



# Technology Networks Cross-Cutting Research Activity

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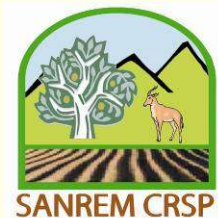
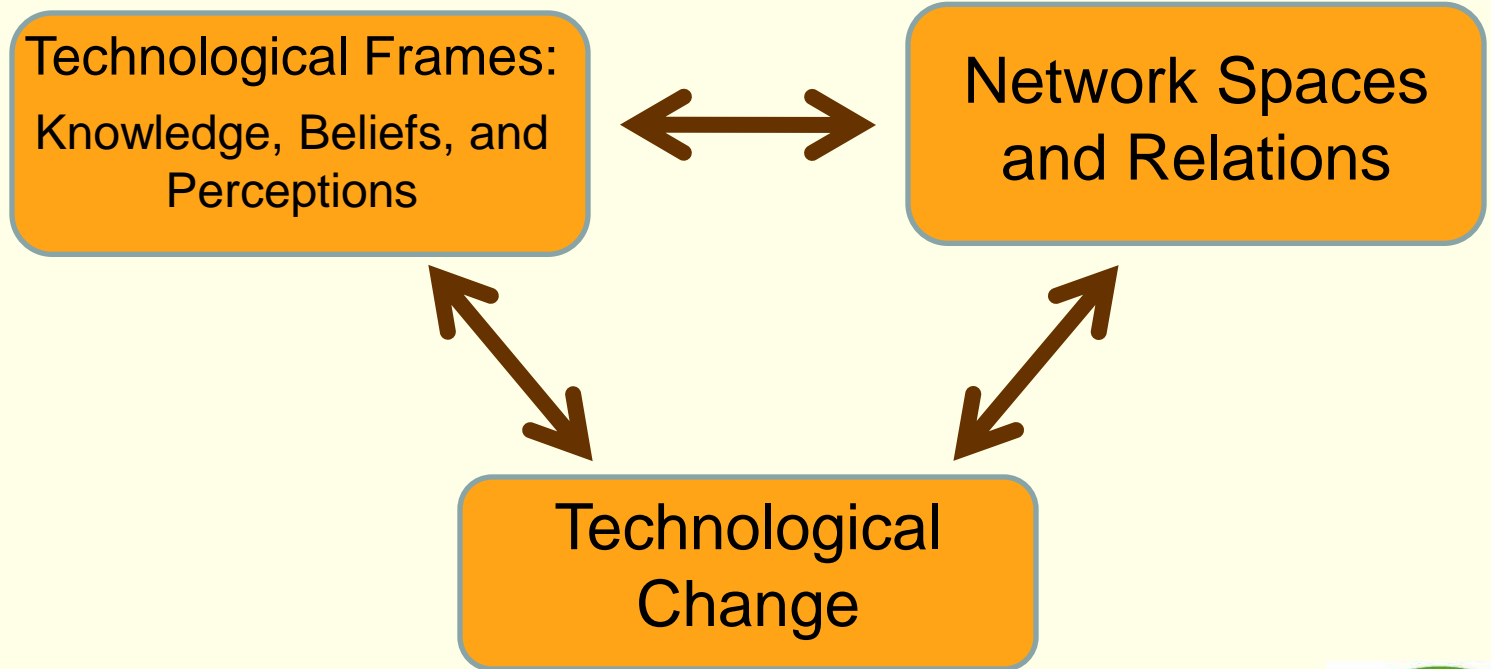


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*Invent the Future*



# Hypothesis Testing for Comparison Within and Across Research Regions



# Technology Network Research Objectives

## Objective 1:

Reveal local agricultural network structures.

## Objective 2:

Identify technological frames shaping production relations.

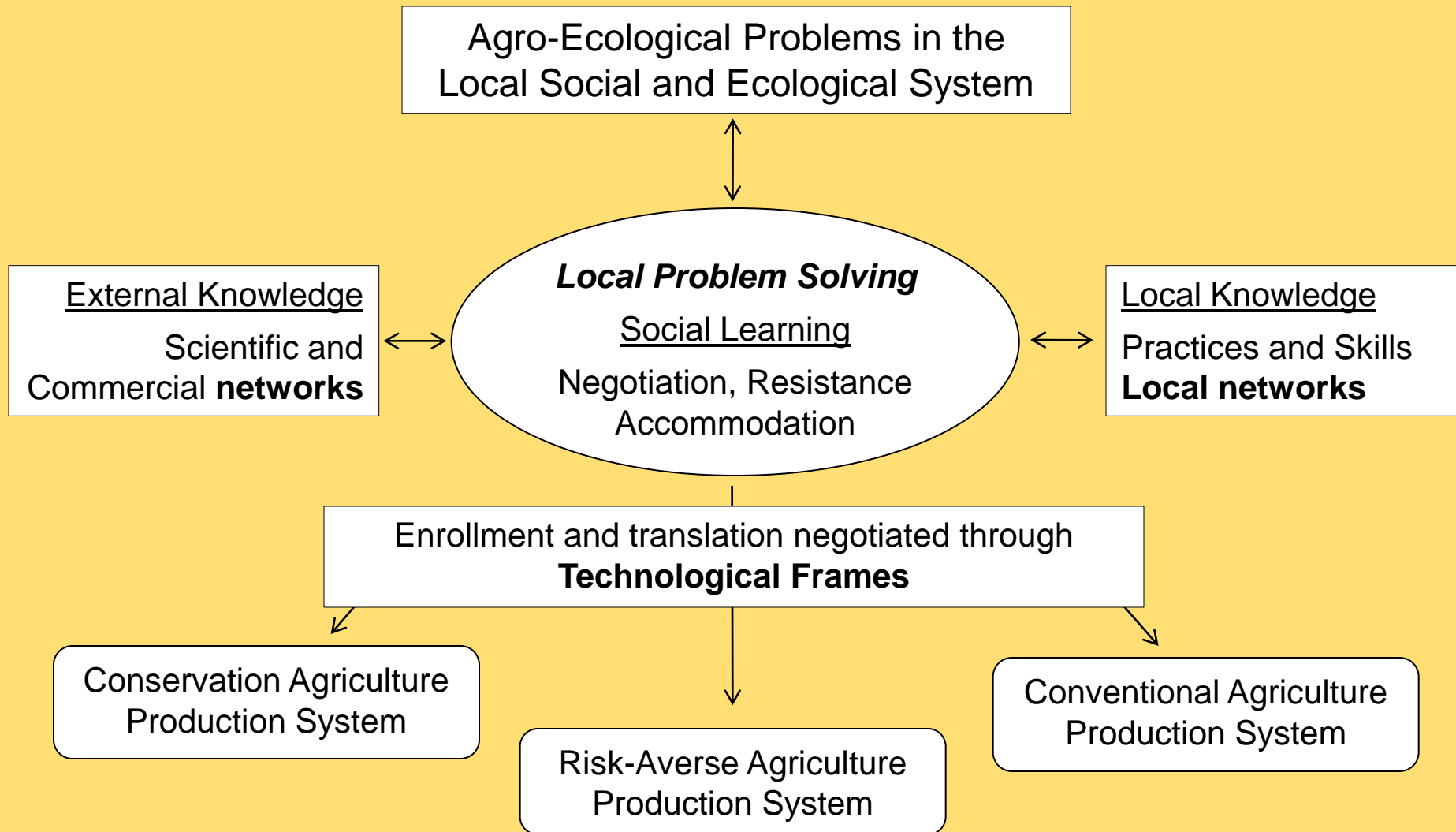
## Objective 3:

Determine knowledge pathways and key actors to facilitate technological change.



# Technology Networks:

The movement and processing of knowledge and innovation



# List of Potential Nodes

People with which contact is made in order to conduct agricultural production activities

Village chief

Family member

Vendor in weekly market

Vendor in an urban shop

Teacher in village

Tractor owner

Minister/Priest/Imam in village

Leader of farmers' organization

Leader of women's organization

Leader of youth organisation

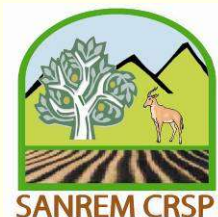
Agent of research institute

Agent of another project

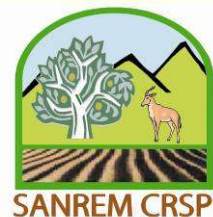
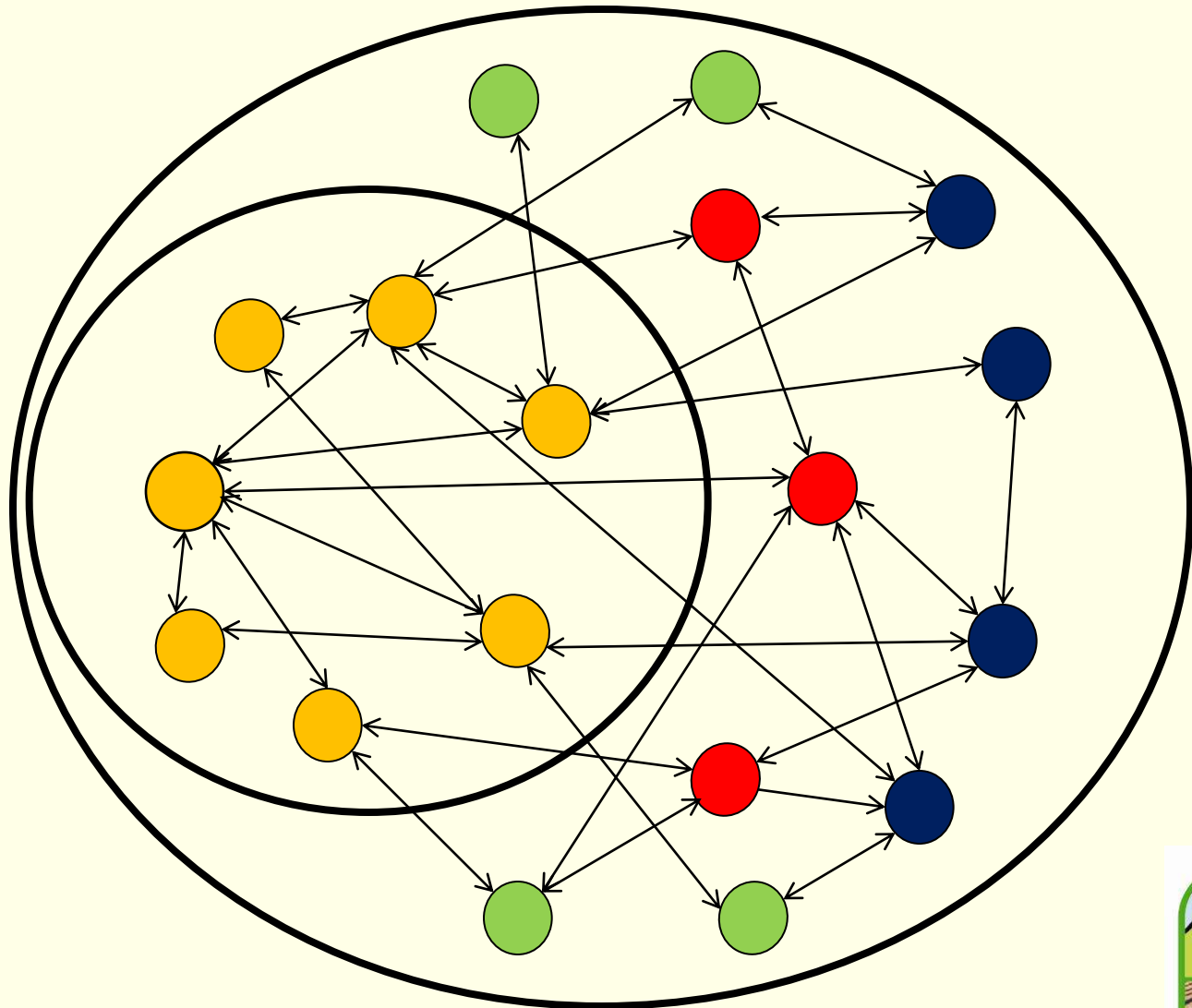
District assemblyman

Extension agent

NGO agent



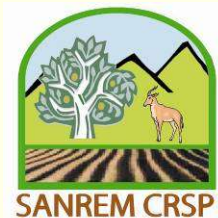
# Network Nodes: Egos and Alters



# Measuring Networks and Technological Frames:

Integrated into Baseline years 1 & 4

- Identity and Quality of Network relations
- Likert Scale Questionnaire



# Identity and quality of network relations

(within the agricultural production network)



<p><b>What resources are accessed through interaction?</b></p>	<p>1. Advice 2. Information 3. Seed 4. Fertilizer</p>	<p>5. Pesticide 6. Herbicide 7. Tractor 8. Other _____</p>
<p>Who Initiates the contact most of the time?</p>	<p>1. Always them 2. Mostly them 3. 50/50 4. Mostly me 5. Always me</p>	
<p><u>Location and Events:</u> Where do you interact?</p>	<p>1. Farm 2. Store 3. Office 4. Market</p>	<p>5. NGO Office 6. Community center 7. Farmer field day 8. Other _____</p>



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# Identity and quality of network relations

(within the agricultural production network) – con't.

Frequency:  
How often do you interact?

1. Weekly
2. Biweekly
3. Monthly
4. Seasonally
5. Yearly

Quality:  
Can you trust resources/info provided?

1. Always
2. Most of the time
3. Somewhat
4. Rarely
5. Never

Gender:

1. All male
2. Mostly male
3. 50/50
4. Mostly female
5. All female



# Technological Frames: Indicator measurement

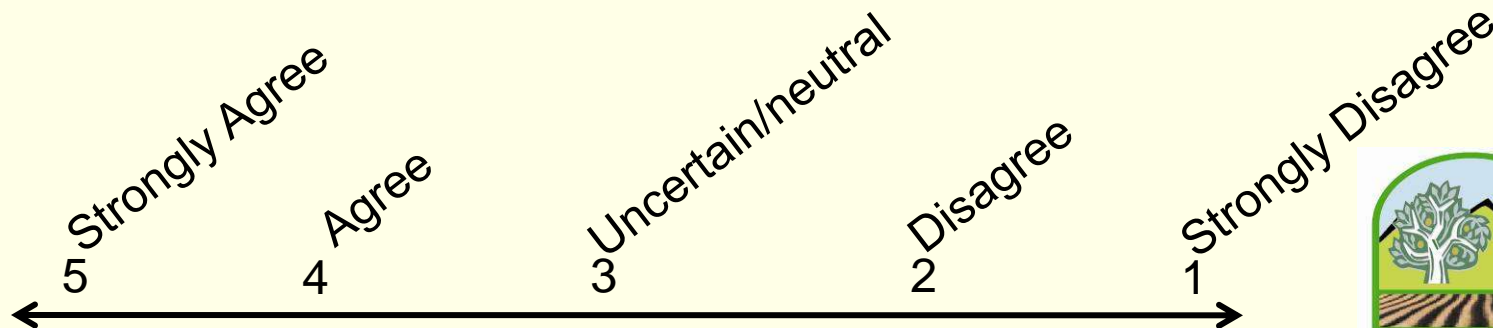
## A set of 20 items

(item order: 1, 14, 15, 6, 2, 16, 7, 17, 8, 18, 9,  
3, 10, 19, 4, 11, 20, 5, 13, 12)

## Consisting of statements characterizing:

- Conservation Agriculture (items 1-5)
- Conventional Agriculture (items 6-12)
- Risk Averse Agriculture (items 13-20)

## Measured on a five-point Likert scale:



# List of Technological Frame Items

## Conservation Agriculture

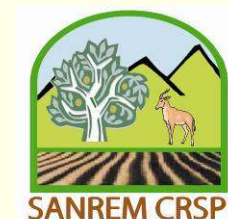
- 1) Land is one's heritage to be preserved for future generations
- 2) One should maintain a permanent crop cover
- 3) Timely weeding (before setting of seed) is important to a successful harvest
- 4) Tillage causes land degradation
- 5) Rotating crops is always best practice



# List of Technological Frame Items

## Conventional Agriculture

- 6) Farm income should always be reinvested to grow the business
- 7) Applying chemical pesticides is always necessary
- 8) Inorganic fertilizer is best to improve soil quality
- 9) Planting decisions are always based off of current market prices
- 10) Crops should only be grown for sale
- 11) One should always strive to grow the most on one's land.
- 12) Land preparation for crop production begins with plowing.



# List of Technological Frame Items

## Risk Averse Agriculture

- 13) Farm labor should be replaced by more efficient herbicides and machines
- 14) Engaging in multiple productive activities is always better than doing just one
- 15) It is better to grow staples within the household or community than purchase them.
- 16) Farm production is necessary to feed the family
- 17) Spreading crops and inputs across multiple plots is always necessary
- 18) Crop residues should only be fed to livestock and poultry
- 19) The staple crop should be planted on the majority of the land every growing season
- 20) Earning off-farm income is more important than a large harvest



# Perceptions of soil quality

What are the most important criteria for evaluating soil quality?

3 – for the most important

2 – for the second most important

1 – for the third

\_\_\_\_\_ water retention capacity

\_\_\_\_\_ the colour of the soil

\_\_\_\_\_ the quality of the crop it produces

\_\_\_\_\_ the quantity of organic material in the soil

\_\_\_\_\_ the quality of the soil when crumbled in one's hand

\_\_\_\_\_ the taste of the soil

\_\_\_\_\_ the effort needed to work the soil



# Constructing Actor Linkage Matrices

	1	2	3	4	5	6	7
1-agricultural producers							
2-fertilizer sellers							
3-pesticide sellers							
4-equipment manufacturers							
5-extension agents							
6-researchers							
7-local leaders							

## Matrix Coding Options:

% of resources accessed

% by gender

Avg. frequency of interaction

% by direction of interaction

% by location of interaction

Avg. levels of trust

**Can be layered with Technological Frames...**



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# Example application:

Fertilizer seller

		1. Advice 0%	5. Pesticide 0%		7
1-agricu		2. Information 50%	6. Herbicide 0%		
2-fertiliz		3. Seed 5%	7. Tractor 0%		
3-pestici		4. Fertilizer 0%	8. Other _____		
4-equipm					
5-extens					
6-resour					
7-local					
		1. Advice 10%	5. Pesticide 0%		
		2. Information 10%	6. Herbicide 0%		
		3. Seed 15%	7. Tractor 0%		
		4. Fertilizer 80%	8. Other _____		

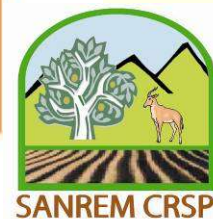
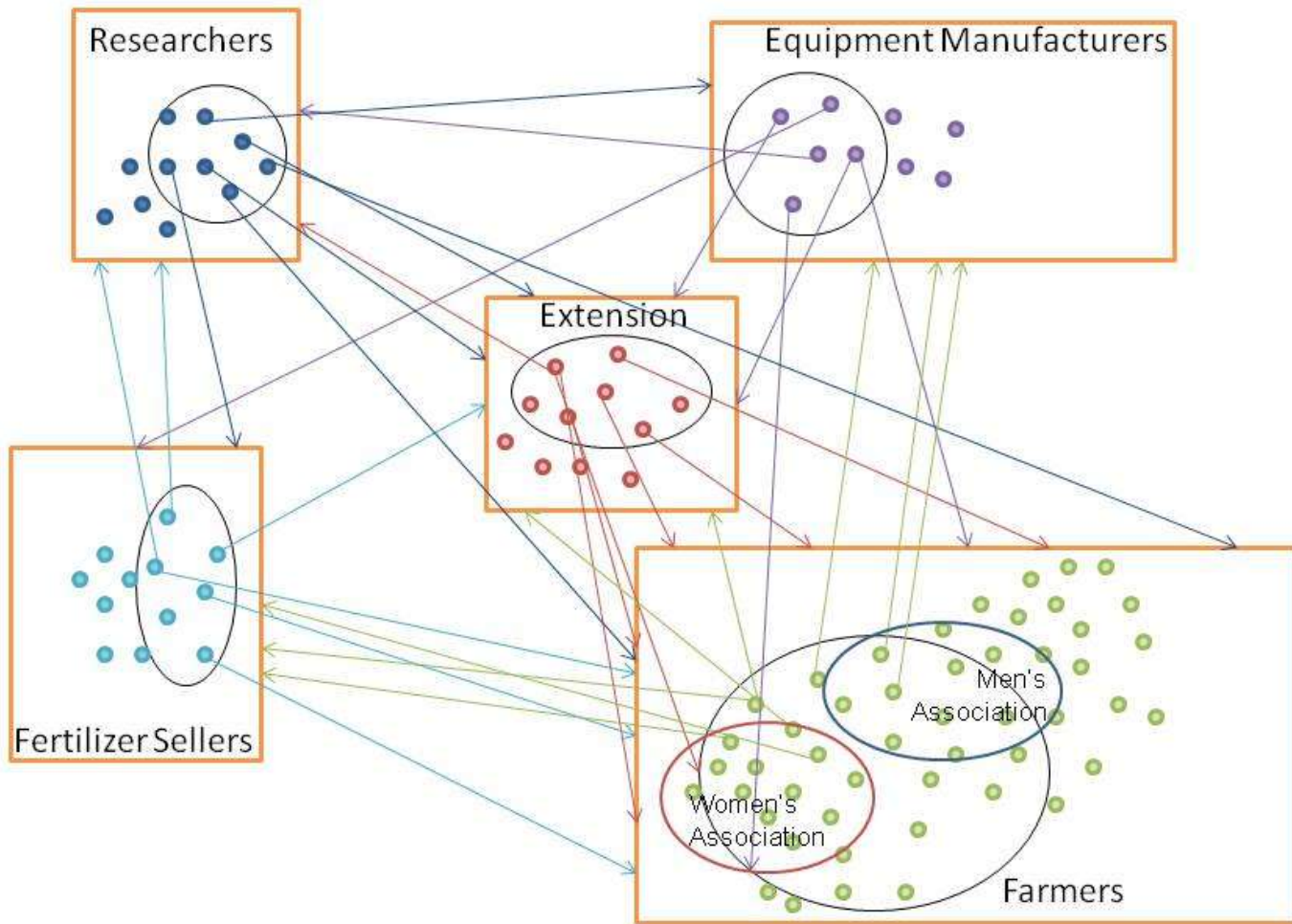
Agricultural Products



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# Constructing Actor Linkage Maps



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# Thank You

## Questions? Comments?





**Creating improved livelihoods ...**



**... through knowledge-based  
sustainable agriculture and natural  
resource management research**