

Assessing options for crop-livestock intensification in semi-arid Southern Zimbabwe: household typologies and community visions

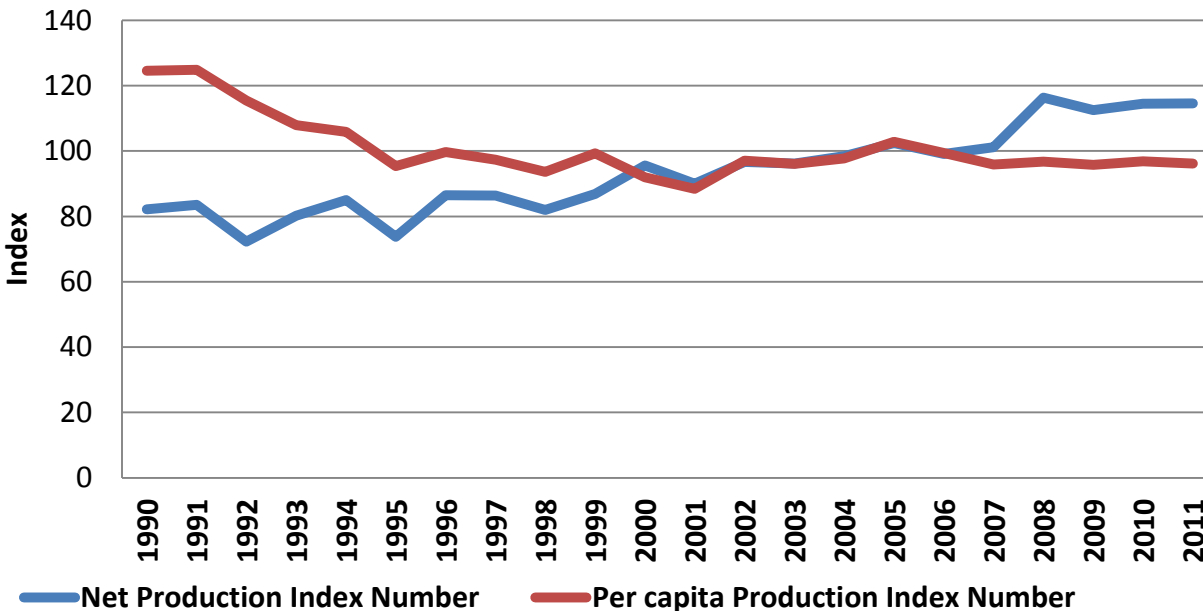
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Declining per capita food production in Southern Africa

**Production trends in Southern Africa
(PIN, 2004-06 base)**



Key challenges

- Resource constraints: > 80% of rural population below **poverty** line
- Limited **biomass**: one growing season, semi-arid rainfed, poor inherent soil fertility
- Extraction of land and soils (**degradation**)
- Poor market linkages and support services (**enabling structures**)

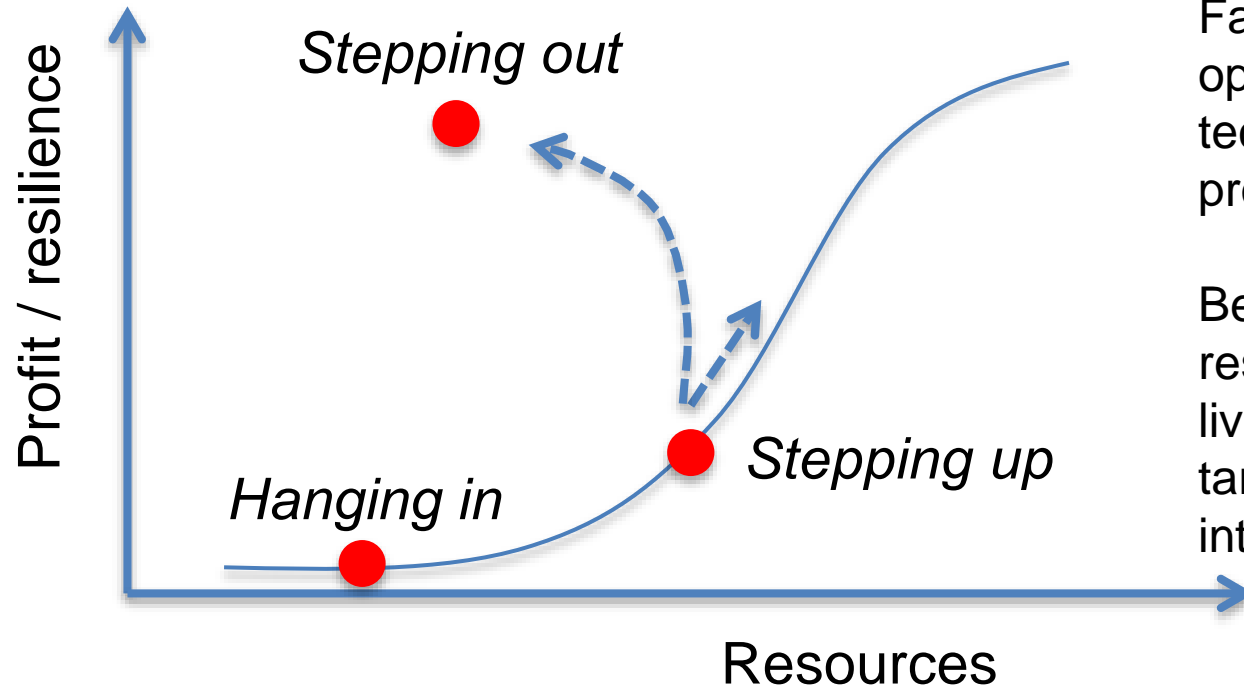
Stepping stones towards increasing agricultural production and improving food security (1)

Identifying household typologies

Working Hypothesis 1:

Farmers have different opportunities to adopt technologies and intensify production systems.

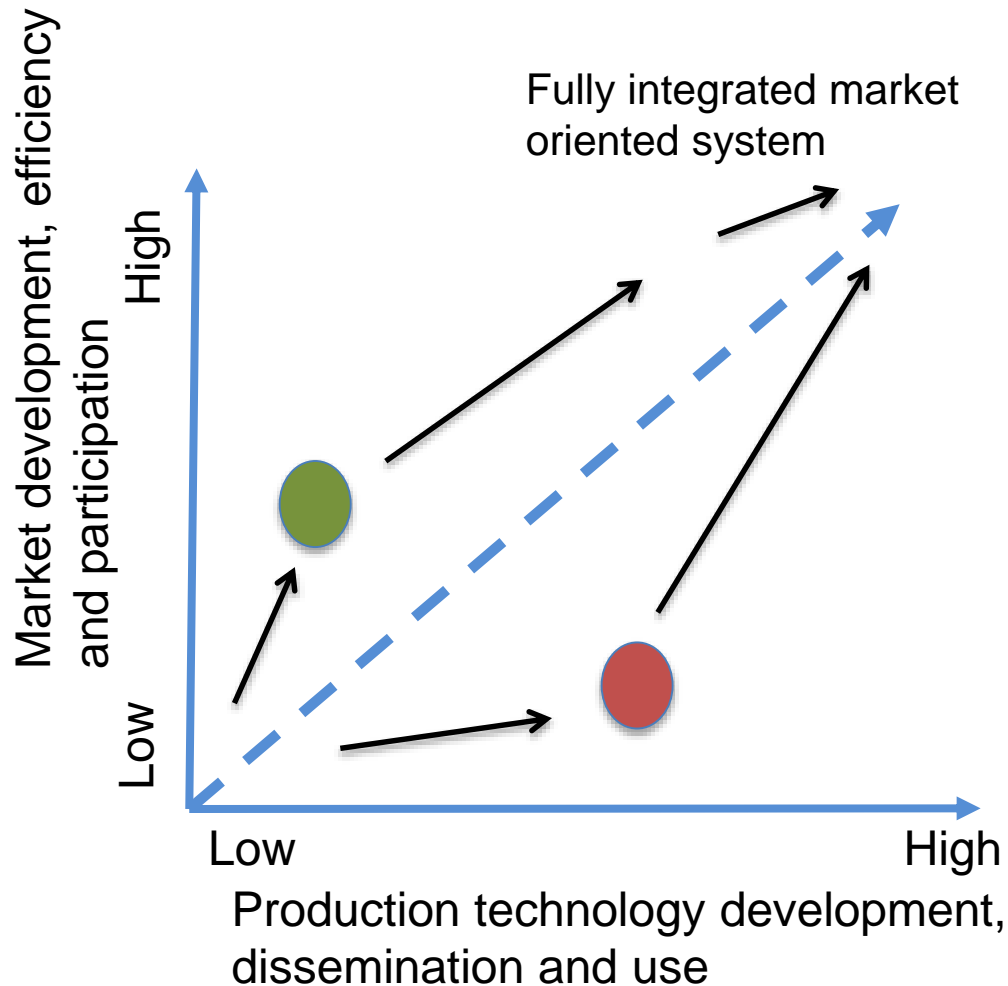
Better understanding farmers resource endowments and livelihood strategies may help targeting development interventions.



After Dorward *et al.*, (2010)

Stepping stones towards increasing agricultural production and improving food security (2)

Identifying pathways for sustainable intensification



Working hypothesis 2:

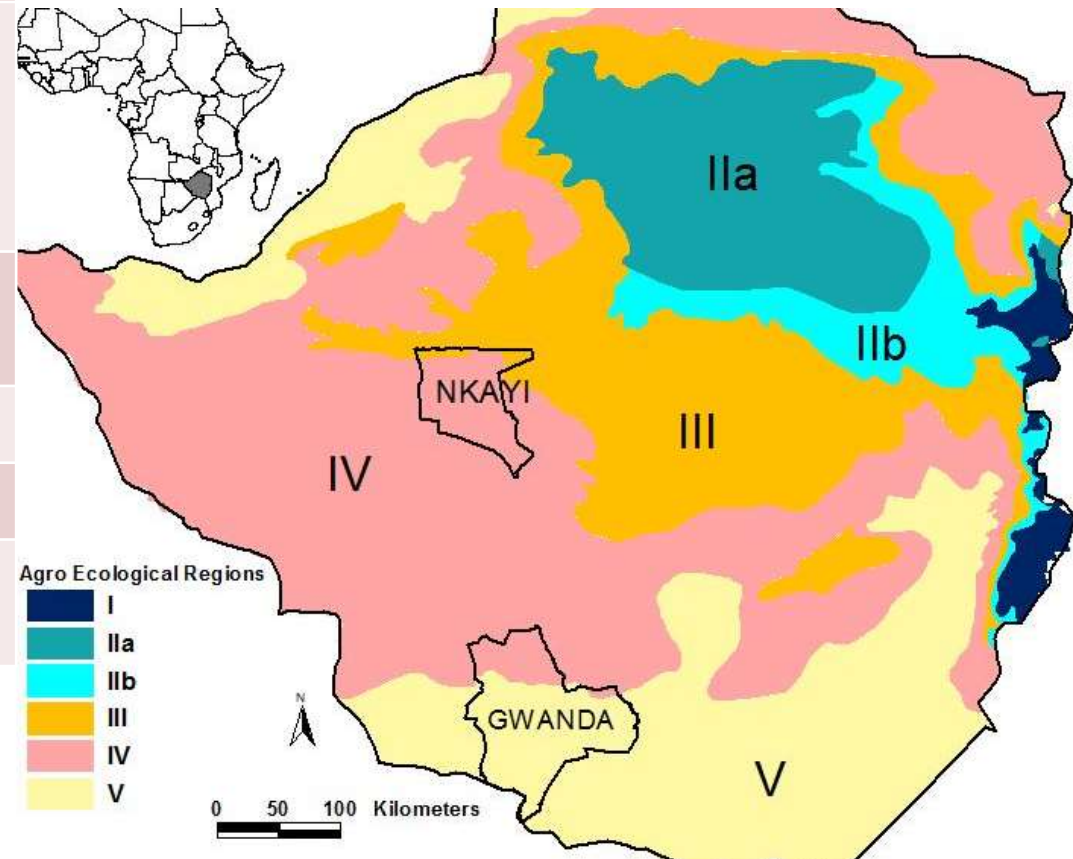
Pathways for sustainable intensification are context specific.

Intervention options need to integrate market development AND production enhancing technologies.

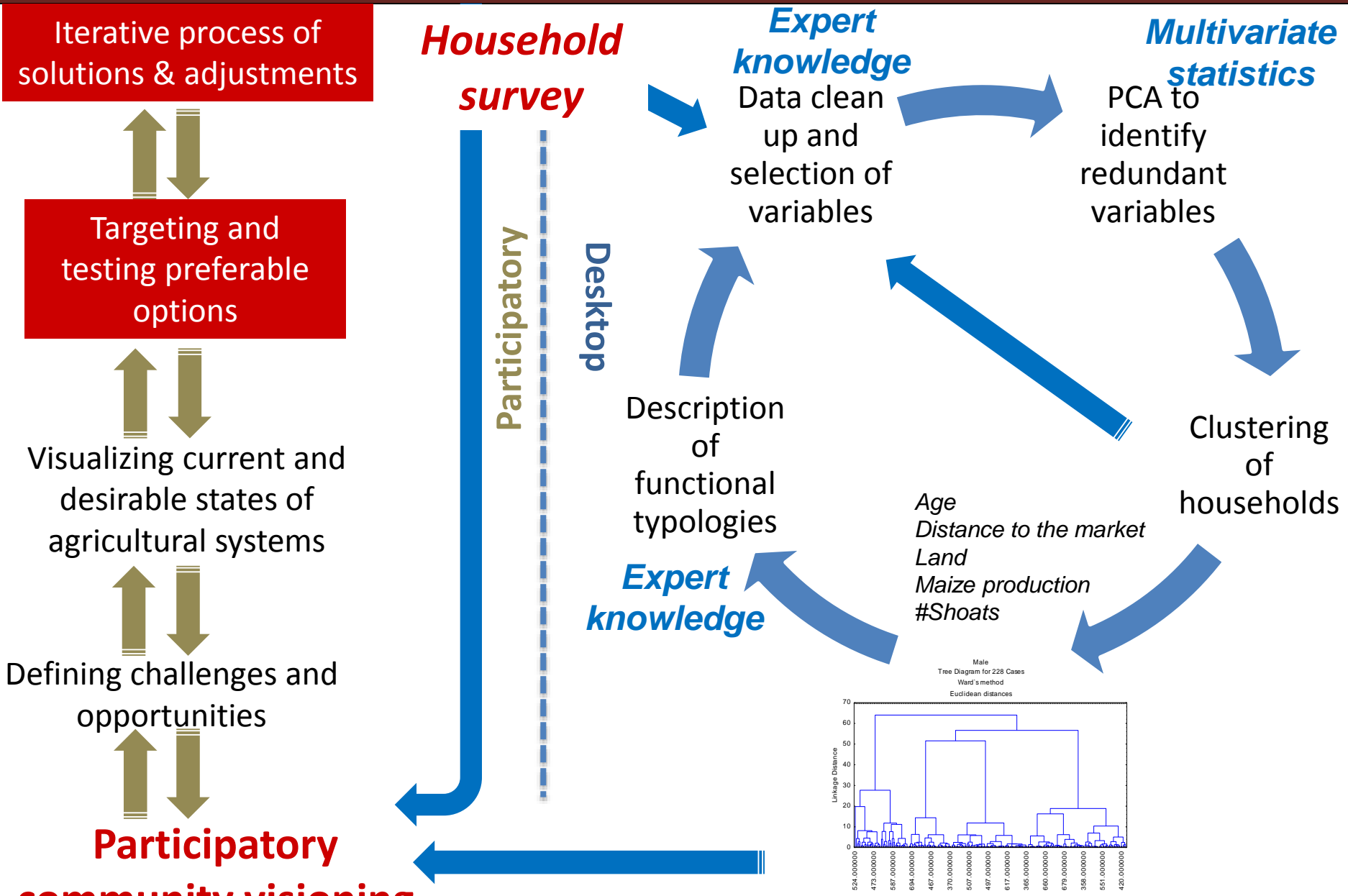
Participatory approaches can help identifying preferable intervention options.

The case: mixed smallholder farming systems in semi-arid Zimbabwe

Farming system characteristics	Nkayi	Gwanda
Agro-ecology		
• Rain (mm, (CV))	656 (33)	434 (23)
• Main soils	Kalahari	Sands
Densities		
• Human (n km ²)	19	10
• Cattle (TLU km ²)	12	8
• Goats (TLU km ²)	1	1
Main crops	Maize, small grains, legumes	
Main livestock	Cattle, goats	
Market access	+	++
Extension	+	+



Methodology



Results

Principal components

Important factors	Nkayi (n=160)	Gwanda (n=90)
Livestock (cattle)	✓ 16%	✓ 27%
Education	✓	✓
Years in village	✓	
Distance to markets	✓	
Off farm income	✓	
Family size / labor	✓	✓
Cultivated land	✓ 6% each	✓ 14% each
Use of fertilizer	✓	
Use of manure	✓	
Household assets	✓	
Age	✓	✓
Livestock (goats)	✓	✓

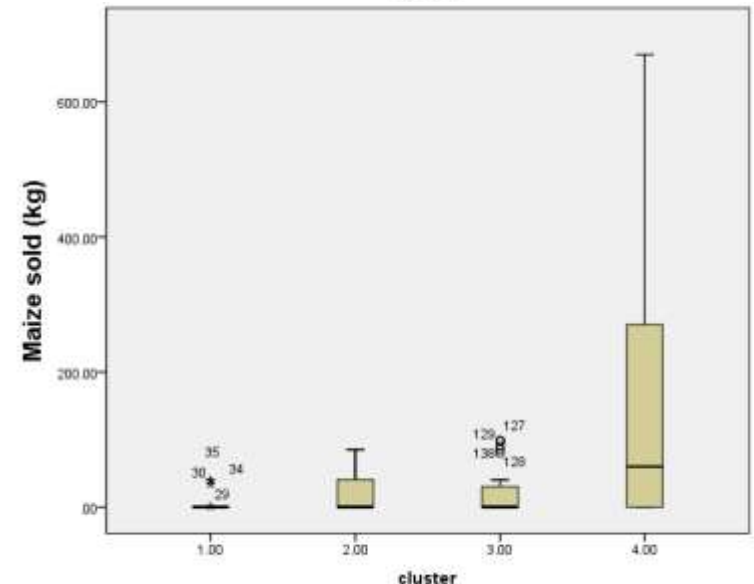
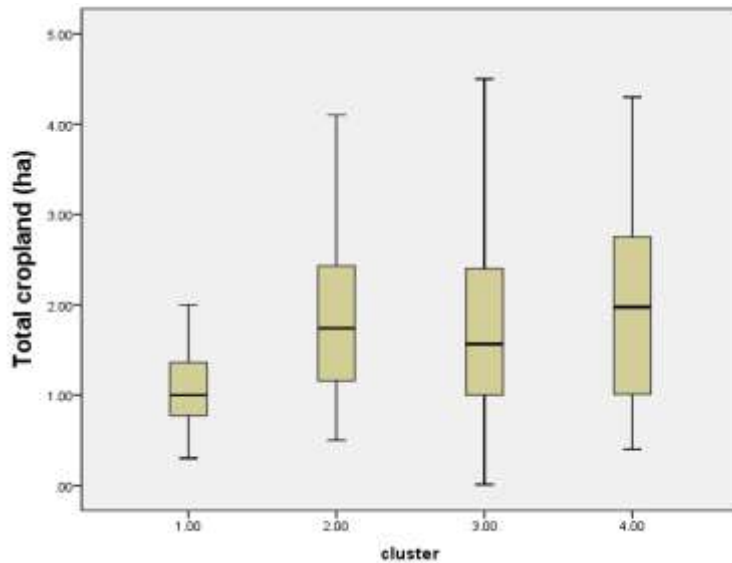
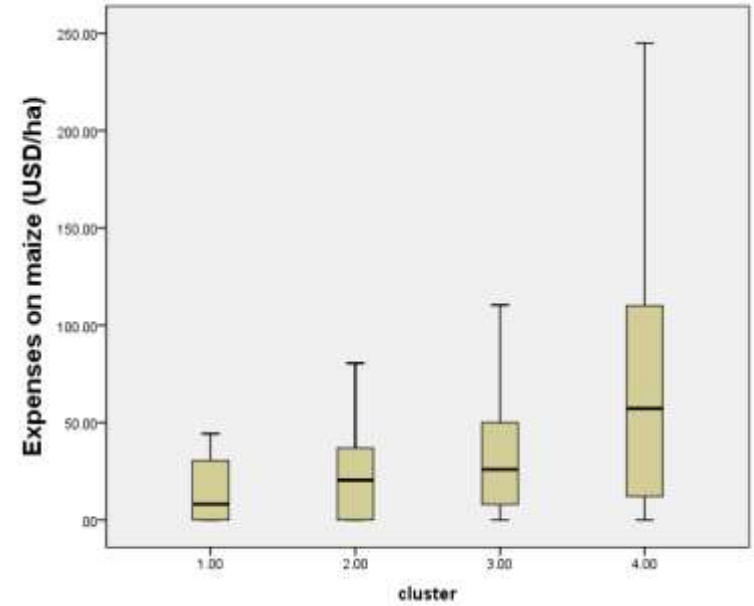
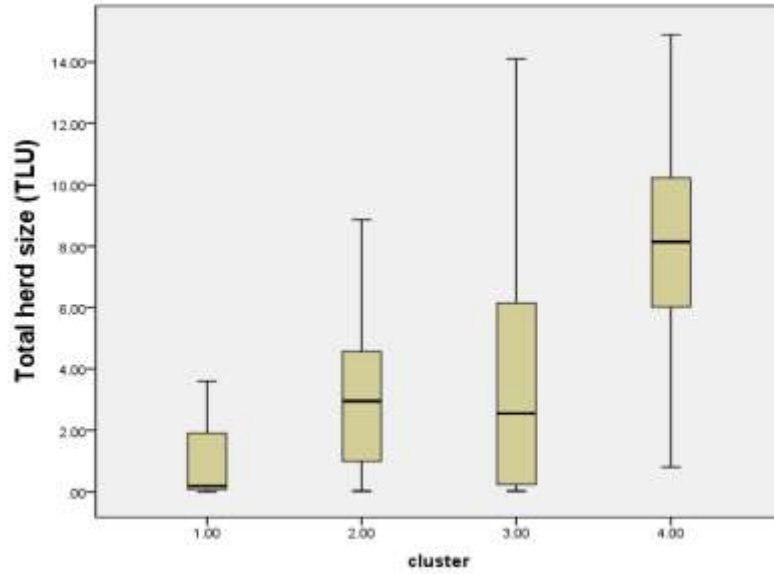
Nkayi: Household typologies (1)

Important factors

	Structural household typologies: resource endowment (median)			
Household types	<u>C1 Young family</u>	<u>C2 Stepping up</u>	<u>C3 Grey heads</u>	<u>C4 Champions</u>
Share population (%)	22	30	34	14
Cattle (TLU)	0	2.1	2.1	6.7
Goats (TLU)	0	0.3	0.2	0.5
Cultivated land (ha)	1	1.6	1.7	1.7
Age of HHH (yrs)	38	47	64	54
Education (yrs)	8	8	3	7
Local knowledge (yrs)	22	37	47	41
Off-farm income (%)	40	50	60	35
Family size (AAME)	4.2	4.4	4.9	4.3
Assets (index)	2	7	3	8
Fertilizer use (kg/ha)	0	0	0	10.7
Manure use (kg/ha)	0	0	0	1364
Use of hybrids	No	Yes	No	Yes
Diversified production	No	No	No	Yes ←
Food secure (months)	2-8	3-11	3-10	3-12 ←
Cash income (U\$S/yr)	327	445	485	569 ←

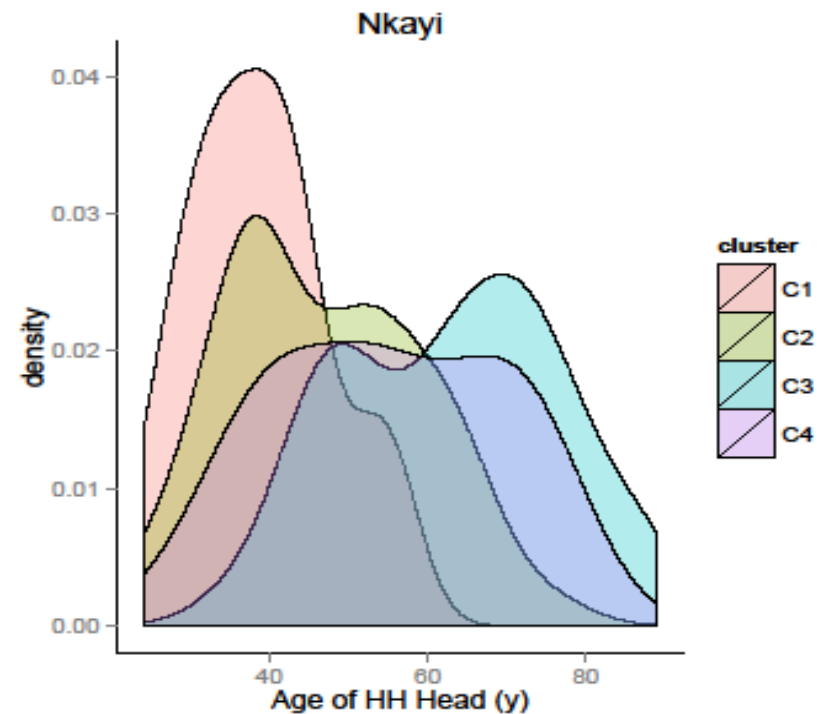
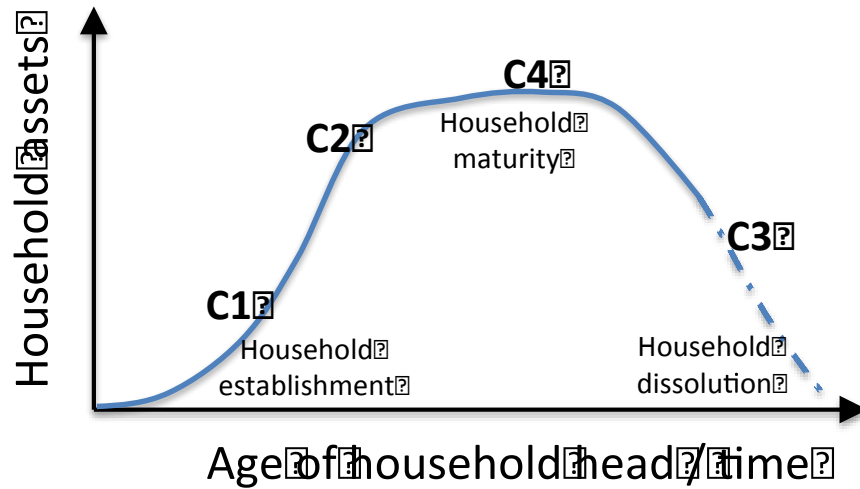
Nkayi: Household typologies (2)

Assets and reinvestments



Nkayi: Household typologies (3)

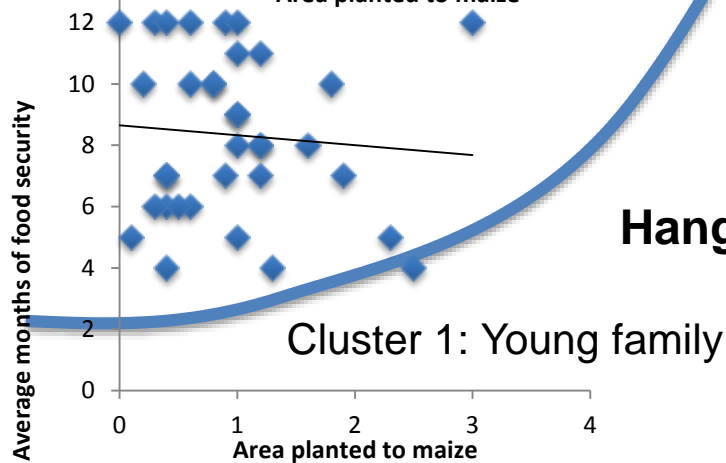
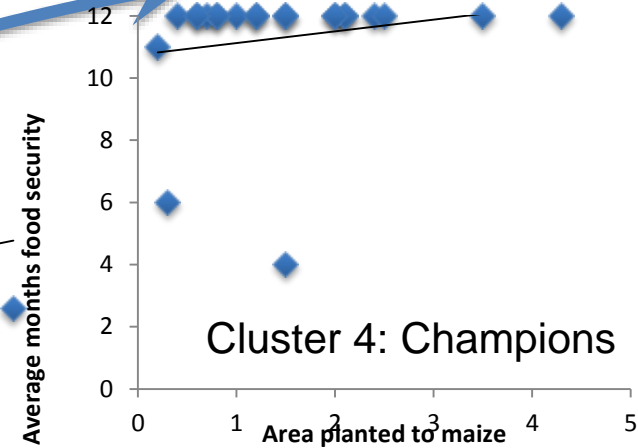
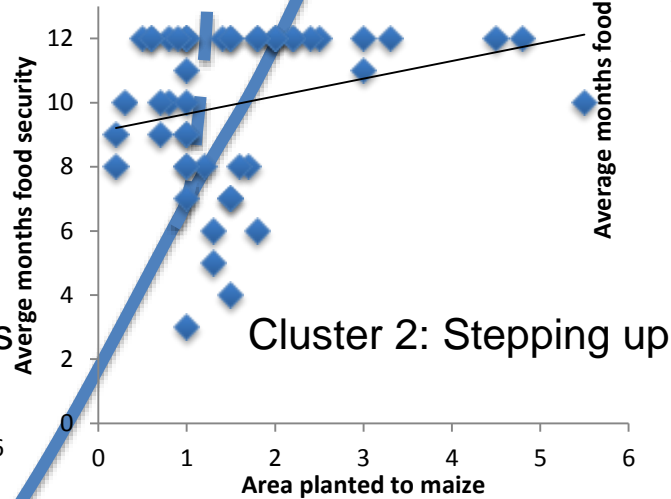
Predispositions to invest



Nkayi: Household typologies (4)

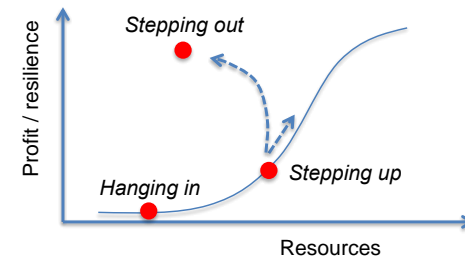
Predispositions to invest

Stepping out



Hanging in

Stepping up

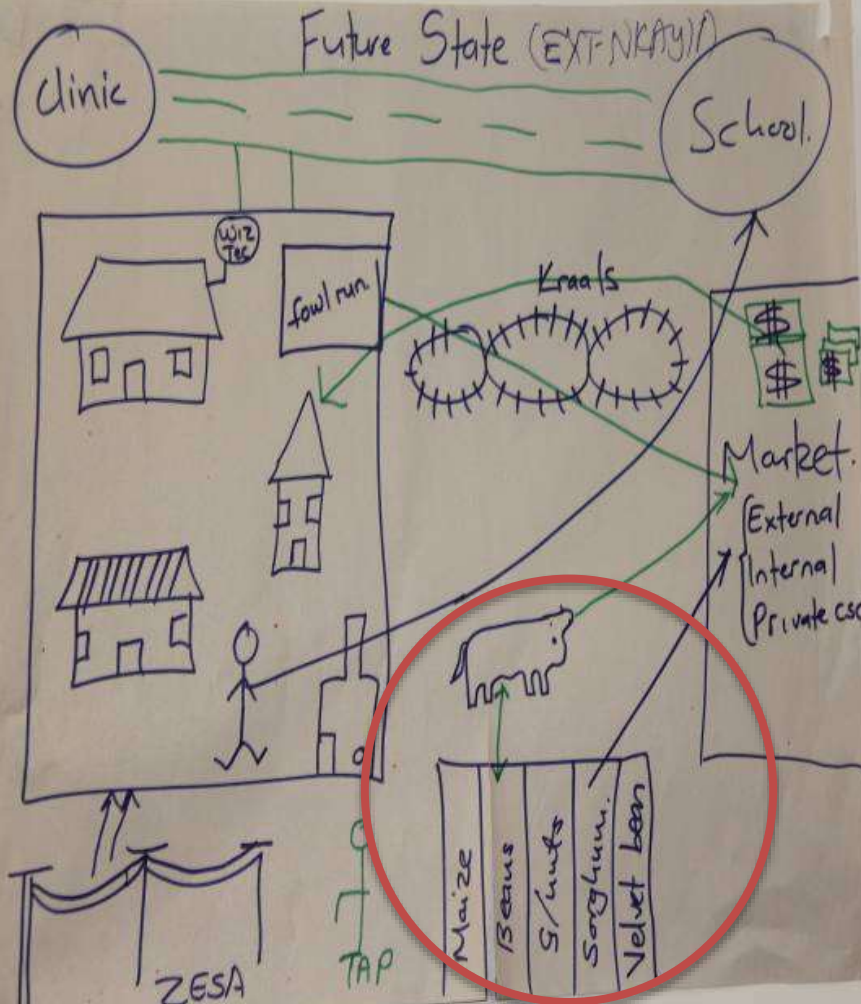


Nkayi: community visioning

Entry points for sustainable intensification

Boosting agricultural production through better crop livestock integration

1. Intensify and diversify crop production
 - Increase legume and vegetable production
 - Improve manure management
2. Improve cattle production, offtake and quality
 - Increase crop residue and fodder production and feeding
 - Mechanize crop production to release cattle for the market
3. Improve market infrastructure and organization (“also for goats”)



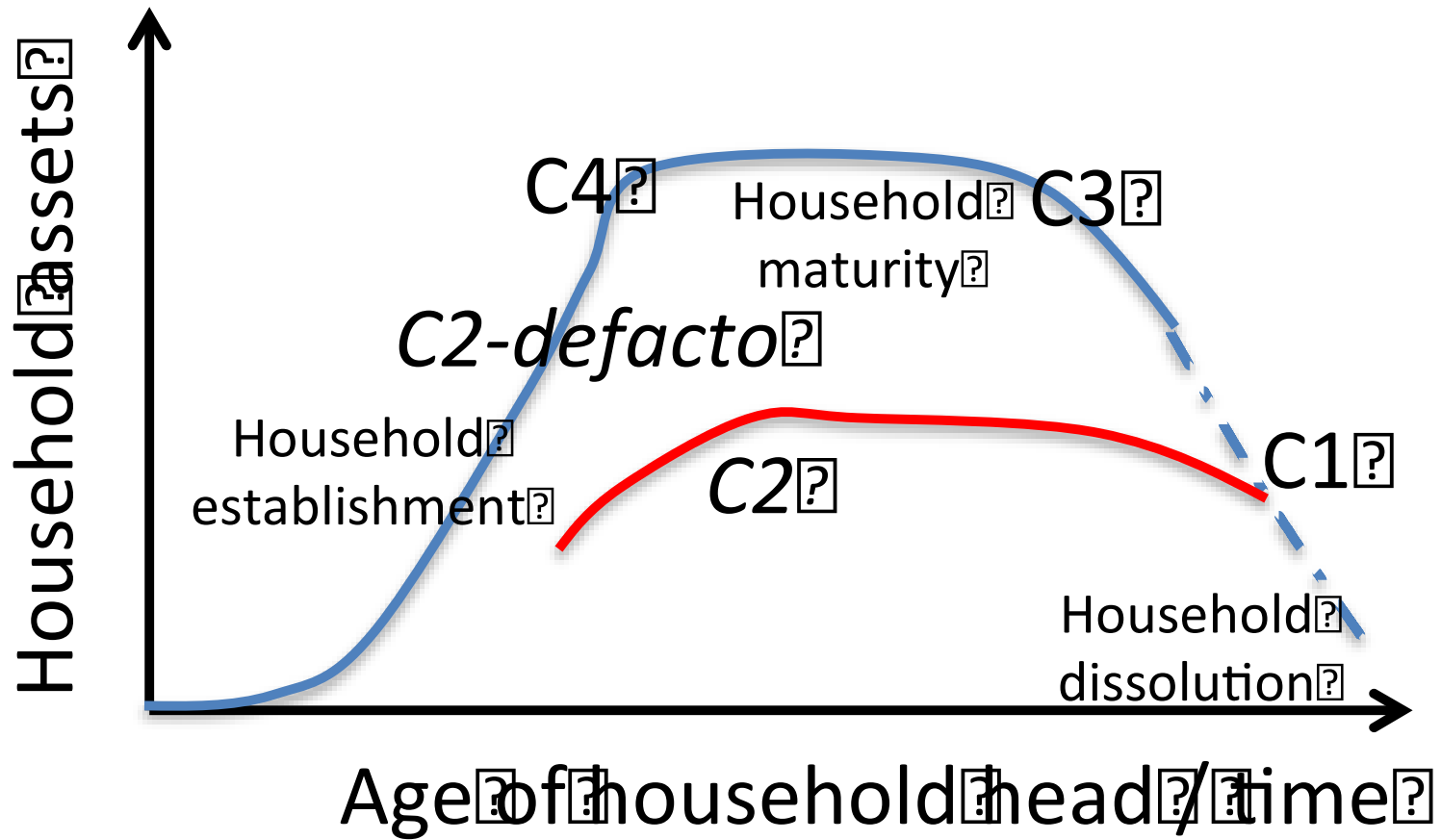
Gwanda: Household typologies (1)

Important factors

Important factors	Structural household typologies: resource endowment (median)			
Household types	<u>C1 Subsistence Old and female</u>	<u>C2 Subsistence Young and female</u>	<u>C3 Grey heads Richest males</u>	<u>C4 Younger male Goats specialized</u>
Share population (%)	32	22	23	14
Cattle (TLU)	1.4	0 (1.4)	14.7	0
Goats (TLU)	1.5	1.2 (5.0)	5.0	4.0
Cultivated land (ha)	1.4	1.7 (2.1)	3.1	1.0
Age of HHH (yrs)	60	41 (36)	59	47
Education (yrs)	3	7 (11)	5	9
Family size (AAME)	3.8	3.0 (3.8)	4.5	7.2
Off-take goats (%)	9	8.5 (0)	15	10.2 ←
Maize yield (kg/ha)	0	0 (180)	0	20
Sorghum yield (kg/ha)	40	0 (190)	55	50
Food secure (months)	4	5 (7)	6	7 ←

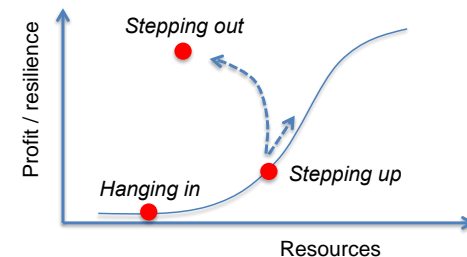
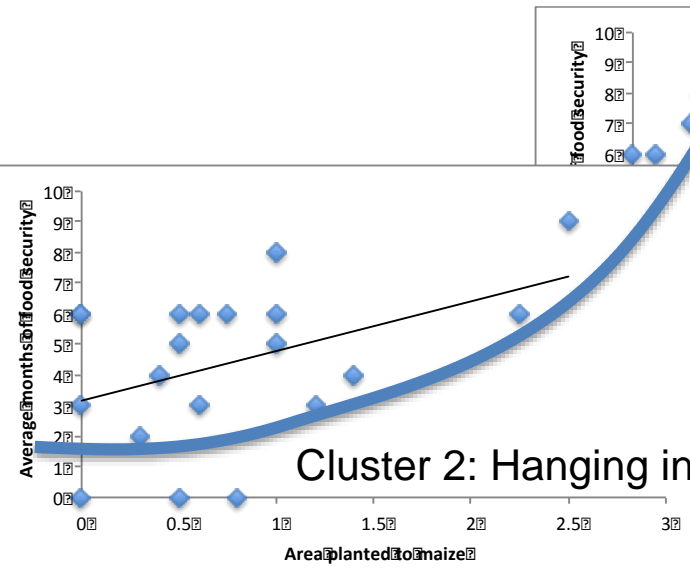
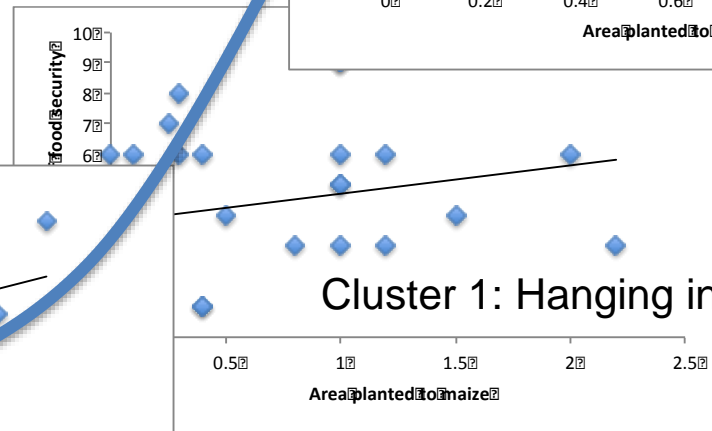
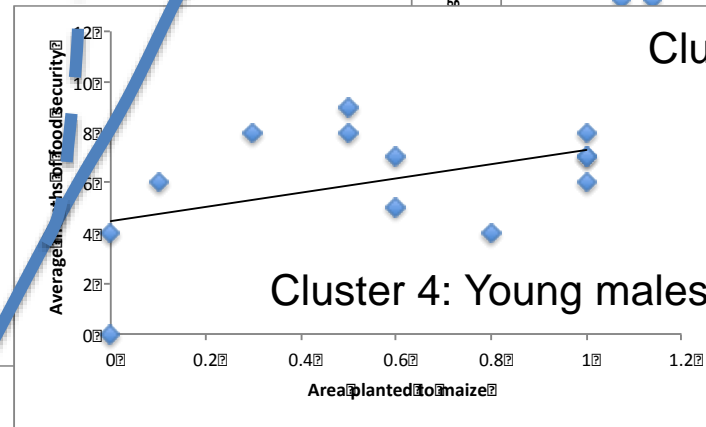
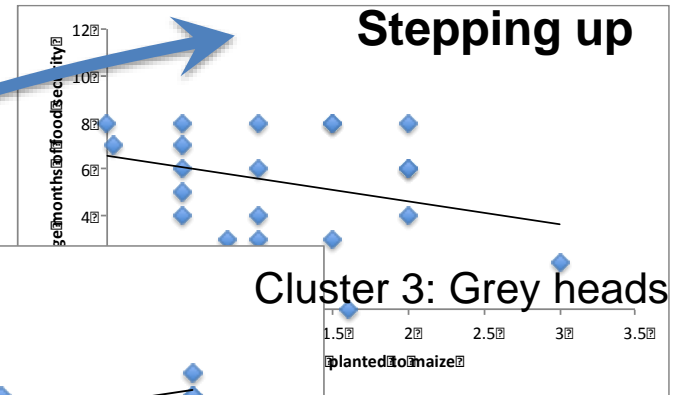
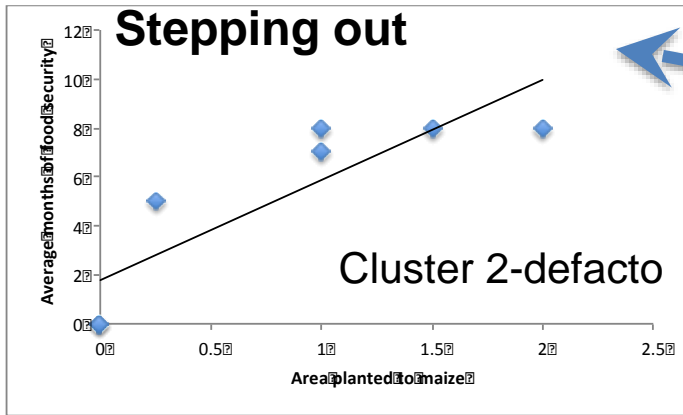
Gwanda: Household typologies (2)

Family phases



Gwanda: Household typologies (3)

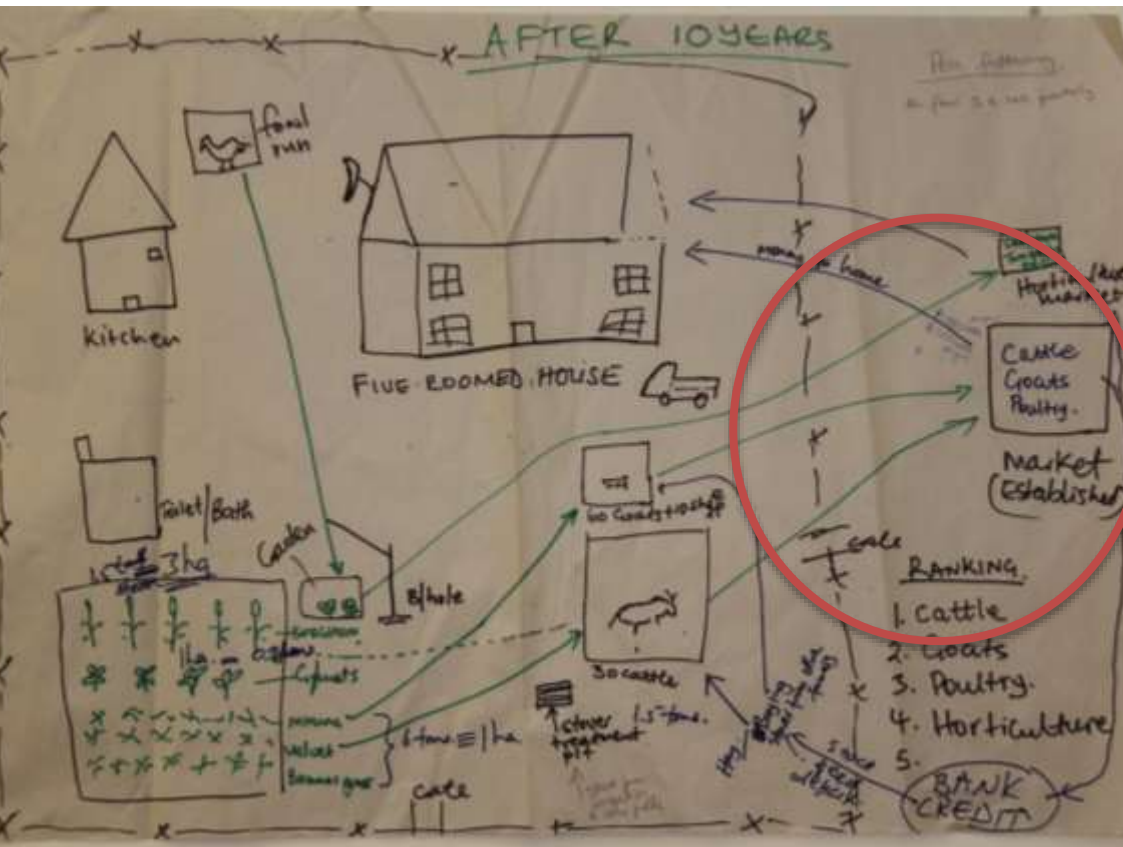
Predispositions to invest



Gwanda: community visioning

Entry points for sustainable intensification

Promoting livestock markets to provide incentives for farmers



1. Strengthen market development

- Improve sale pen management, auctioning, grading
- Improve access to inputs and market information
- Enhance fodder production and pen feeding for market oriented production

2. Increase crop production

- Improve soil fertility through better manure management
- Water harvesting technologies
- Pests and disease control
- Identify opportunities for sorghum

Conclusions

- More market oriented crop livestock production is smart for sustainable intensification processes
- Strong growth potential + diversity of farming systems
→ multiple pathways and transitions towards improved systems
- Farmers have different predisposition to invest
→ household typologies can be useful to define context specific interventions in an iterative process
- Involving communities and stakeholders to define such transitions is critical to enhance the local capacity to adjust

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