Technology Networks for Conservation Agriculture: Tororo, Uganda

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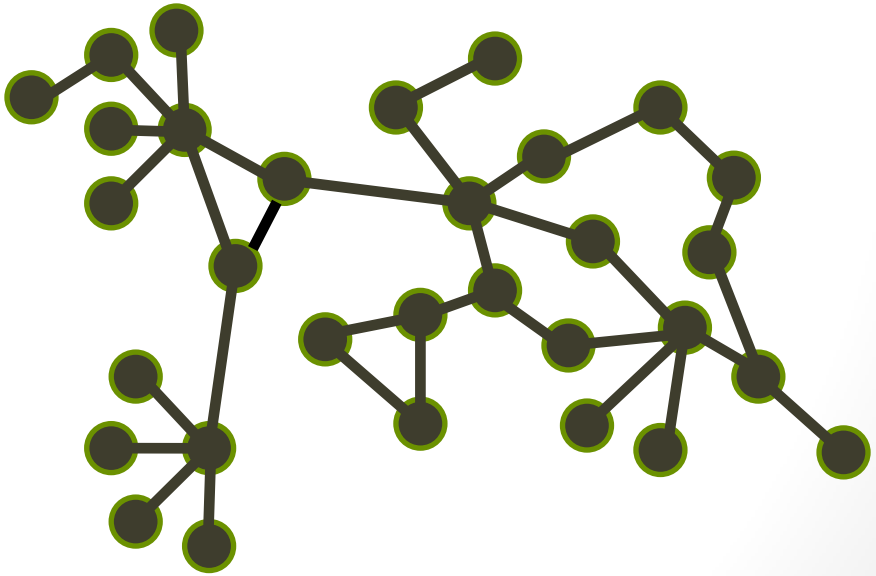

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Introduction

- Successful Conservation Agriculture requires:
  - Broad based support network
  - Change in mindset regarding agricultural production practices
- Everyone has to be involved
  - Why we have tried to bring you all here today

Research Process

- Focus Groups in 2010
  - Identify key contacts for agricultural production
  - List of 19 occupations generated
- Survey conducted in 2010
  - 93 farm households were asked about their key contacts for agricultural information/resources in Molo Sub-county
    - Kidoko and Kipangor Parishes
  - Follow up “Technology Networks” interviews conducted in 2011 with 15 individuals
    - Community agents
    - Agricultural service providers

Research Aims

- Understand existing mindsets with regard to agricultural production
  - Especially with regard to conservation agriculture
- Map the structure of agricultural production networks in Tororo
  - Key nodes in the network
    - For farmers
    - In the whole agricultural production network
  - Knowledge and beliefs about CA
    - Differences between farmers and service providers/community agents

Farmer Involvement in Networks

Variable	Observations	Mean	Standard Deviation	Min Value	Max Value
Resource Contacts	93	2.84	1.87	0	9
Information Contacts	93	2.76	1.78	0	9

Key Resource Contacts for Farmers

Agent Type:	Number of Reports (Out of 93):	Percentage of Farmers Reporting Contact:
Veterinary Service provider	40	43%
Neighbor/friend	38	41%
Vendor in a agro-vet shop	37	40%
Vendor in weekly market	29	31%
NGO/ Development Agent	18	19%
Family Member	17	18%
Vendor in a shop in urban center	13	14%
Leader of farmer organizations	11	12%
Leader of women's organization	11	12%
Village/Subcounty chief	9	10%
Agricultural/Micro Finance Representative	4	4%
Teacher in village	1	1%
Government Parastatals	1	1%
Agricultural researcher	1	1%
Leader of youth organisation	1	1%
Minister/Priest/Imam in village	0	0%
Government Extension agent	0	0%
Tractor owner/ animal traction provider	0	0%
Local Political leaders	0	0%

Key Information Contacts for Farmers

Agent Type:	Number of Reports (Out of 93):	Percentage of Farmers Reporting Contact:
Government Extension agent	39	42%
Veterinary Service provider	39	42%
Vendor in a agro-vet shop	35	38%
Neighbor/friend	31	33%
NGO/ Development Agent	21	23%
Vendor in weekly market	20	22%
Family Member	15	16%
Vendor in a shop in urban center	13	14%
Leader of women's organization	13	14%
Leader of farmer organizations	12	13%
Village/Subcounty chief	7	8%
Agricultural/Micro Finance Representative	4	4%
Teacher in village	2	2%
Leader of youth organization	2	2%
Local Political leaders	2	2%
Government Parastatals	1	1%
Agricultural researcher	1	1%
Minister/Priest/Imam in village	0	0%
Tractor owner/ animal traction provider	0	0%

Analyzing Network Structure

- Matched the farmer data (93) to Technology Networks Data (15)
- Determine Influential Nodes:
  - Degree Centrality = Number of contacts for agricultural information
  - Betweenness Centrality = Score which indicates the extent to which an agent controls the transmission of information between contacts

Rank	Agent Type	Degree Centrality	Betweenness Centrality
1	Farm Organization Leader	20	20.42
2	Government Parastatal	19	19.84
3	Urban Agrovet	19	15.09
4	Local Agrovet	19	14.39

Knowledge and Beliefs about Agricultural Production

Focus on the Three Principles of CA:

1. Crop rotation
2. Maintaining a permanent crop cover
3. Minimizing tillage

Corresponding statements on questionnaire:

- "Rotating crops is always best practice"
- "One should maintain a permanent crop cover"
- "Tillage causes land degradation"

- Farmers indicated agreement on a scale of 1-5
  - 5 = "strongly agree"
  - 1= "strongly disagree"

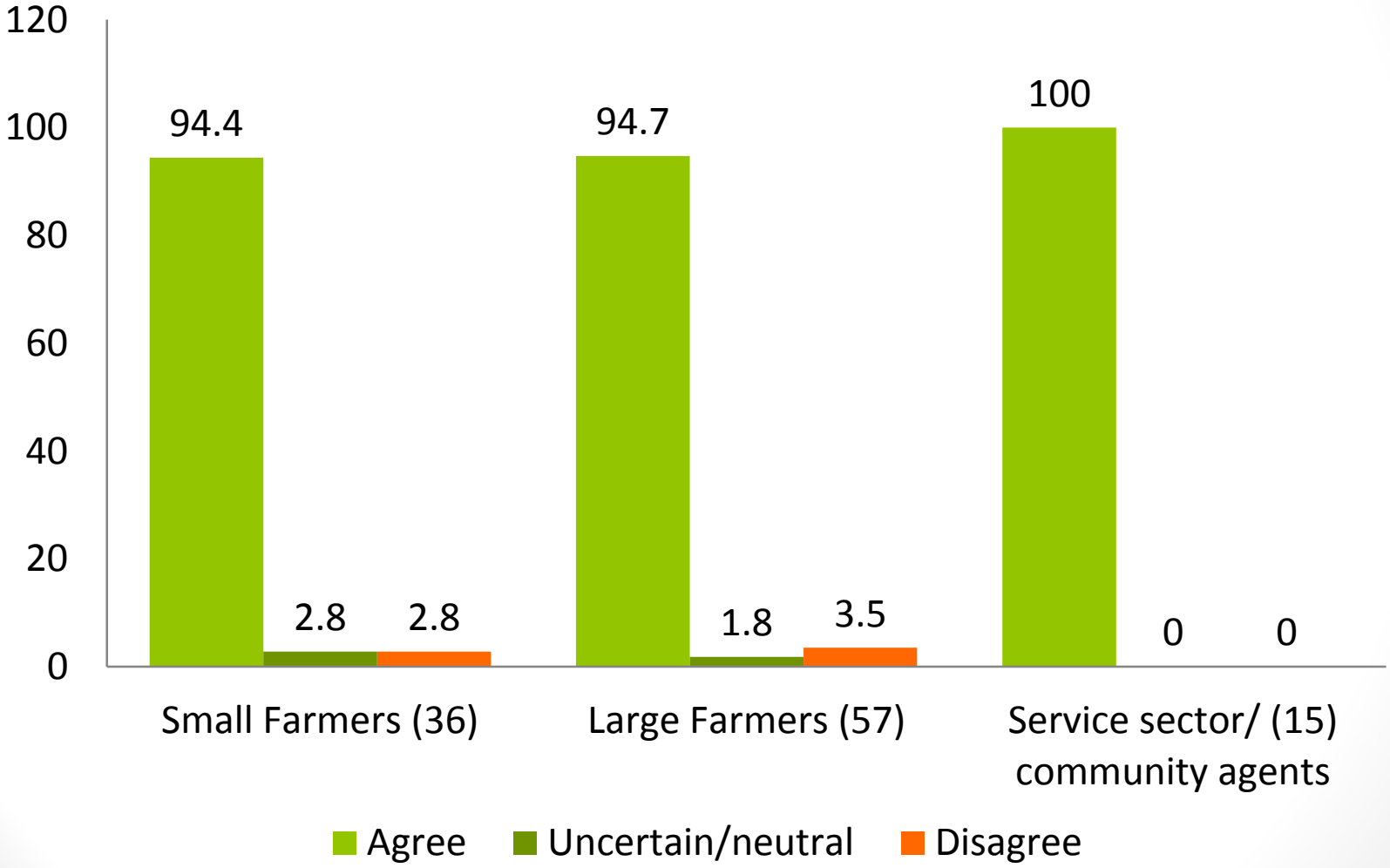
Disaggregating Knowledge and Beliefs about Agricultural Production

- Differences between farmers and community agents/service providers?
  - Farmers (n=93)
  - Service Providers (n= 15)
- Differences between smaller and larger farmers?
  - Are small or large farmers more predisposed to CA?
    - Small farmer = 3 acres or less (n= 36)
    - Large farmer = more than 3 acres (n=57)
- Differences between farmers with extension contact and without extension contact?
  - Extension might expose farmers to CA views?
    - Farmers with extension contact (n = 39)
    - Farmers without extension contact (n=54)

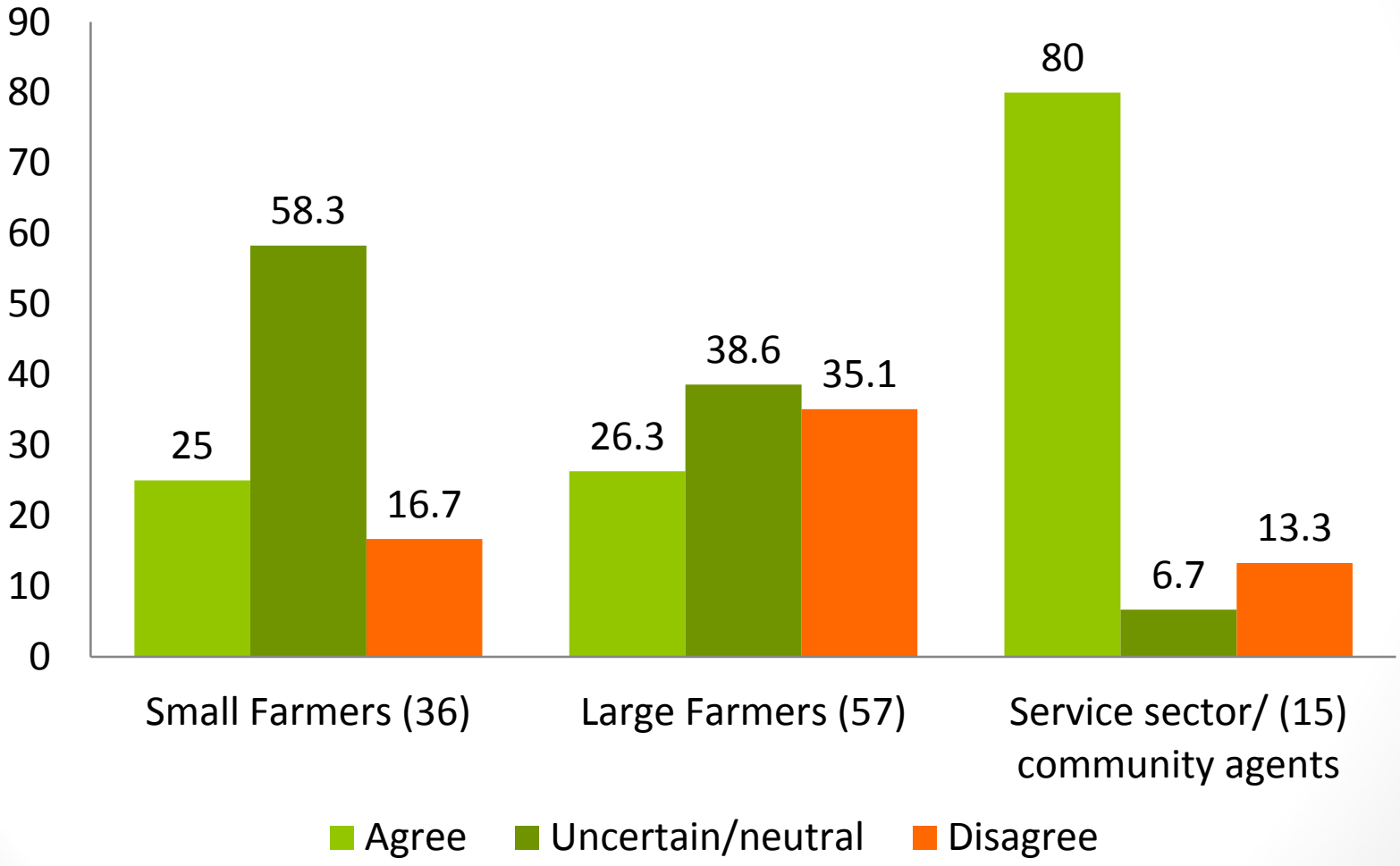
Knowledge and Beliefs about Agricultural Production

Beliefs about Conservation Agriculture by Stakeholder Groups		Agree (%)	Uncertain/ neutral (%)	Disagree (%)
One should maintain a permanent crop cover	Small Farmers (36)	25.0	58.3	16.7
	Large Farmers (57)	26.3	38.6	35.1
	Service sector/ (15) community agents	80.0	6.7	13.3
Tillage causes land degradation	Small Farmers (36)	30.6	36.1	33.3
	Large Farmers (57)	42.1	28.1	29.8
	Service sector/ (15) community agents	66.7	0.0	33.3
Rotating crops is always best practice	Small Farmers (36)	94.4	2.8	2.8
	Large Farmers (57)	94.7	1.8	3.5
	Service sector/ (15) community agents	100.0	0.0	0.0

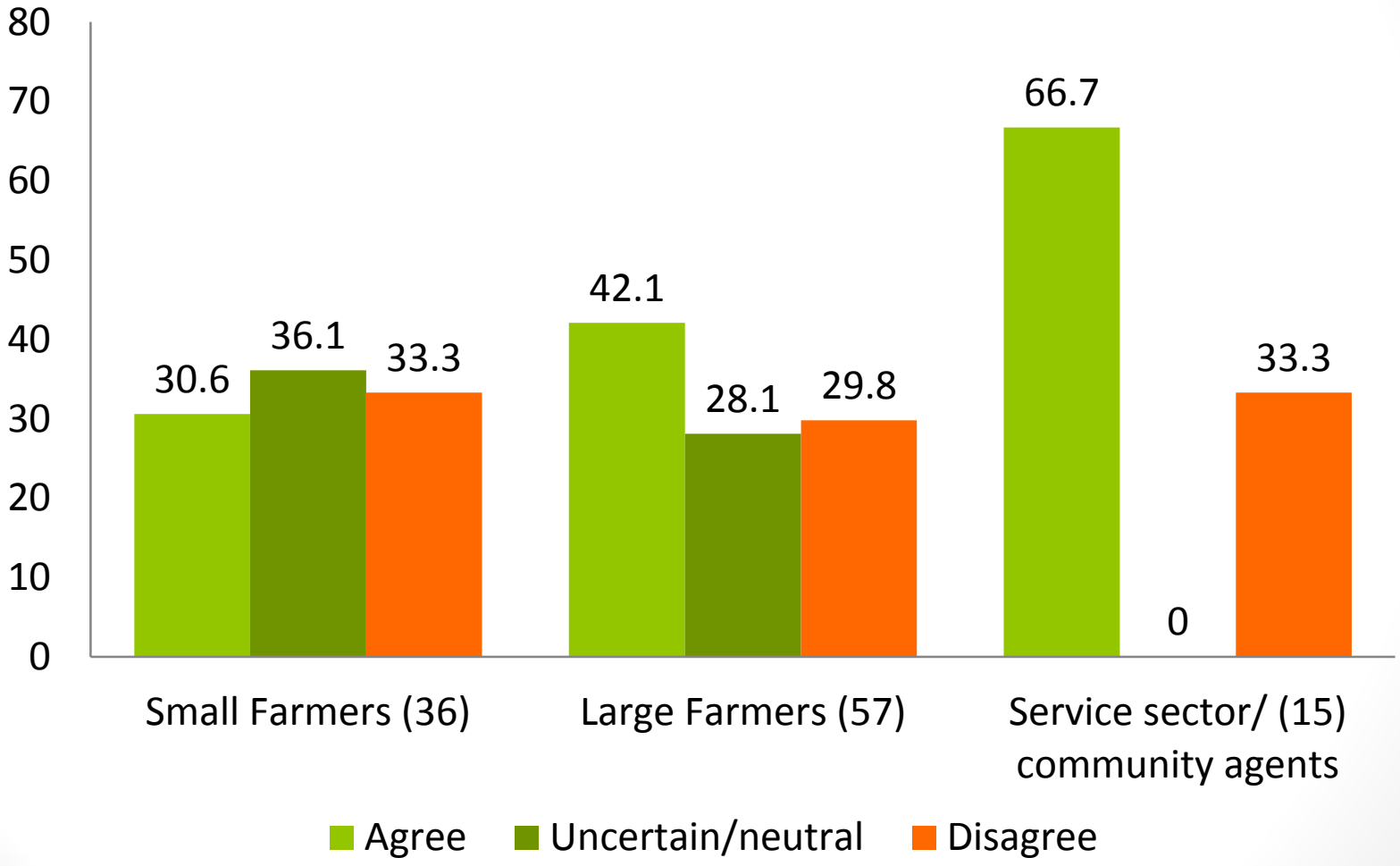
Rotating Crops is Best Practice



One Should Maintain a Permanent Crop Cover



Tillage Causes Land Degradation



Impact of Extension Contact on Knowledge and Beliefs

One should maintain a permanent crop cover	Agree	Uncertain/ neutral	Disagree	Mean values
Farmers w/o contact (n=54)	29.6	40.7	29.6	2.96 [a]
Farmers with contact (n=39)	20.5	53.8	25.6	2.83 [a]
Service sector/community agents (n=15)	80.0	6.7	13.3	4.13 [b]

Note= different letters in the same column are significantly different from one another

Impact of Extension Contact on Knowledge and Beliefs

Tillage causes land degradation	Agree	Uncertain/ neutral	Disagree	Mean values
Farmers w/o contact (n=54)	31.5	31.5	37.0	2.94 [a]
Farmers with contact (n=39)	46.2	30.8	23.1	3.33 [a]
Service sector/community agents (n=15)	66.7	0.0	33.3	3.40 [a]

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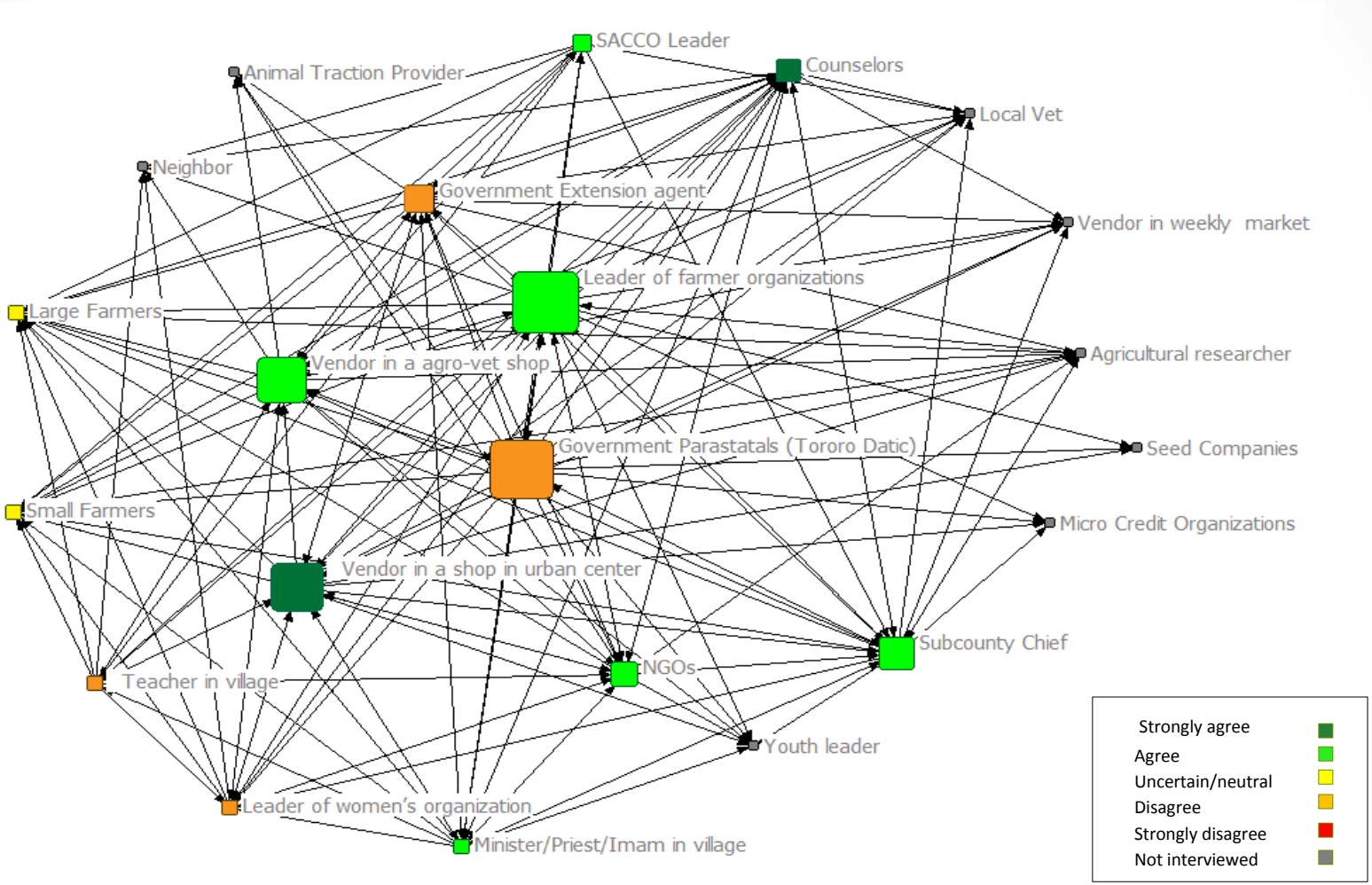
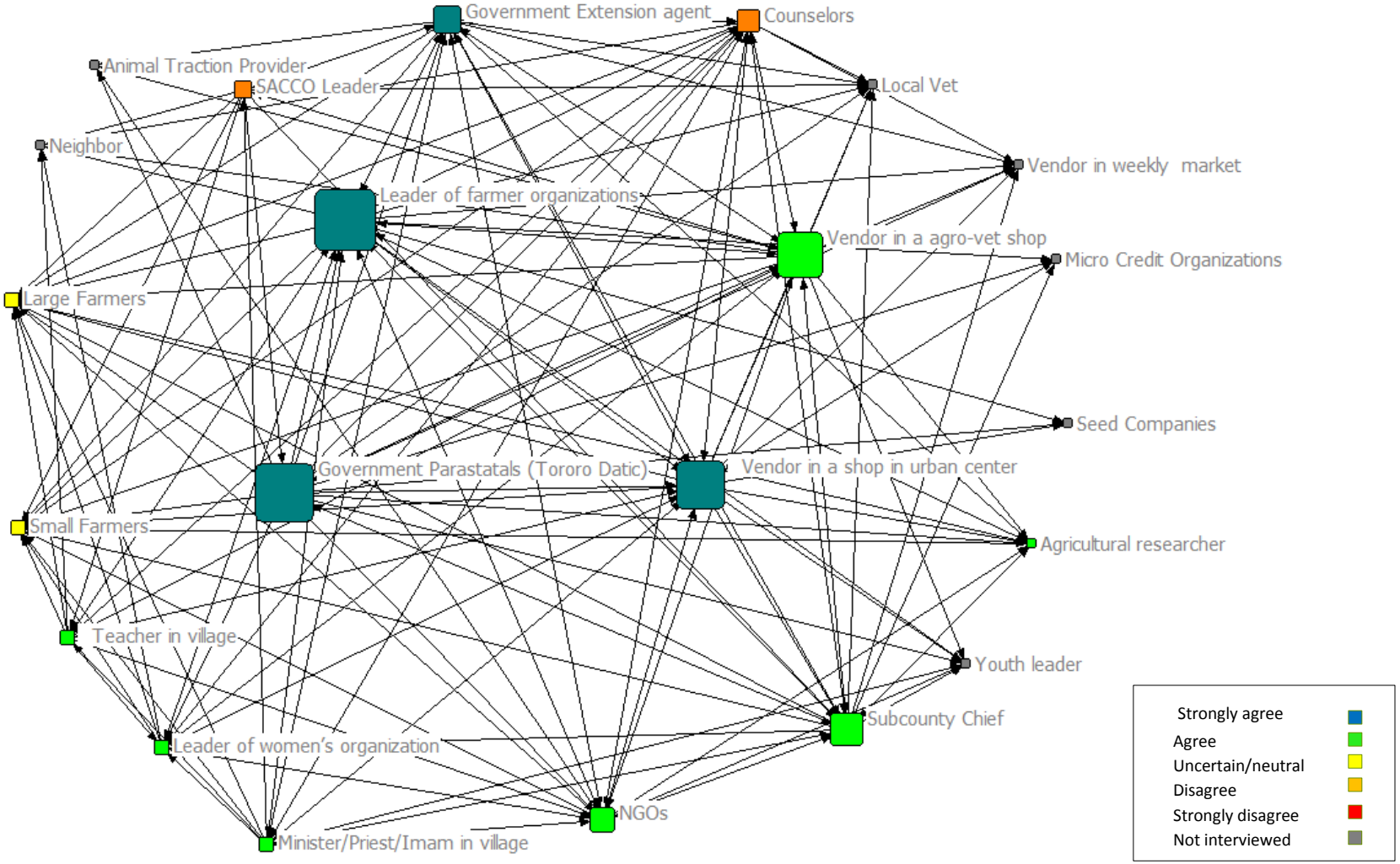
MAPPING KNOWLEDGE AND BELIEFS ABOUT AGRICULTURAL PRODUCTION NETWORKS



Tillage Causes Land Degradation

Mapped network of information flows and beliefs about agricultural production



One Should Maintain a Permanent Crop Cover

Mapped Information flows and beliefs about agricultural production

How can we use this information to design a strategy to scale up CA?

- Who are the important groups to be reached?
- How can we better connect them to information and resources?
  - About agriculture?
  - About CA?
- What strategies are most appropriate for these groups?
  - Education?
  - Demonstrations?
- What are the remaining technical issues to be resolved for successful CA in Tororo?
  - Who needs to be brought together to resolve these issues?

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