



Sweetpotato seed tracing in Geita Region, Tanzania

RTB Seed System Toolbox
Course:
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RESEARCH
PROGRAM ON
Roots, Tubers
and Bananas

Research problem

- Seed systems & genetic gains at farm level:
 - Access to quality seed of improved varieties
 - Higher variety turnover
 - Increased productivity
- Roots, tubers and bananas (RTBs) seed systems largely informal:
 - Easily propagated through vegetative parts
 - Vegetative seed is bulky, perishable, and prone to carrying pests and pathogens

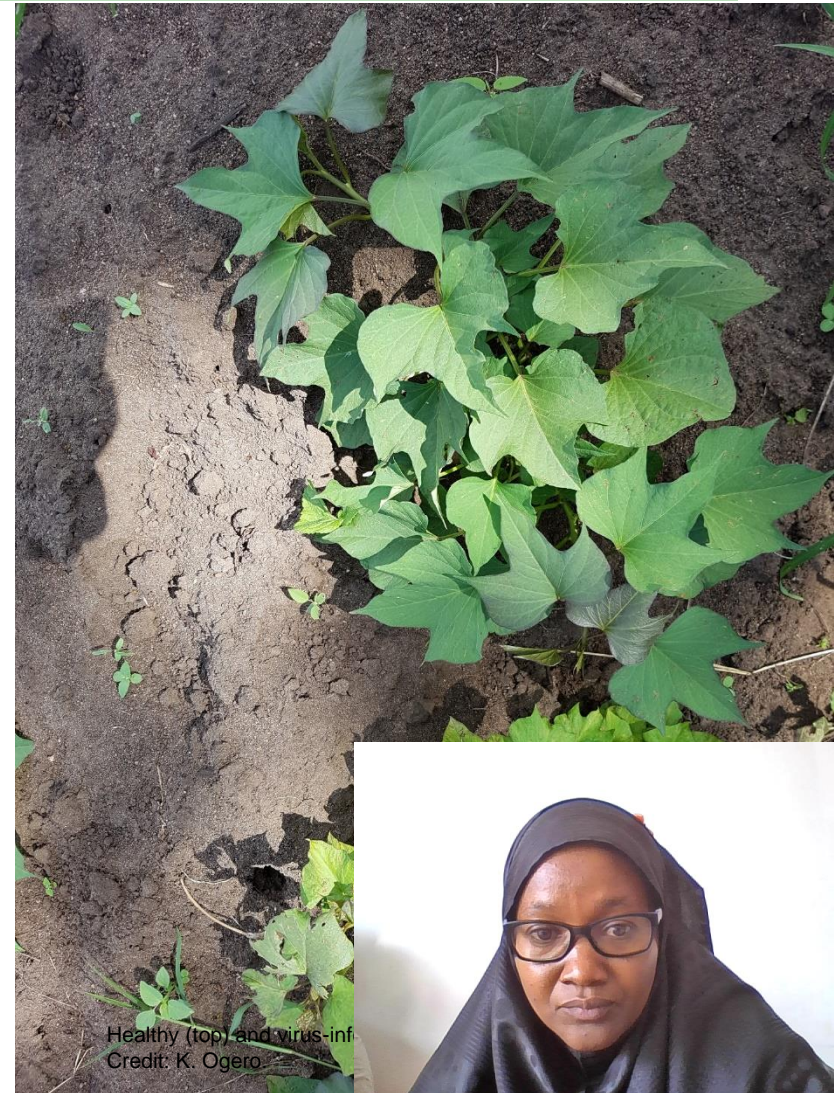


A farmer carrying sweet
Tanzania. Credit: K. Og



Research problem

- Vegetative nature of RTB seed makes recycling easy leading to:
 - Accumulation of pathogens within the plant.
 - Challenge to establishing sustainable seed systems
- It is easy for farmers to share RTB seed
- Improving RTB seed systems requires characterization of current patterns, behaviors and values associated with exchange of seed.



Background

- We assessed patterns around acquisition and sharing of seed in two districts in Geita Region, Lake Zone, Tanzania
- The Lake Zone leads in sweetpotato production
- Yellow- and white-fleshed varieties dominate
- Increasing appreciation of orange-fleshed varieties
- Mostly grown by smallholders on less than 1 ha for subsistence purposes
- Majority of growers are women: household food security



- Men dominate in more commercial areas
- Constraints in adoption of improved varieties



Background

- > 95% of seed flows are farmer-based: own fields & neighbors
- Unimodal rainfall areas: low availability of seed at start of rains, but higher willingness to pay (WTP)
- Bimodal rainfall areas: all year availability of seed; but accumulation of diseases & pests. Lower WTP.



Clean vine cuttings. Tanzania. Credit: K. Ogero.

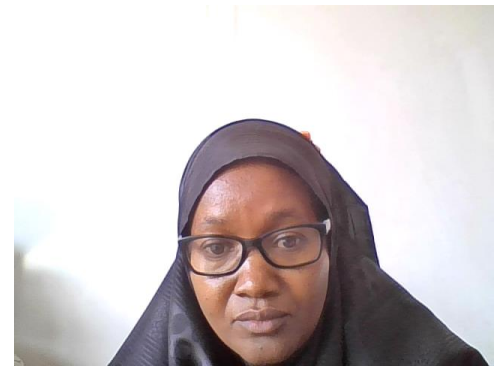


Traditional vine multipliers
Credit: K. Ogero.



Objectives

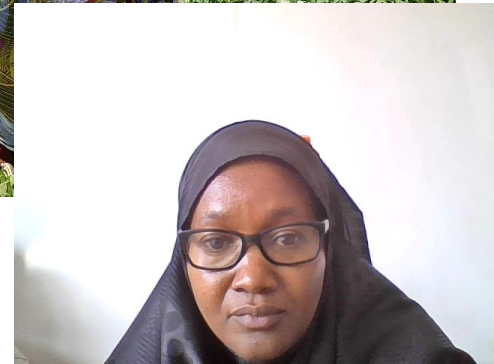
1. Understand how sweetpotato seed of released varieties and landraces is shared among different types of farmers in the Lake Zone, Tanzania.
1. Assess the linkages between “formal” and “informal” seed actors and how they could be strengthened to accelerate dissemination of new varieties and quality seed.
 - *i.e. who shares with whom and under what conditions/what type of transactions, and why this is important*



Research questions

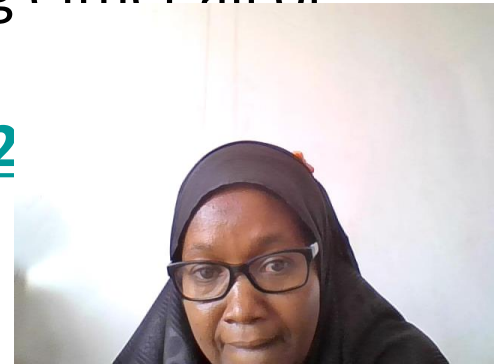
Can a largely informal seed system provide smallholder farmers with improved varieties generated by formal breeding programs?

- i. How does seed of improved varieties and landraces diffuse through farmer-to-farmer transactions?
- ii. Are there differences in access and sharing of sweetpotato seed among male and female farmers?
 - a. Relationship between provider & recipient
 - b. Information shared (variety, quality, quantity ...) and mode (face-to-face, cell phone, other)
- iii. What modes of transaction dominate farmer-farmer dissemination of sweetpotato seed?
 - a. Transaction types (cash, gift, barter, farmer-to-farmer exchange ...)
 - b. Volumes
 - c. Frequency



Method

- We used the [Seed Tracing](#) tool which uses a survey to describe the links between actors of a seed system
(Kilwinger, F.B.M. and Buddenhagen, C.E. 2021. Description sheet to seed tracing. Lima (Peru). CGIAR Research Program on Roots, Tubers and Bananas (RTB). Available online at: www.rtb.cgiar.org) to map seed flows in the study area.
- Snowball sampling was used. The first respondents were purposively selected with the help of extension officers and interviewed. This was followed by interviewing either all or an unbiased sample of their connections.
- Adapted a questionnaire from [Delaquis et al. 2](#)

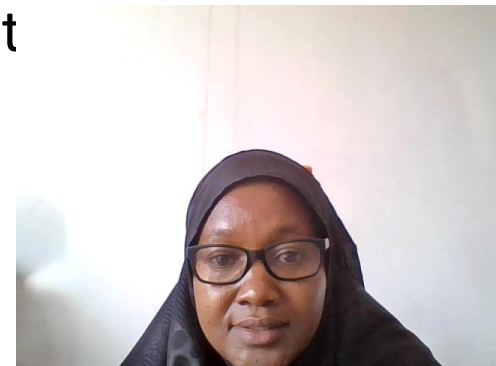


Method

- 158 farmers in two districts were interviewed as follows:

District	Female	Male	Total
Bukombe	40	44	84
Geita DC	54	20	74
Total	94	64	158

- Aged between 19 to 75 years old
- Interviews were held either at home, community area or the field.
- 10 villages were covered in the two districts



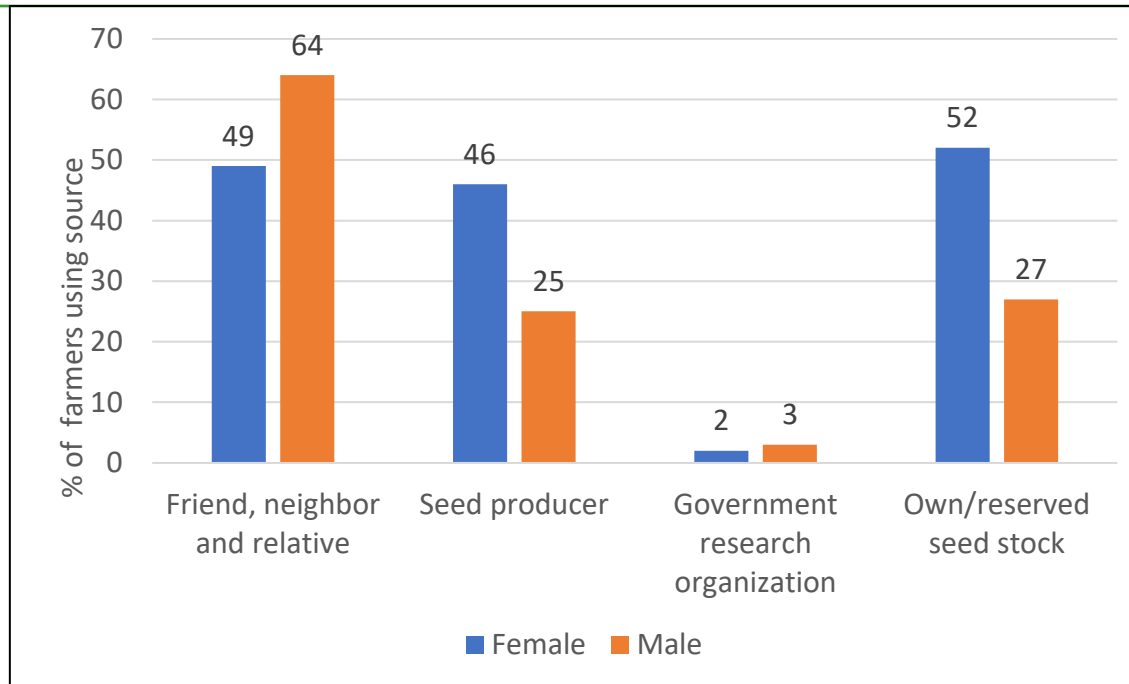
Method

- SPSS was used to analyze the frequencies of answers to identify differences and trends in :
 - Seed acquisition & provision
 - Seed recycling
 - Mode of transaction
 - Information sharing
- A social network analysis was conducted using R to map the seed flows i.e. where seed came from and where and therefore identify the key nodes in the system



Results (1): Sourcing of seed

The sources from where female (n=94) and male farmers (n=64) acquired seed for planting



*More than one source possible per farmer

- Seed was mostly sourced from close social networks
- Those who had accessed seed from TARI were seen to use the same seed in the next season
- 79% of male farmers and 64% female said they would use the same seed in the next season



Results (2): Mode of transaction and sourcing

The link between mode of transaction and source disaggregated into male (211) and female (n=359)

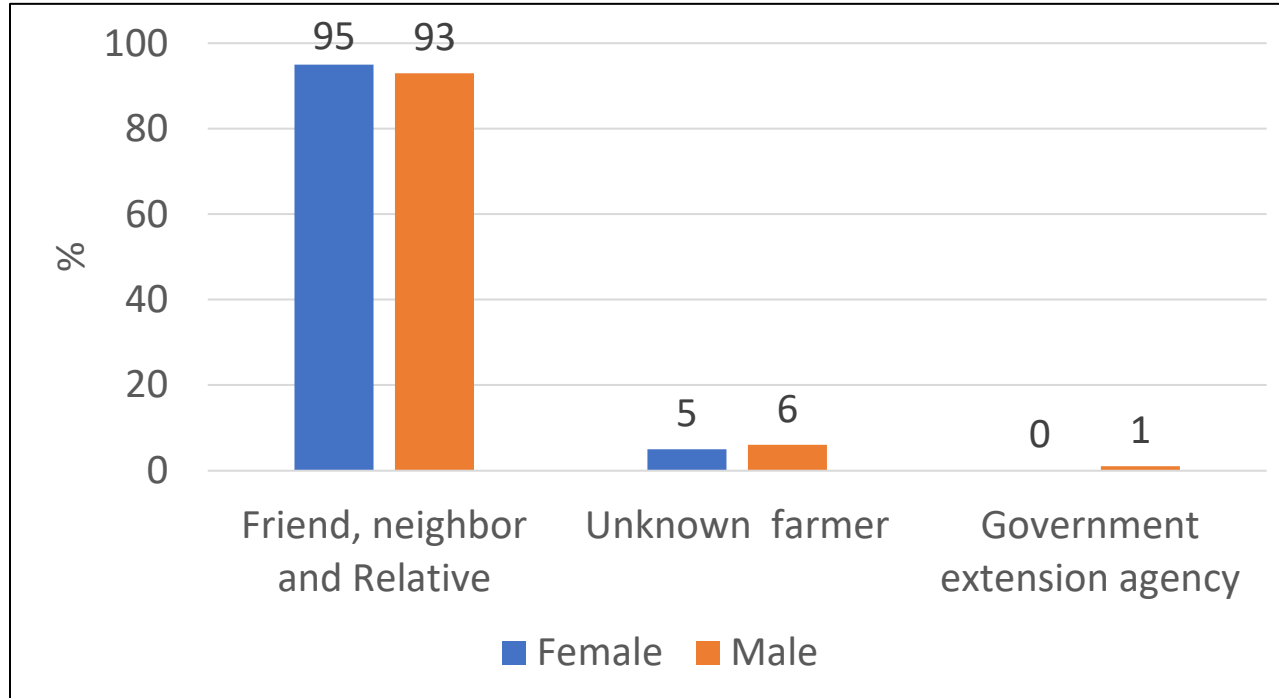
Mode of transaction	Sex and source					
	Female			Male		
	Friend, neighbor & relative	Seed producer	Govt. research	Friend, neighbor & relative	Seed producer	Govt. research
Barter	5(2%)	2(2%)	0	0	0	0
Gift	152(70%)	63(48%)	12(100%)	120(83%)	14(28%)	16(100%)
Buy	60(28%)	65(50%)	0	25(17%)	36(72%)	0
Total	217(100%)	130(100%)	12(100%)	145(100%)	50(100%)	16(100%)

- Gifting dominated acquisition of seed from close relations
- Almost equal number of cash transactions and gifting of seed from seed producers by female farmers
- Male farmers had more cash-based acquisition of vines from
- 79% of male farmers and 64% female said they would use the next season



Results (3): Sharing of seed

Categories of female (n=93) and male (n=86) seed recipients



- Seed was mostly shared with friends, neighbors and relatives
- Indicates that most sweetpotato is shared within communities



Results (4): Mode of transaction and sharing of seed

The link between mode of transaction and seed sharing disaggregated into transactions of female (n=337) and of male (n=439) respondents

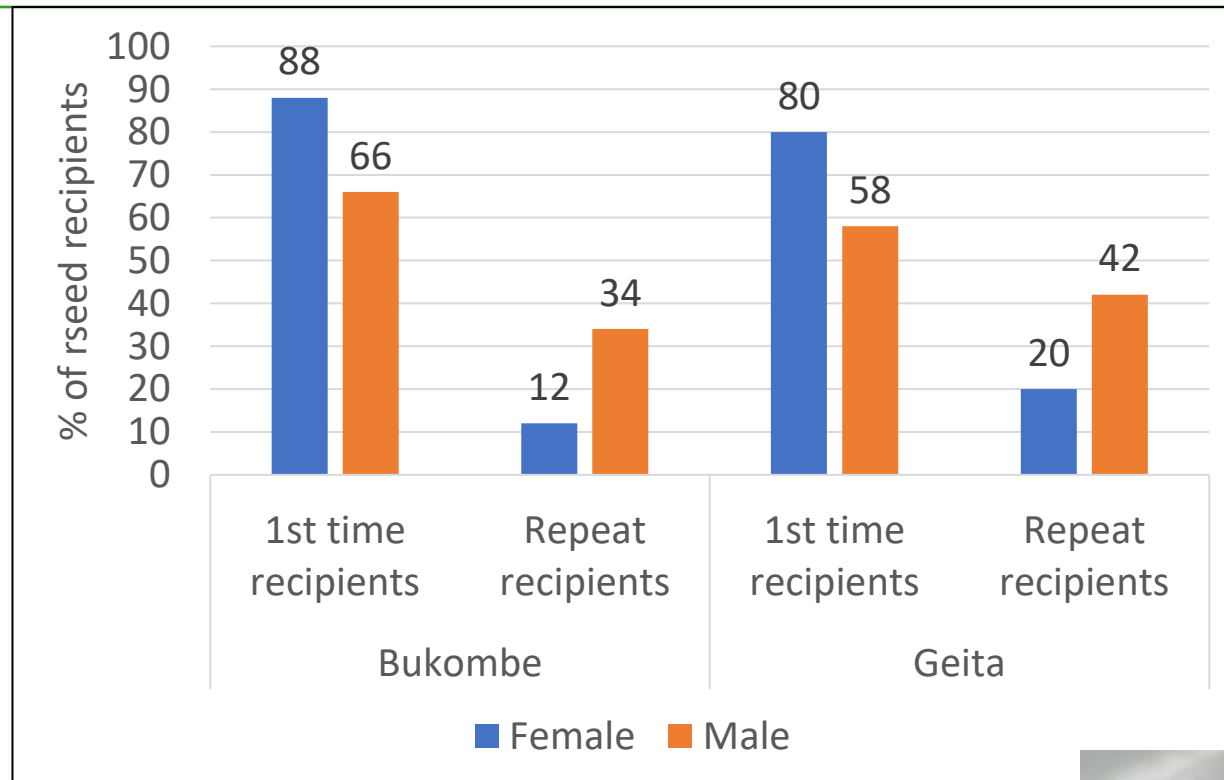
Mode of transaction	Gender and type of seed recipient					
	Female			Male		
	Friend, neighbor & relative	Unknown farmer	Govt ext.	Friend, neighbor & relative	Unknown farmer	Govt ext.
Barter	29(9%)	0	0	-	0	0
Gift	203(63%)	10(67%)	0	114(28%)	0	0
Sell	90(28%)	5(33%)	0	294(72%)	27(100%)	4(100%)
Total	322 (100%)	15(100%)	0	408(100%)	27(100%)	4(100%)

- Most of seed shared by female respondents was as gifts, even to unknown farmers
- Selling of seed was mostly by male respondents, e networks



Results (5): Repeat seed recipients

Percentage of repeat female (n=93) and male (n=86) seed recipients



- There were more returning male seed recipients than female seed recipients
- Shows limited seed conservation among male farmers



Results (6): Mode of transaction by district

Mode of transaction disaggregated into Bukombe (n=487) and Geita (n=289) districts

Mode of transaction by district

Bukombe				Geita			
Barter	Gift	Sell	Total	Barter	Gift	Sell	Total
11 (2%)	117 (24%)	359 (74%)	487 (100%)	18 (6%)	210 (72%)	61 (21%)	289 (100%)

- Selling seed was more common in Bukombe than in Geita



Results (7): Dominant varieties by district

Number & percentage of transactions for major varieties in Bukombe and Geita districts

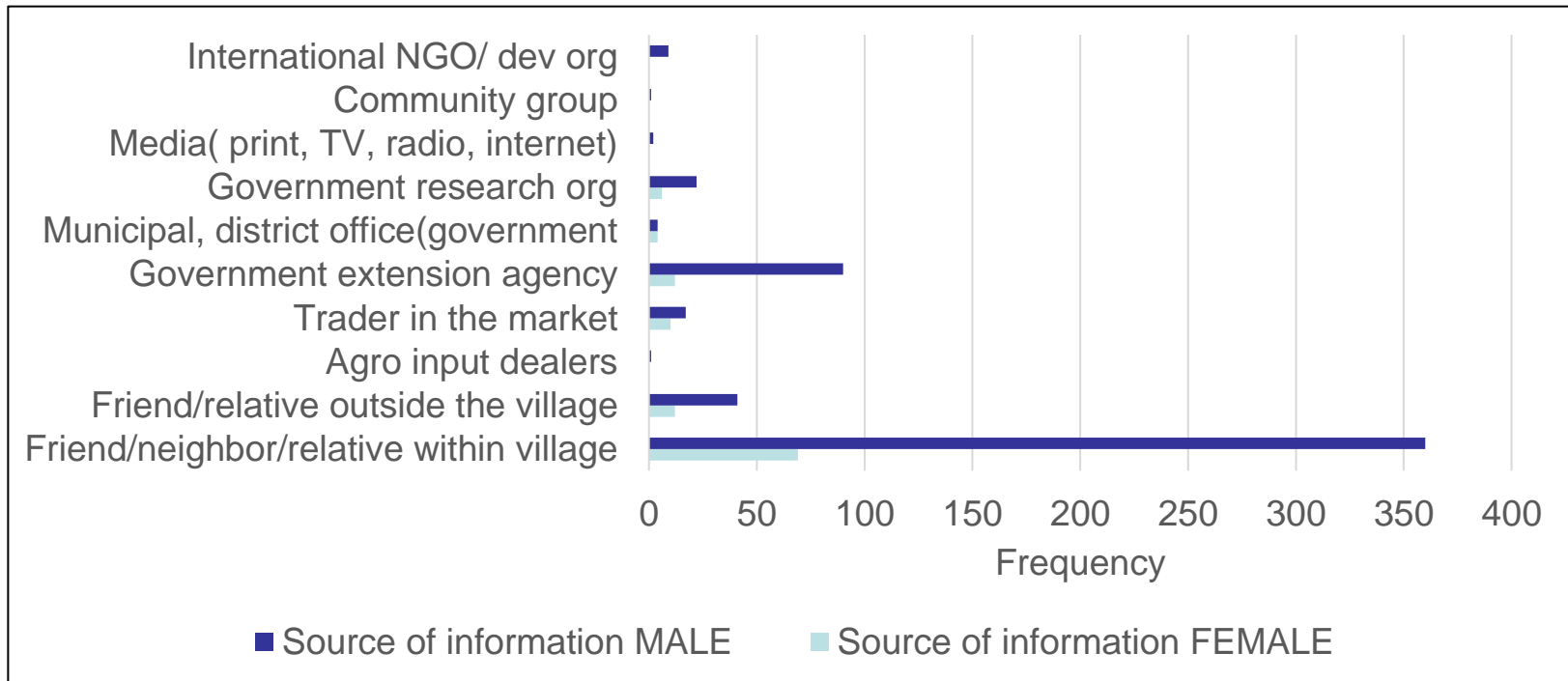
Variety	Bukombe (11 varieties)	Geita (19 varieties)	Total
Ukimwi	60(42%)	2(1%)	62(19%)
Kabode	7(5%)	37(21%)	44(14%)
Pisi tatu	52(36%)	0	52(16%)
Busanagulwa	1(1%)	28(16%)	29(9%)
Polista	2(1%)	13(7%)	15(5%)
Mwanakulwa	0	18(10%)	18(5%)
Other varieties	22(15%)	81(45%)	103(32%)
Total	144(100%)	179(100%)	323(100%)

- Higher diversity of varieties in Geita district than in Bukombe
- Most exchanged varieties in Bukombe were Ukimwi and Pisi tatu whereas in Geita it was Kabode and Busanagulwa



Results (8): Information sources

Number of times female (n=94) and male (n=64) respondents received information from various sources

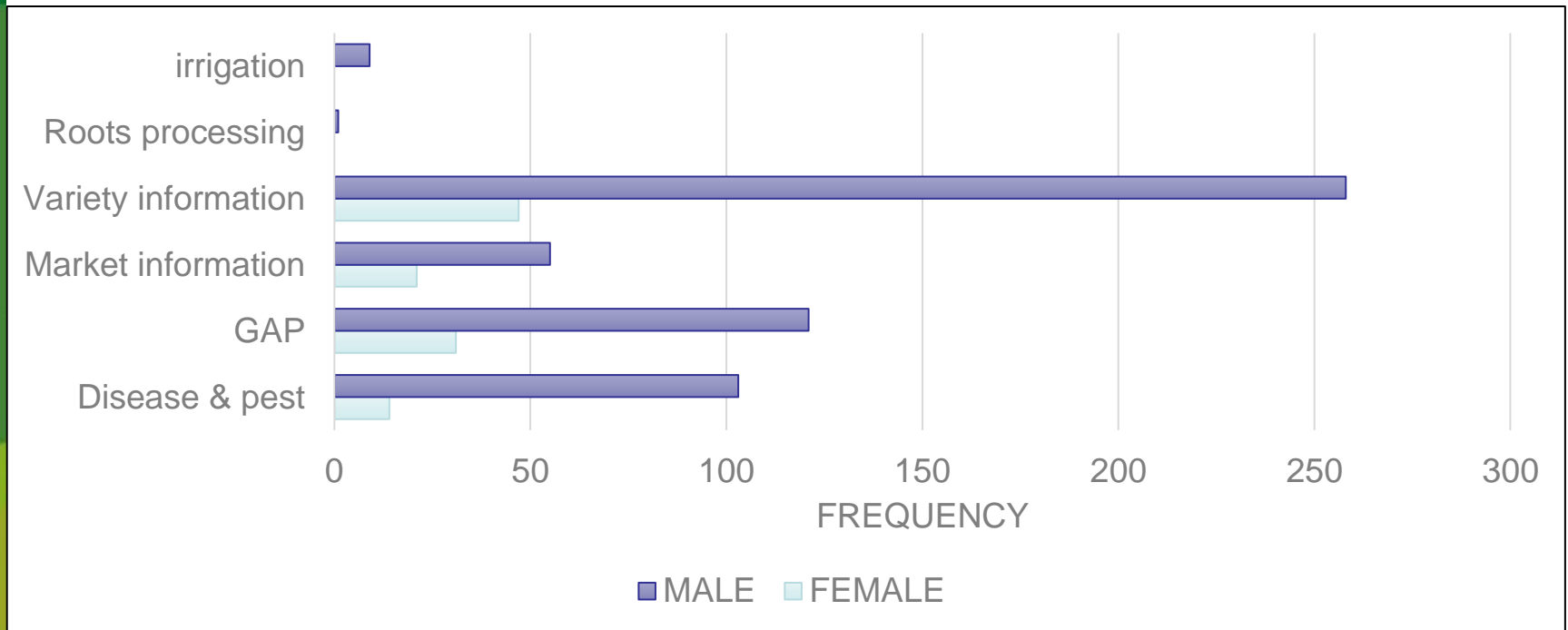


- The main source of information was friend/neighbor within the village followed by government extension
- Men received more information than women



Results (9): Types of information

Number of times female (n=94) and male (n=64) respondents received different types of information

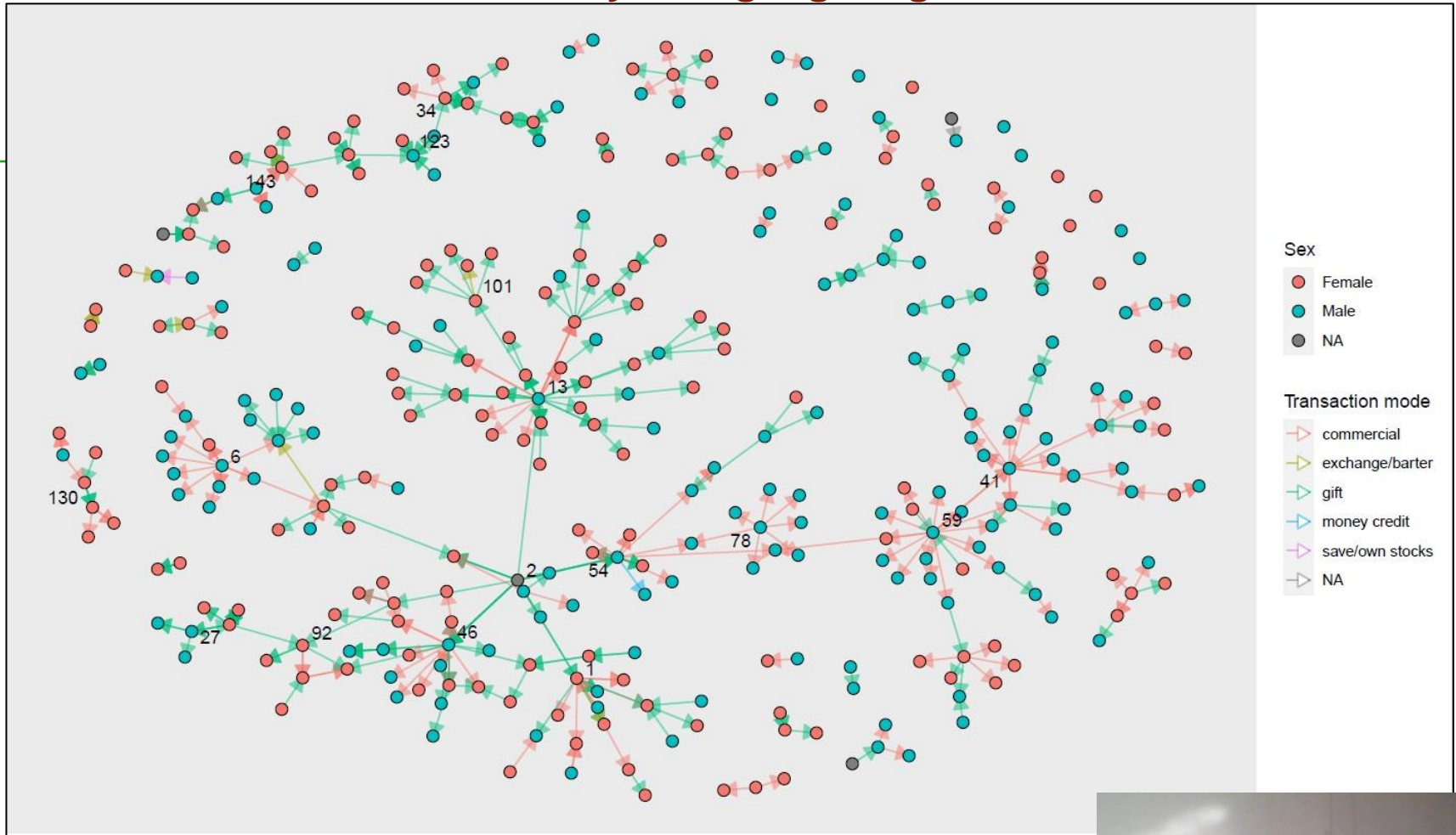


- The main type of information was on varieties sources followed by GAP



Results (10): Seed flows

Social network analysis highlighting seed flows



- Node 2 is TARI: Institute linked to 6 seed producers (3 in Geita) who are connected to tens of other farmers. importance of decentralization of seed systems- identifying various districts can help reach more farmers with



Discussion

- Dominance of neighbors and own farm as main sources of seed shows that a decentralized approach to sweetpotato seed production is still important.
 - Most farmers do not travel long distances to seek seed.
- Focusing on a few seed producers strategically located in major sweetpotato producing villages can increase efficiency in dissemination of improved varieties.
 - One approach of linking formal and informal seed systems.
- Consideration of gender differences in seed system interventions important:
 - Need to understand behaviors in seed sharing between male farmers. Why did male sell even to their close relatives?
- Farmer field days within the village can lead to rapid diffusion of information; neighbor-neighbor information sharing dominates



Discussion

- Adoption of ICT platforms such as Seed Tracker need to factor the gender differences on access to information
 - Do women have requisite resources to access these platforms?
 - Can women use this tool to acquire information?
- Implications for adoption of Seed Tracker for seed regulatory:
 - Easy to pilot/adopt within key nodes – train those not trained as seed producers
 - Close networks (neighbors, friends, family) information- how to link with extension to to information about seed through the app



Discussion

- Women are less likely to recycle seed because of limited access to lowlands for seed conservation, inability to afford costs of seed production- how to motivate female farmers willing to produce quality seed?
- More commercially-orientated areas tend to focus on few varieties. This is likely determined by preferences in the major markets.
 - Also, more seed transactions in the more commercial areas



Conclusions

- Given the closed and small networks in which farmers currently share seed decentralized approaches of vine multiplication and dissemination seem possible
- Sweetpotato seed production seems more profitable in areas such as Bukombe where the crop is grown commercially compared to areas that are more subsistence
- Implementation of seed tracker requires:
 - Focus on key-vine producers/suppliers
 - Awareness of how male and female farmers able to access information



Conclusions

- The insights of this study shows the value of a good diagnostic before developing interventions: it allows us to ask relevant questions:
 - How can future interventions take advantage of increasing number of cash transactions to build sustainable seed systems?
 - How can we develop more effective linkages between farmers and extension agencies to increase access to accurate information?
 - How can we adopt ICT platforms in improving seed systems that also offer advantages for...



Lessons learnt from the course

- Great teamwork from design to manuscript development
- Wide array of Toolbox experts available to assist
 - Great inputs from Erik although he was on vacation
- Survey tools can evolve following the initial data collection



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- CGIAR Research Program on Roots, Tubers and Bananas (RTB) provided the funding for this study
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