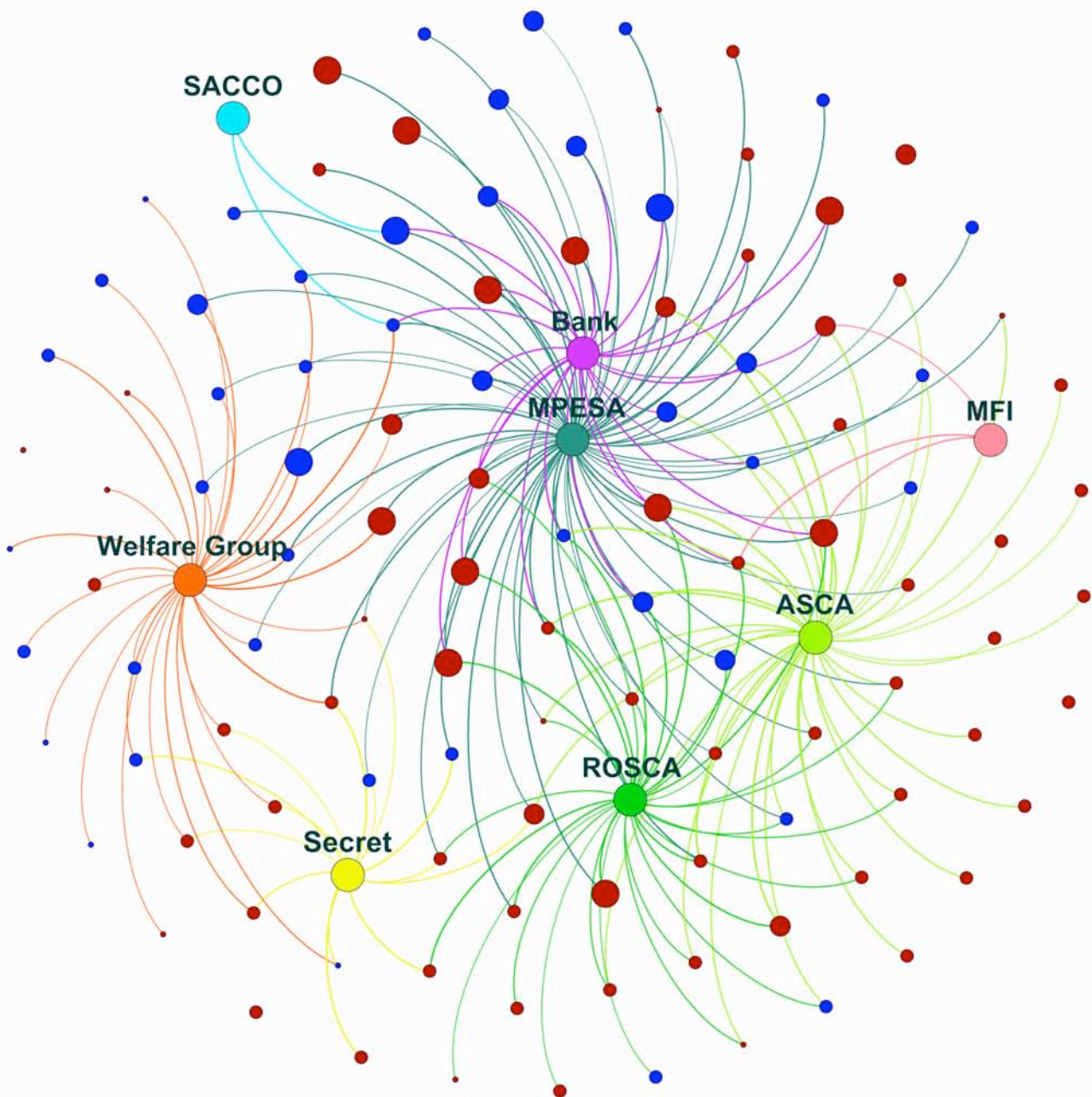


Figure 48: Visual representation of multiple use of financial services – Nyamira

Colour of nodes: Men: Blue / Women: Red
Size of nodes: Education
Size of edges: Income
Colour of edges: Financial providers origin

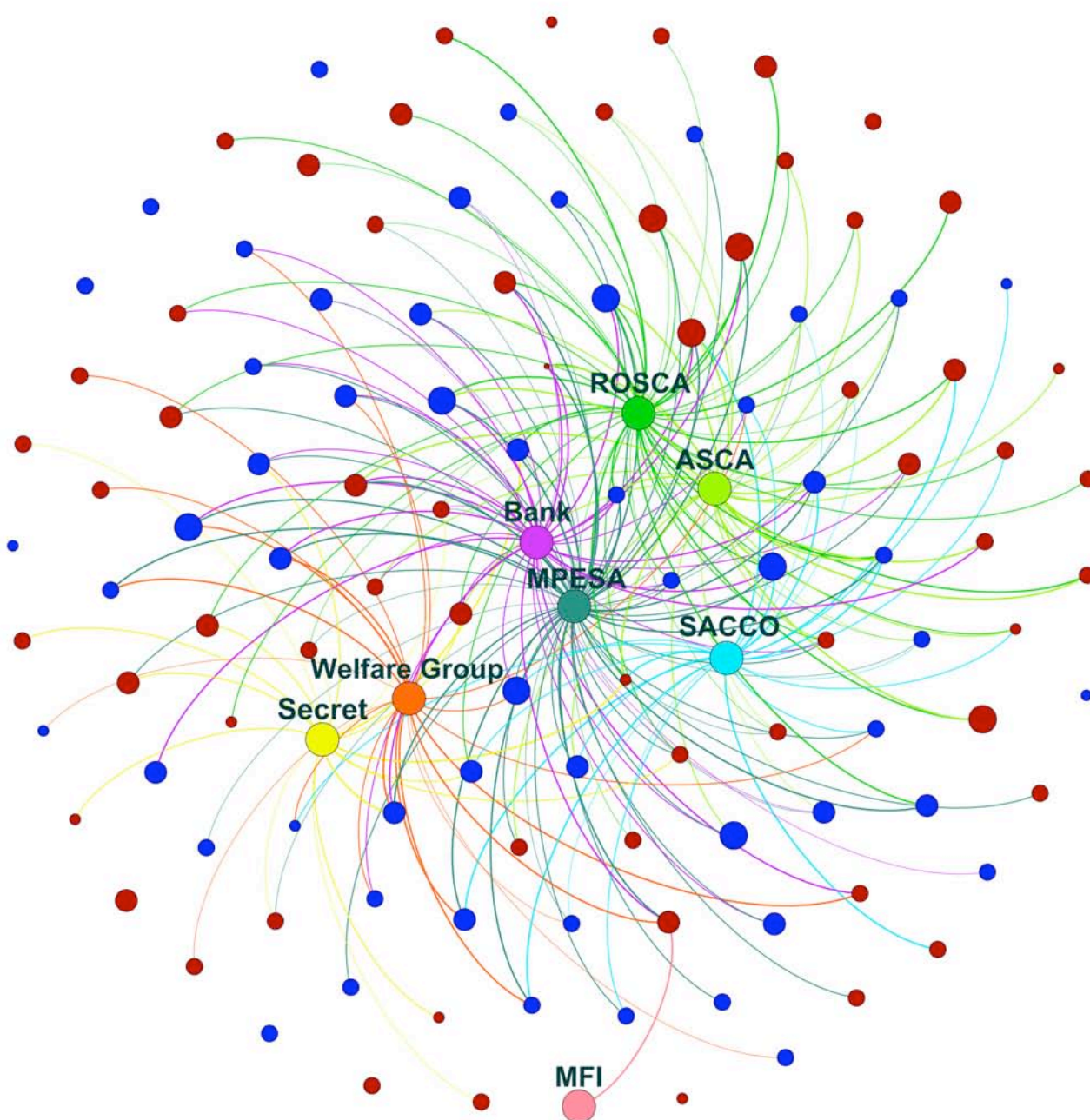


Figure 49: Visual representation of multiple use of financial services – Karatina

Colour of nodes: Men: Blue / Women: Red
Size of nodes: Education
Size of edges: Income
Colour of edges: Financial providers origin

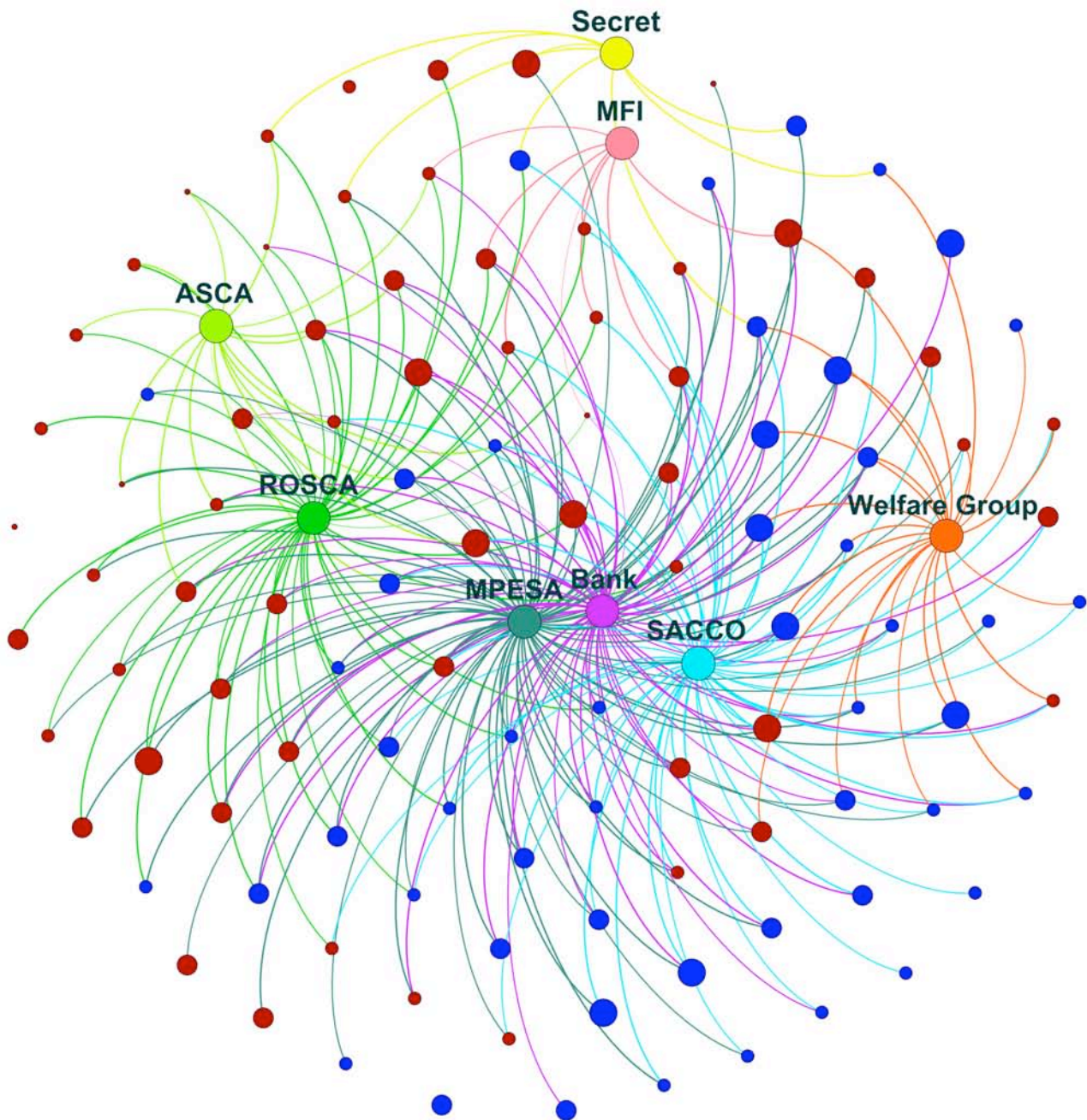
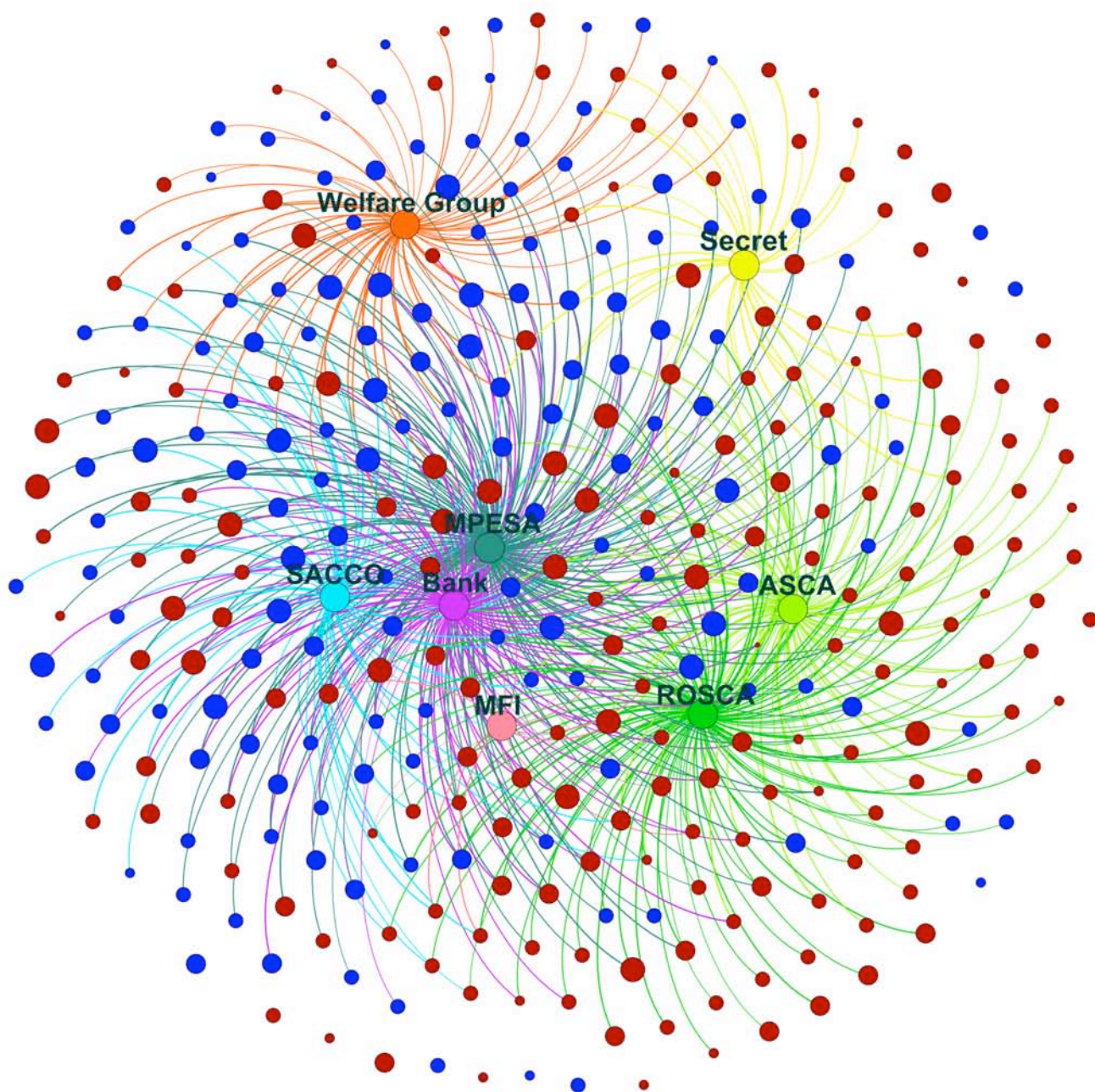


Figure 50: Visual representation of multiple use of financial services – Karatina/Kitui/Nyamira

Colour of Nodes: Men: Blue / Women: Red
 Size of nodes: Education
 Size of edges: Income
 Colour of edges: Financial providers origin



REFERENCES

1. IFPRI, 2004. Global Rural–Urban Mapping Project (GRUMP), Alpha Development Data, Africa and Asia Urban Masks, International Food Policy Research Institute, Washington D.C. <http://www.ifpri.org/dataset/global-rural-urban-mapping-project-grump>.
2. Fouillet, C and Johnson, S. (2011). « Spatial dimensions of the financial sector in Kenya 2006–2009 », in FSD Kenya (ed.), Financial inclusion in Kenya: results and analysis from FinAccess 2009, Financial Sector Deepening Kenya, Nairobi.
3. Fruchterman, T.M.J. and Reingold, E.M. (1991), "Graph drawing by force-directed placement", *Software: Practice and Experience*, 21(11), pp. 1129–1164.
4. Larmarange, J., 2006. "Cartographier les données des enquêtes démographiques et de santé à partir des coordonnées des zones d'enquête", Chaire Quételet, November 29–December 1, Université Catholique de Louvain, Louvain-la-Neuve.
5. Tatem, A.J., Noor, A.M., Von Hagen, C., Di Gregorio, A. and Hay, S.I., 2007. "High Resolution Population Maps for Low Income Nations: Combining Land Cover and Census in East Africa", *PLoS ONE*, 2(12), e1298. doi: 10.1371/journal.pone.0001298



