Social Network Analysis and Data Mining of Land Tenure Information in the Talking Titler System

Michael Barry & Kwame Asiedu
Chair in Land Tenure & Cadastral Systems
University of Calgary

XXV FIG Congress Kuala Lumpur
16 – 21 June 2014

Department of Geomatics Engineering
Schulich School of Engineering
University of Calgary
Position Yourself Ahead of the Crowd

Outline

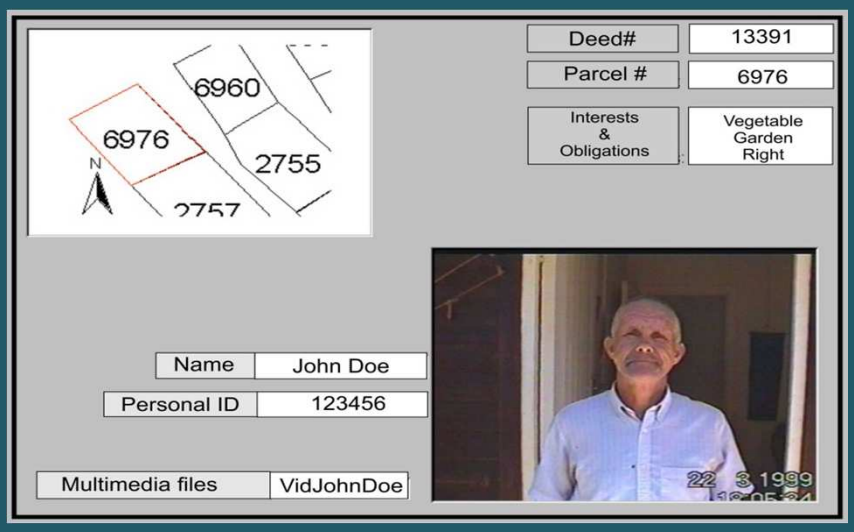
Context

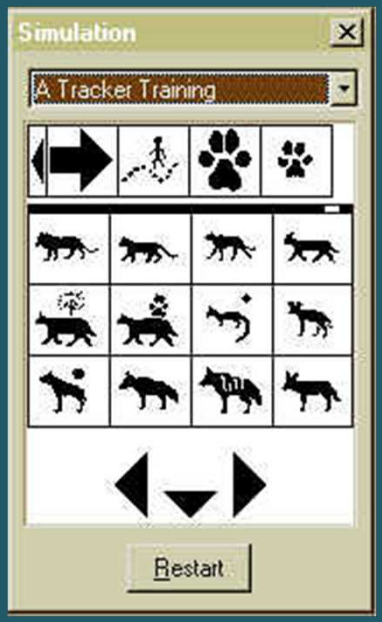
- Complexity in tenure relationships and changes in these relationships a challenge.
- Need to collect local level records before change occurs – accept that they'll be "disorganised"
- Examine these records e.g. stories, videos, from the bottom up – data analysis philosophy parallels with grounded theory or factor analysis

Structure

- Talking Titles approach and data model
- Exploratory experiment using changing customary system in a peri-urban area and simulated data.
- Visuals and critique of some of the graphs produced by network analysis

Early Talking Title 1999





Data Model – Flexibility the Priority

Can relate each class to itself and each other class

Parent Classes

Person	Reference Instrument	Land Object	Media Item

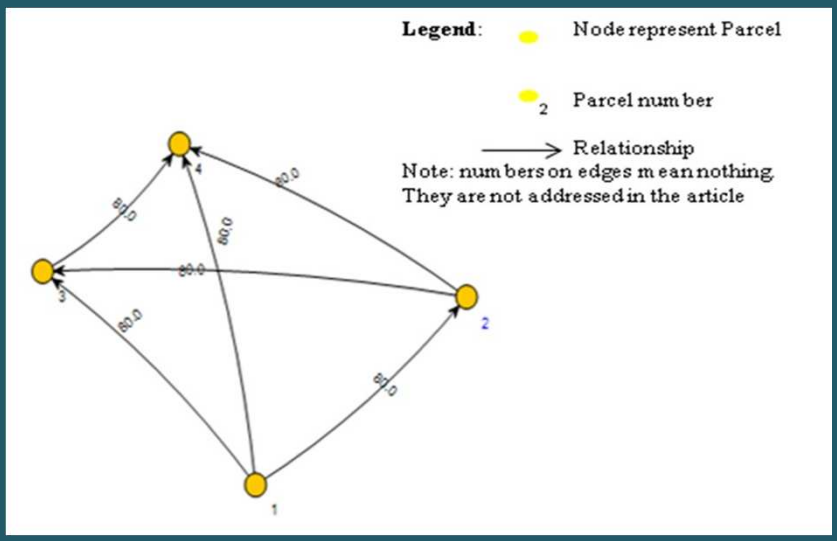
John Doe	14 Jones St	ID19420713	Free form description of entry
Jane Doe	14 Jones St	ID19621011	
Arthur Other	14 Jones St	ID19621011	

Relationships

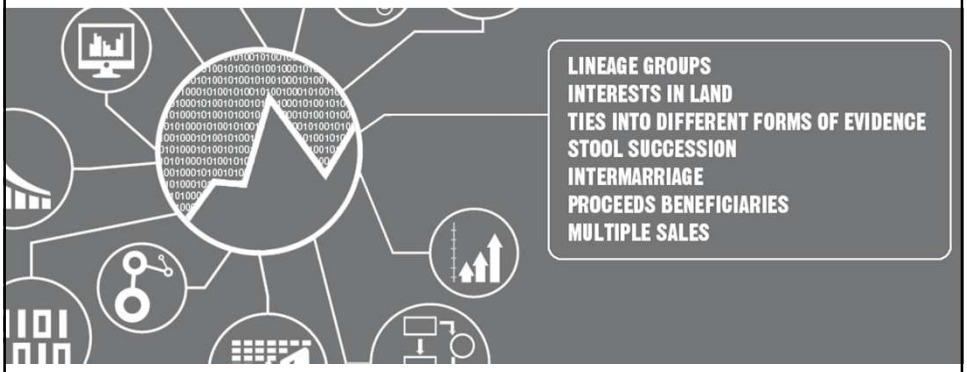
Person	Reference Instrument	Land Object	Media Item

Jane Doe	Daughter	Relationship: Expects to inherit house
Arthur Other	Adopted Son	Relationship: Expects usufruct rights

Parcel "Chain of Title" Network



What are we looking for in network analysis

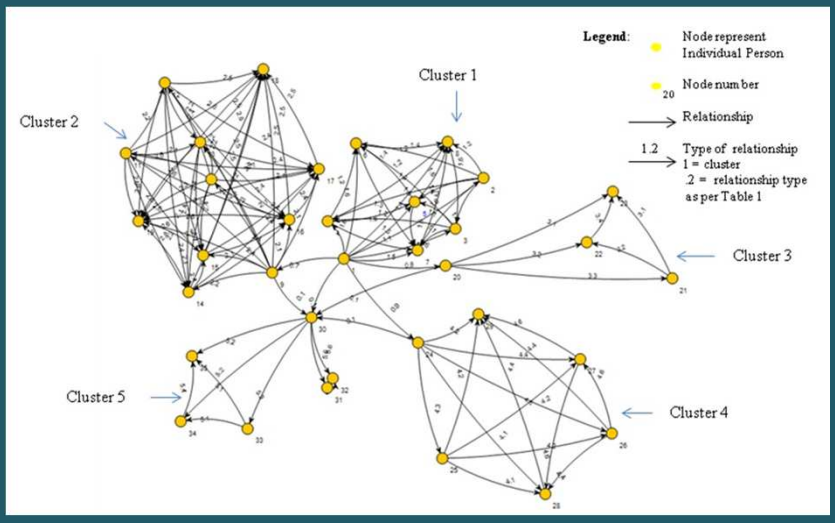


7

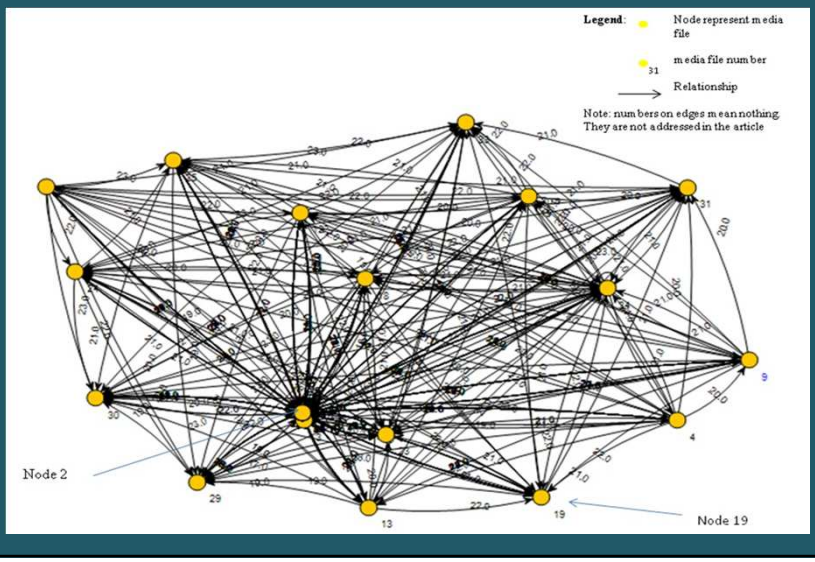
"Weights"

Weight Value	Relationship
1	Parent/Son
2	Parent/Daughter
3	Husband/Wife
4	Sibling/Sibling
5	Grandparent/Grandchild
6	Other(in-law, cousin, aunt, uncle, nephew etc)
0.7	Lender/Borrower
0.8	Seller/Buyer
0.9	Land owner/Share cropper
0.1	Land surveyor

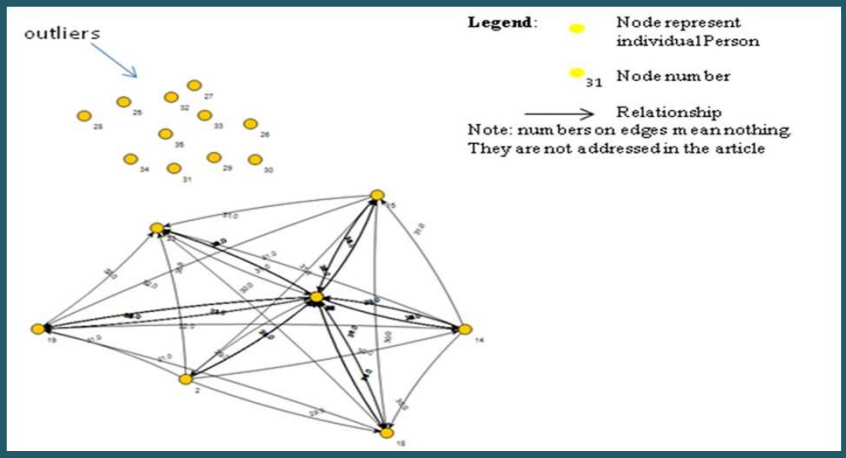
Person-to-Person Network



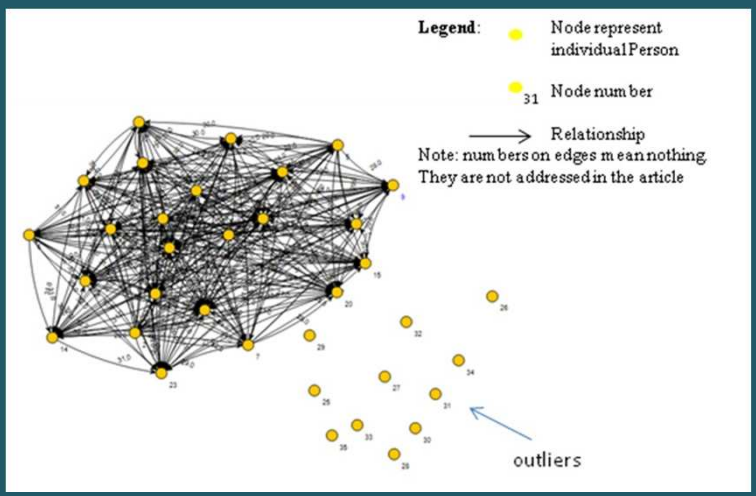
Media-Media Network – folded Person-Media Network



Person-Person in Person-land Relationships



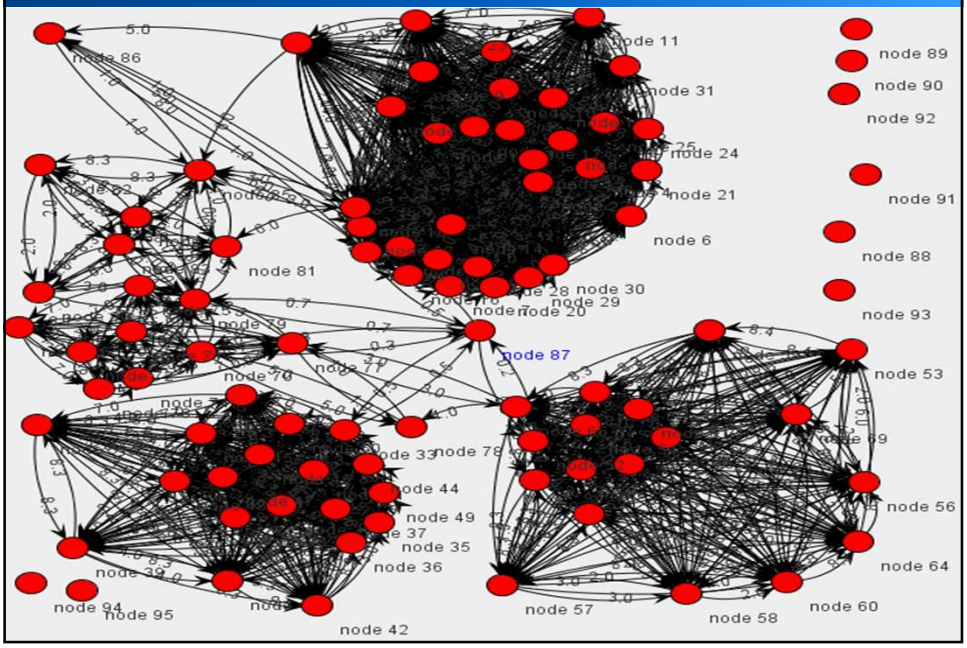
Person-Person folded Person-Media Relationships



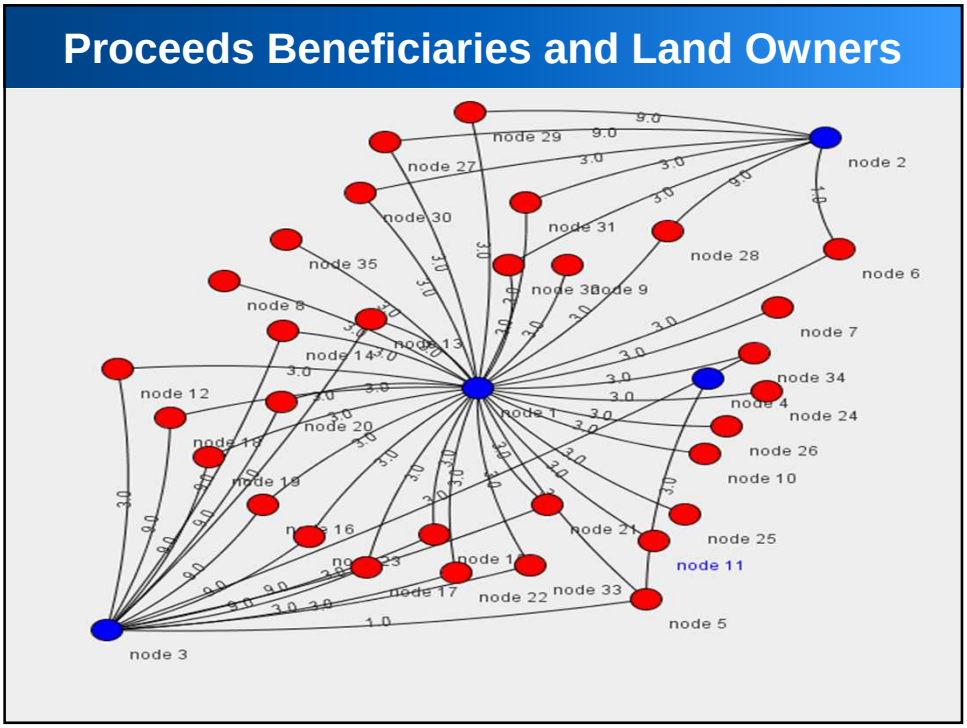
Problems!

- Go out and collect and relate everything and anything – create a mess
- Did this through simulation of keywords and relationships and what does the mess look like?
- Look at the mess and then focus on particular entities (e.g. persons) or relationship types – e.g. who is selling land.

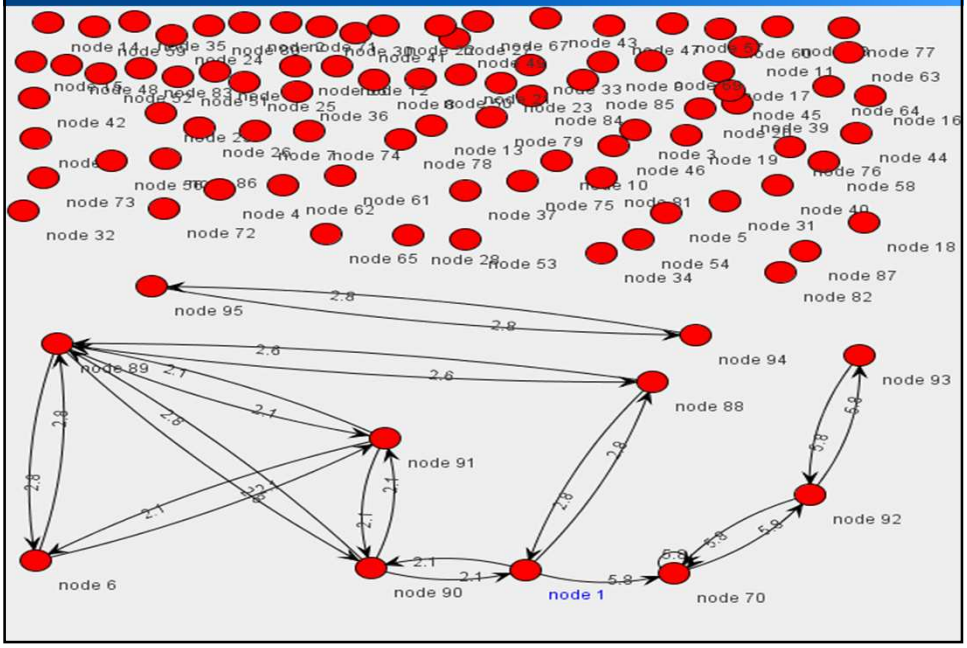
Lineage, Stool Succession & Intermarriage



Proceeds Beneficiaries and Land Owners



Multiple Land Sales (Family A)



Conclusions

- Tool for visualising and exploring data
- May be useful in identifying strategies that people use to defend their tenure and the complex relationships involved in this.
- Useful in monitoring change and forecasting problems as relationships change
- Useful in identifying mistakes in land records
- Useful for small data sets – i.e. local level
- Getting the data – useful in future, how do we persuade people to collect data now?
- Need institutions prepared to work at micro-level