



CbCCA Methodology

For community level implementation and climate resilience building

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A smallholder level decision support process improves resilience to climate change

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mahlathini
development foundation



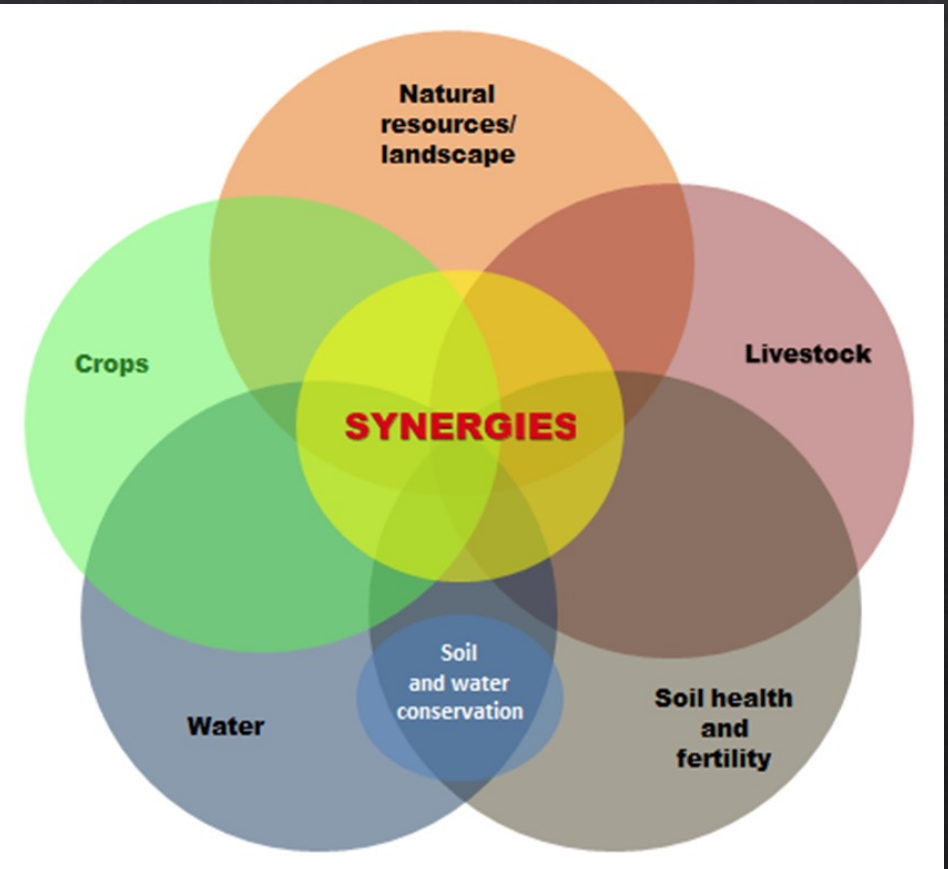
DSS Guiding principles

SOCIO-ECONOMIC

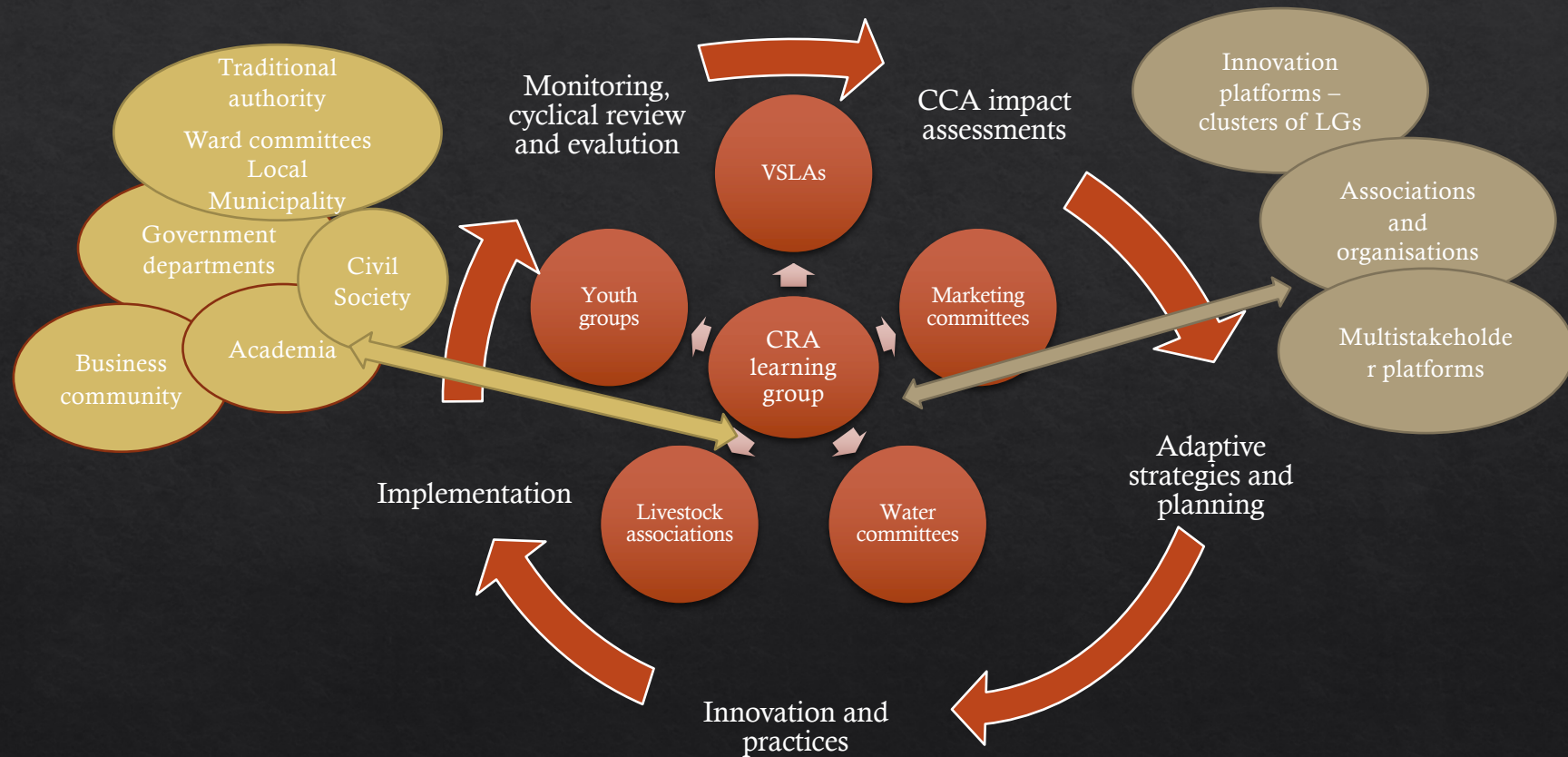
- ◇ Build on **community-based criteria**, indicators and priorities
- ◇ Generate **transitional strategies**
- ◇ Assess **costs and benefits**
- ◇ Link national and local **planning mechanisms**
- ◇ Strengthen **local networks**
- ◇ Promote **values other than financial values**
- ◇ Prioritize **locally appropriate actions**

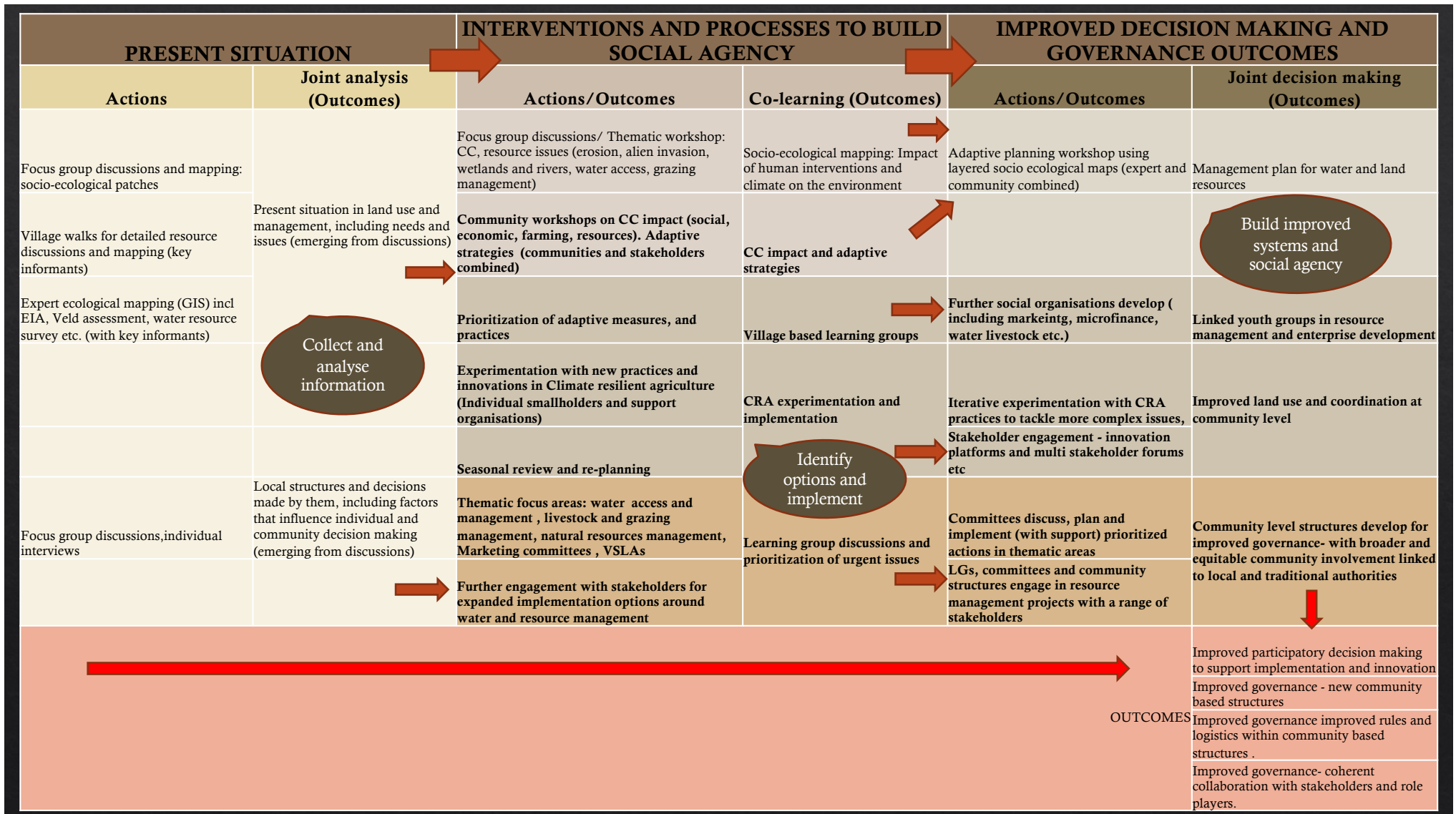
SOCIO-ECOLOGICAL

- ◇ Encourage **crop diversity** and **continuity**
- ◇ Ensure **healthy soil**
- ◇ Protect **natural resource base** and **ecosystem services**
- ◇ Reduce external inputs
- ◇ Make the **most effective use** of water and land for all purposes
- ◇ Enhance understanding and skills in storage, value adding, and marketing – go beyond immediate markets

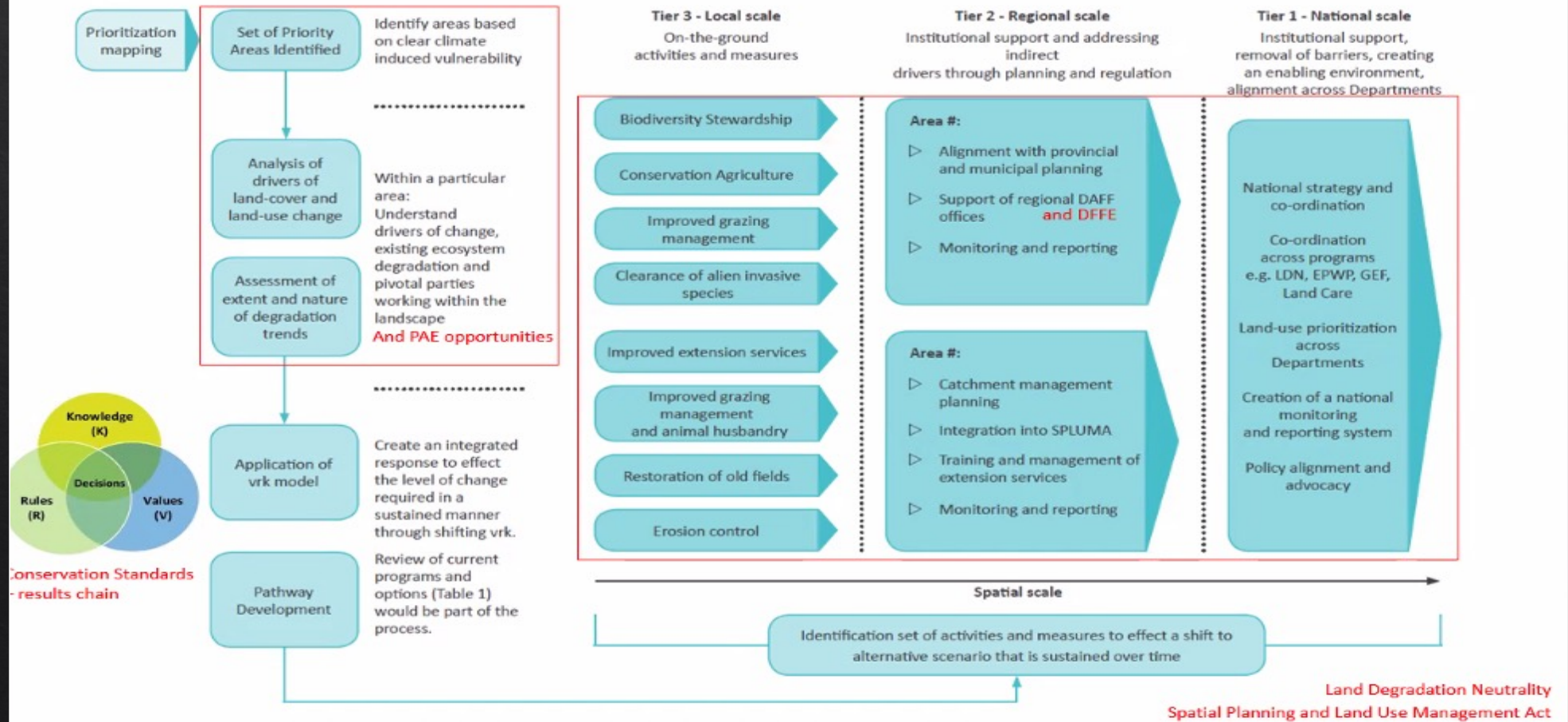


CRA learning groups: Process for development of social agency

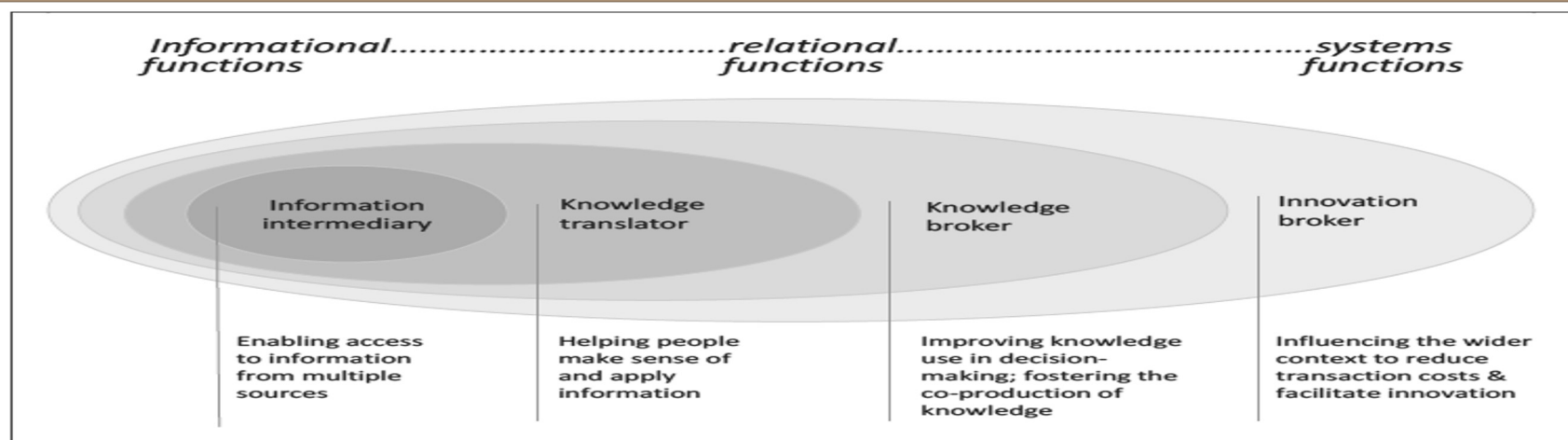




National EbA framework



Smallholder CCA decision support system: individual and facilitated



Activities and processes	Local good practice	Climate Change dialogues	Farmer level experimentation to test practices	CoPs and innovation platforms
	Best practise options	Impacts of CC	Introduction of new practices and ideas to try	Benchmarking for visual indicators
	Stakeholder engagements	Adaptive strategies	Learning and mentoring	
	Materials and information	Appropriate practices	Assessment of outcomes and impacts	
	Internet based platform		Cyclical, iterative learning and implementation	
Facilitator-Farmer Decision Support System				

The outputs/outcomes of the process

A choice of appropriate, tested practices and technologies for implementation at homestead and field level across a range of bioclimatic regions

A locally relevant decision support system (DSS) for implementing CRA and SWC practices in smallholder farming systems in South Africa

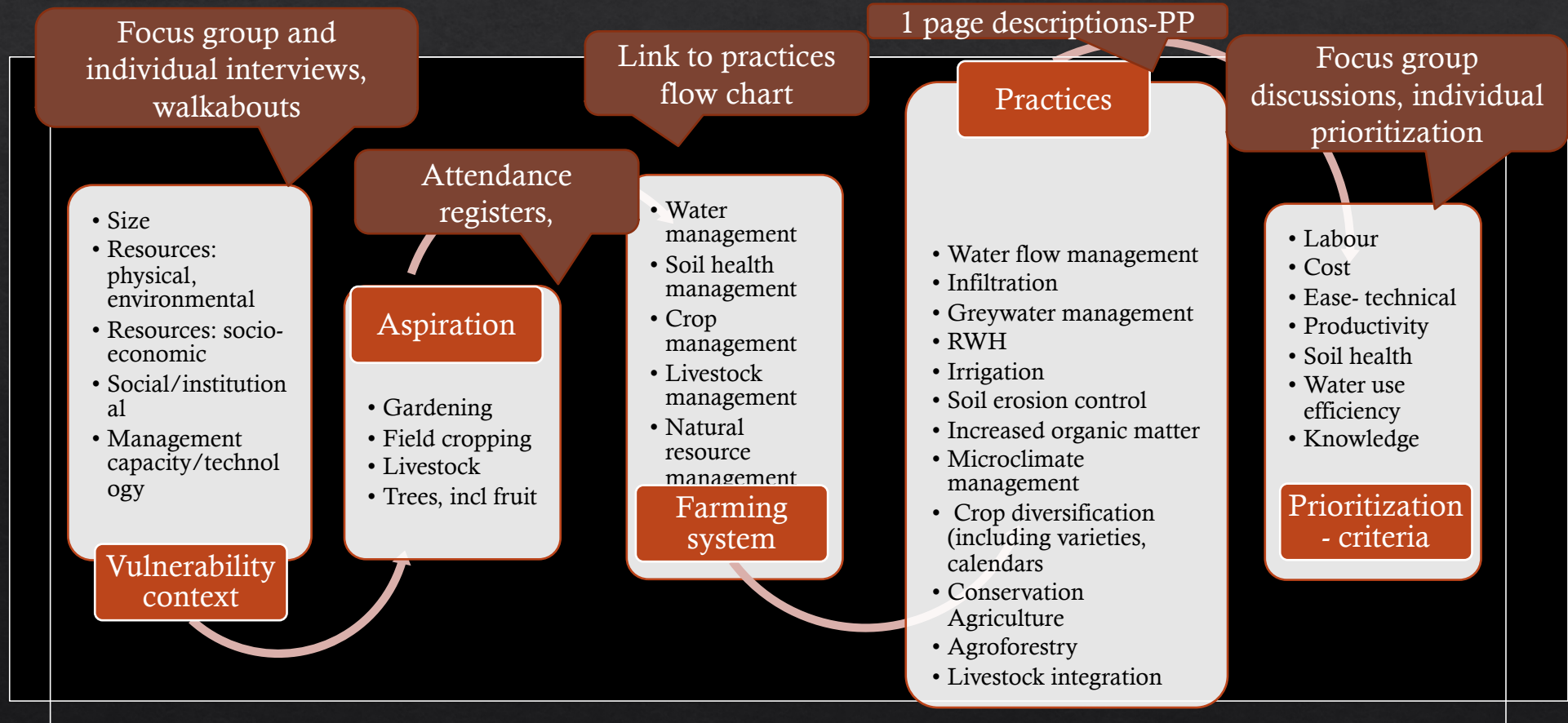
Baskets of options for use at community level for introduction of concepts, awareness raising and implementation, across a range of bioclimatic regions

Recommendations for appropriate knowledge mediation, learning and dissemination strategies for CRA in smallholder farming systems

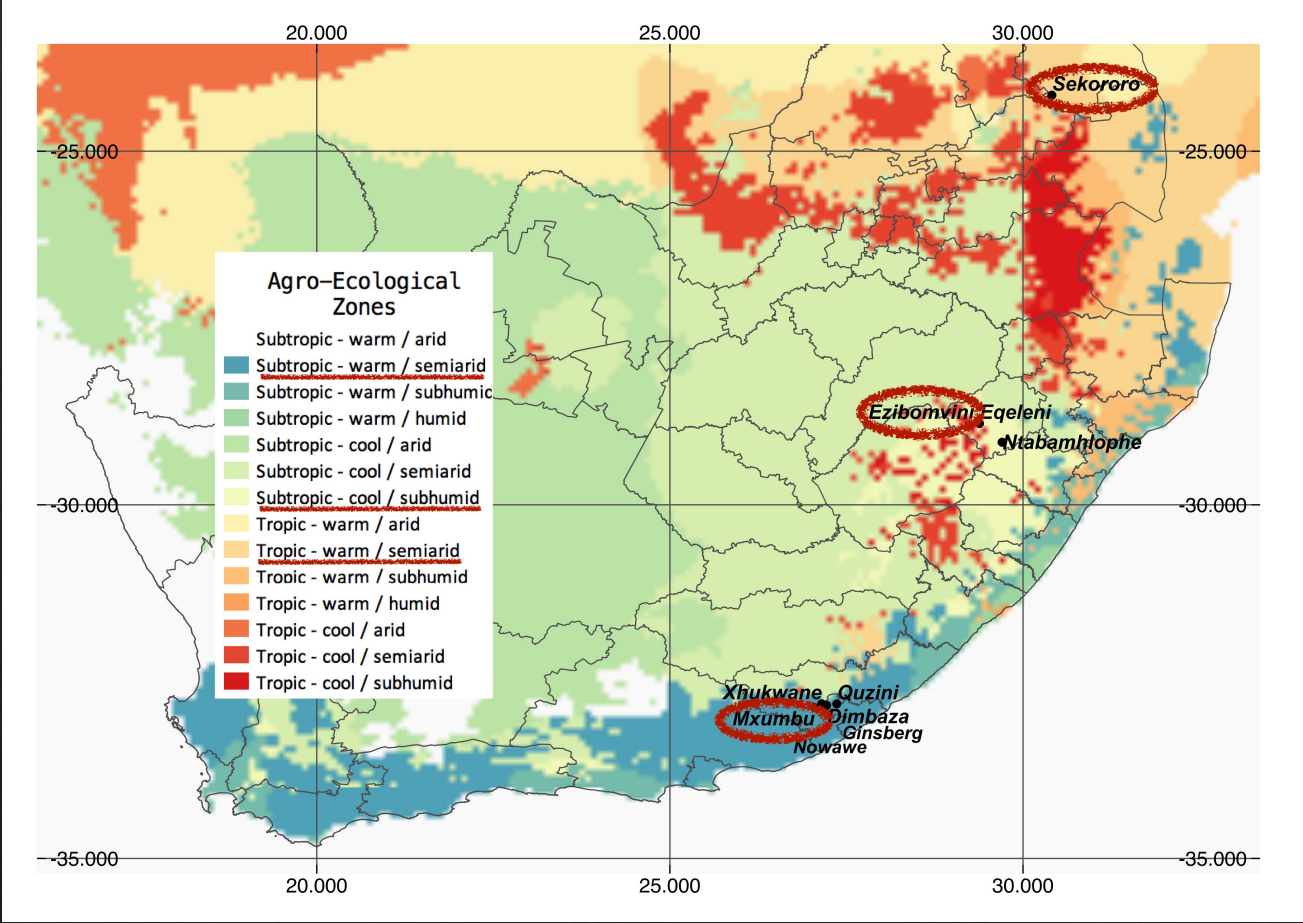
A model for community-based monitoring of CRA indicators.

DSS outline

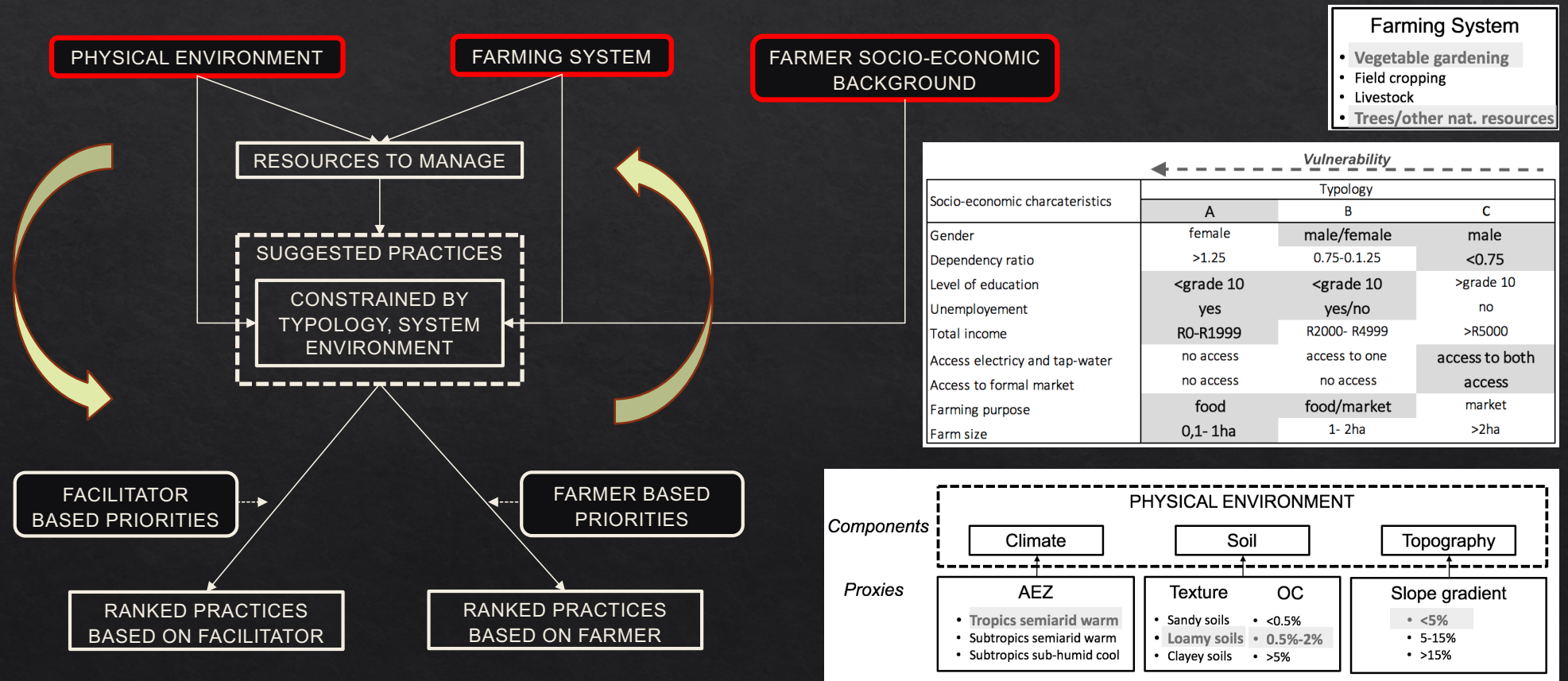
Start with desktop information re CC information for the locality and general farming information, then go on to focus group discussions and individual interviews



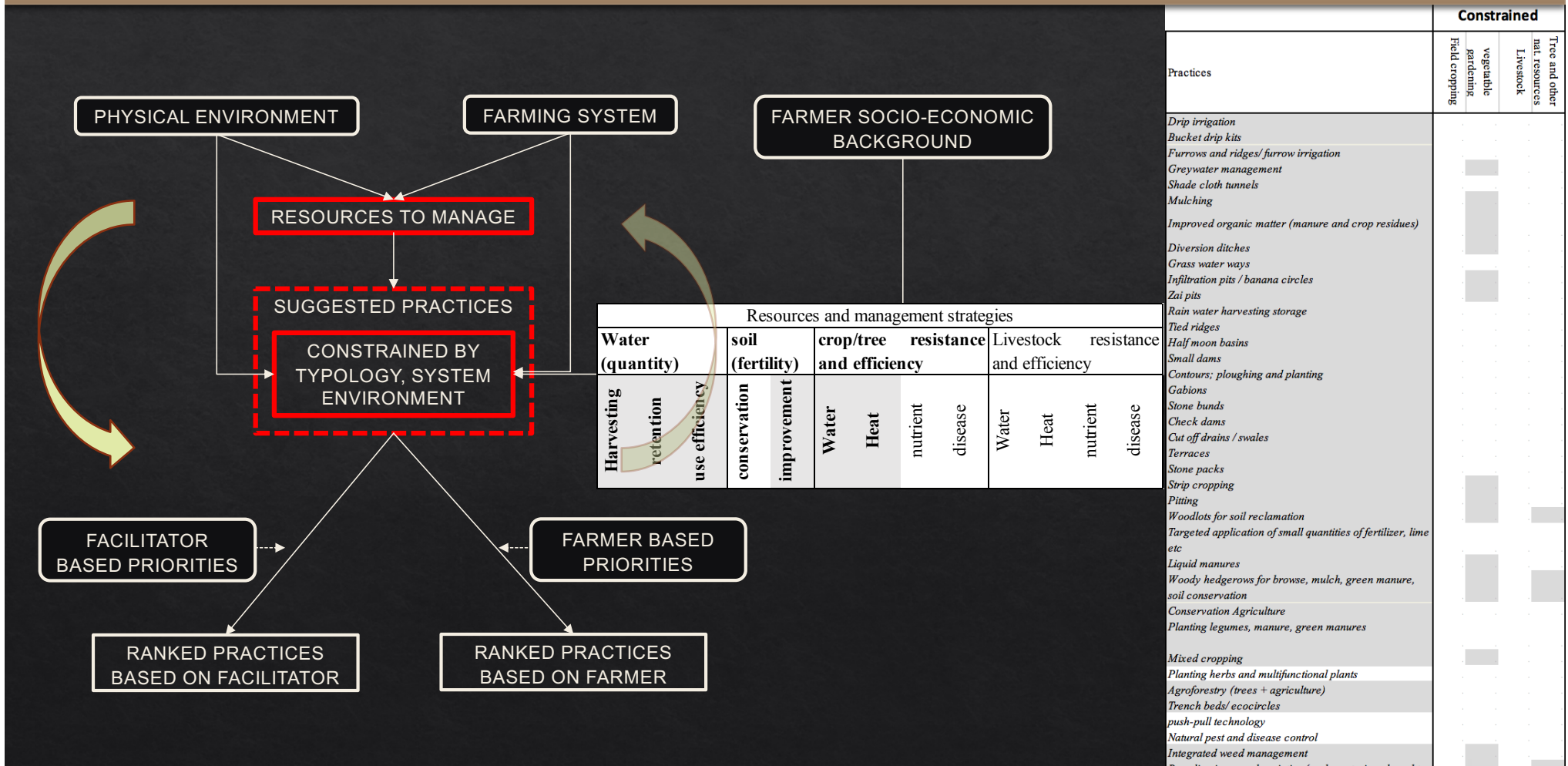
DSS example: Individual-online



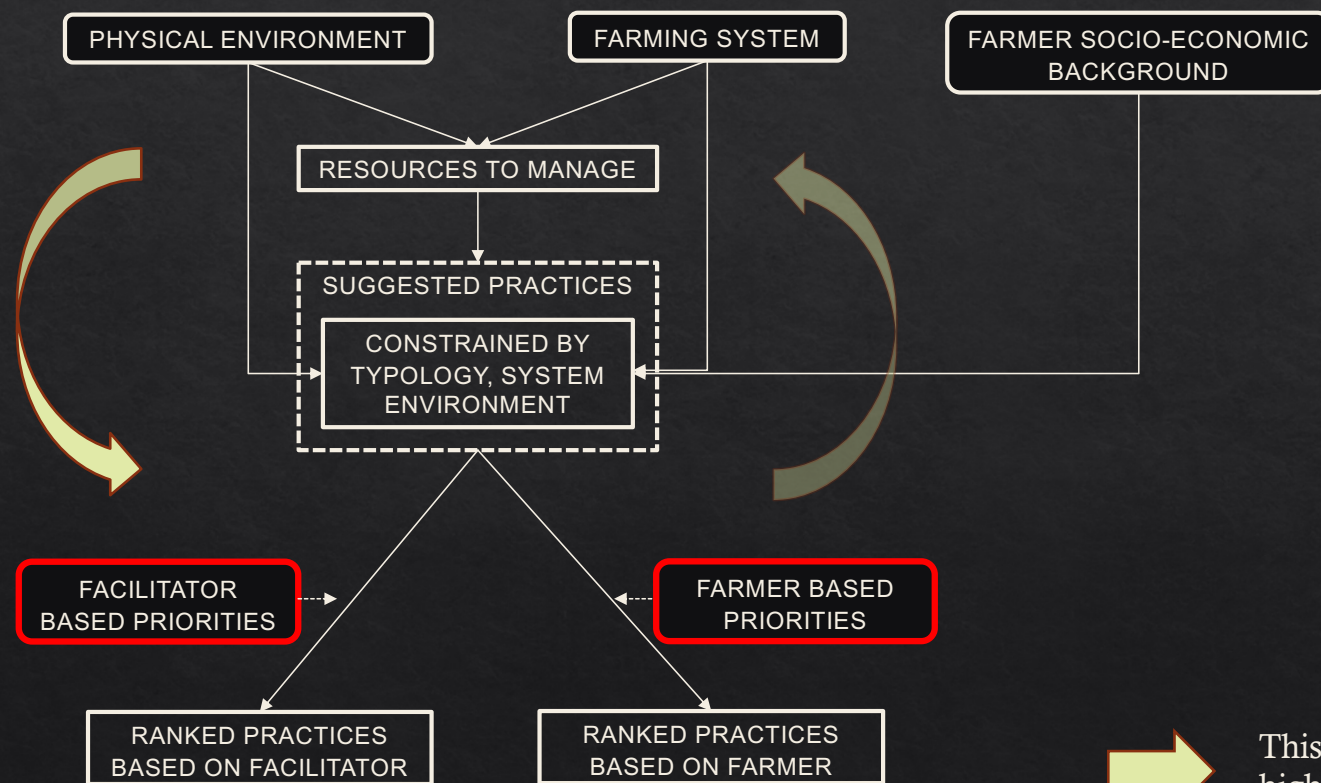
Input for DSS: e.g. Farmer in Sekororo



Output of DSS: Suggested practices



Prioritization by farmer & facilitator



For each suggested practice, scores (1-3) are provided per theme by

facilitator concerning impact on:

- water
- soil
- crop
- Livestock
- Tree and natural resources

farmer concerning need for/benefit to:

- labour
- investment
- skills
- crop productivity
- water saving

➔ This helps to identify the practices that have a higher probability of being adopted or not

FOCUS GROUP DISCUSSIONS:

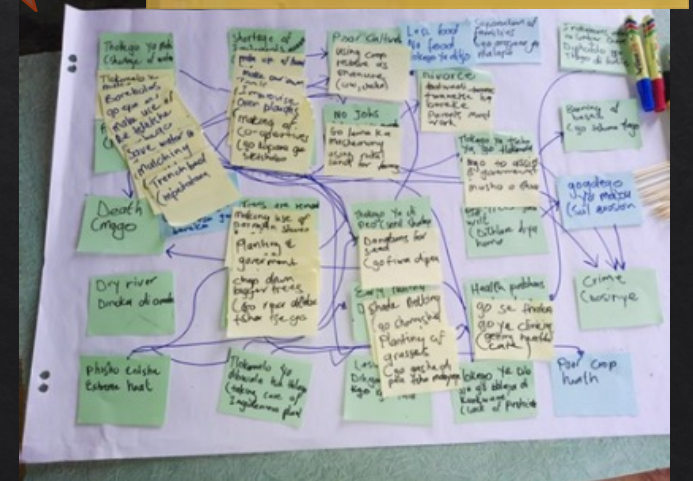
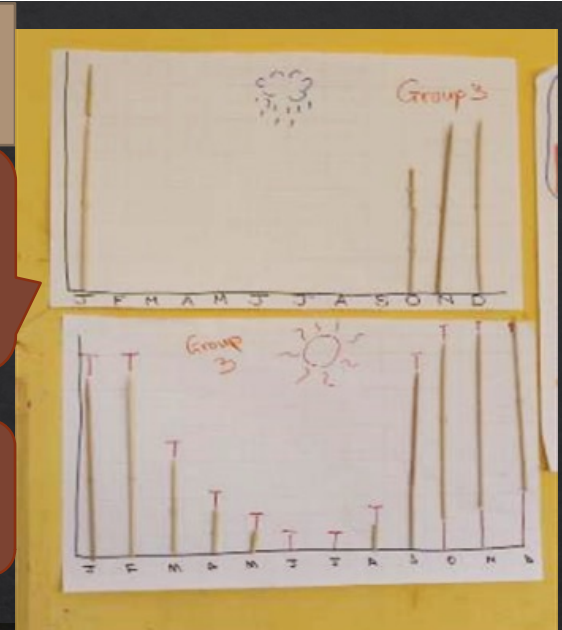
CC dialogues – effects (past, present, future), seasonality, impacts, practices, prioritization criteria

WORKSHOPS OUTLINE (CCA workshops 1-3)

1. What we are seeing around us, what has been happening (nature, economy, society, village, livelihoods, farming) (*list main issues (biophysical, social, economic) – with ranking of vulnerability, organisational mapping, financial flows and services mapping,*
2. Past, present, future of farming activities and livelihoods (*timelines and trends*)
3. Climate vs weather (*role play*)
4. Scientific understanding of climate change (*Power point input*)
5. Seasonality diagrams of temperature and rainfall – generally what it is, what is changing (*seasonality diagrams*)
6. Reality maps (choose temp, or rainfall): draw up mind maps of impacts (*Impact mapping*)
7. Turn impacts in to priority goals (positive statements) and think through adaptive measures that we know of or think could work (*Adaptation strategies*)
8. Introduce a range of practices (facilitation team) related to these goals to broaden potential adaptive measures (*A4 picture summaries and power point presentations*)
9. Walkabouts and individual interviews (*transect walks, key informant interviews, mapping of local innovations/adaptations*)
10. Prioritization of practices – matrix using farmer level criteria for assessment (*matrix ranking and scoring*)
11. Planning of farmer experimentation, learning sessions and implementation of practices (*Individual experimentation outlines, lists*)

Seasonality diagrams; rainfall, heat

Impacts; reality map



Climate change impacts on livelihoods and farming

	KZN	EC	Limpopo
Water	Less water in the landscape; streams and springs dry up, borehole run dry, soils dry out quickly after rain	Less water in the landscape; streams and springs dry up, borehole run dry, soils dry out quickly after rain	Less water in the landscape; streams and springs dry up, borehole run dry, soils dry out quickly after rain
	Dams dry up	Dams dry up	Dams dry up
	Municipal water supply becoming more unreliable	Municipal water supply becoming more unreliable	Municipal water supply becoming more unreliable;
			Need to buy water for household use – now sometimes for more than 6 months of the year
			RWH storage only enough for household use.
Soil	More erosion Soils becoming more compacted and infertile	More erosion Soils becoming more compacted and infertile	More erosion Soils becoming more compacted and infertile
			Soils too hot to sustain plant growth
Cropping	Timing for planting has changed- later	Timing for planting has changed- later	Can no longer plant dryland maize
			All cropping now requires irrigation – even crops such as sweet potato
			Drought tolerant crops such as sorghum and millet grow-- but severe bird damage
	Heat damage to crops Reduced germination and growth	Heat damage to crops Reduced germination and growth	Heat damage to crops Reduced germination and growth
	Seeding of legumes becoming unreliable	Seeding of legumes becoming unreliable	Seeding of legumes becoming unreliable
	Lower yields	Lower yields	Lower yields
			Winter vegetables don't do well - stress induced bolting and lack of growth
	More pests and diseases Loss of indigenous seed stocks	More pests and diseases	More pests and diseases Loss of indigenous seed stocks
Livestock	Less grazing; not enough to see cattle through winter	Less grazing; not enough to see cattle through winter	Less grazing; not enough to see cattle through winter
	More disease in cattle and heat stress symptoms	More disease in cattle and heat stress symptoms	More disease in cattle and heat stress symptoms
	Fewer calves	Fewer calves	Fewer calves
	More deaths	More deaths	More deaths

Climate Change impacts as discussed by smallholders



Natural resources	Fewer trees; too much cutting for firewood	Fewer trees; too much cutting for firewood	Fewer trees; too much cutting for firewood
	Decrease in wild animals and indigenous plants	Decrease in wild animals and indigenous plants	Decrease in wild animals and indigenous plants
	Increased crop damage from wild animals such as birds and monkeys	Increased crop damage from wild animals such as birds and monkeys	Increased crop damage from wild animals such as birds and monkeys
	Availability of indigenous vegetables has decreased		No longer able to harvest any resources due to scarcity
			Increased population puts pressure on resources
Social	More diseases Increased poverty and hunger	More diseases Increased poverty and hunger	More diseases Increased poverty and hunger
	Increased crime and reduced job opportunities	Increased crime and reduced job opportunities	Increased crime and reduced job opportunities
			Increased food prices Increased conflict Inability to survive

Climate Change impacts as discussed by smallholders – continued.



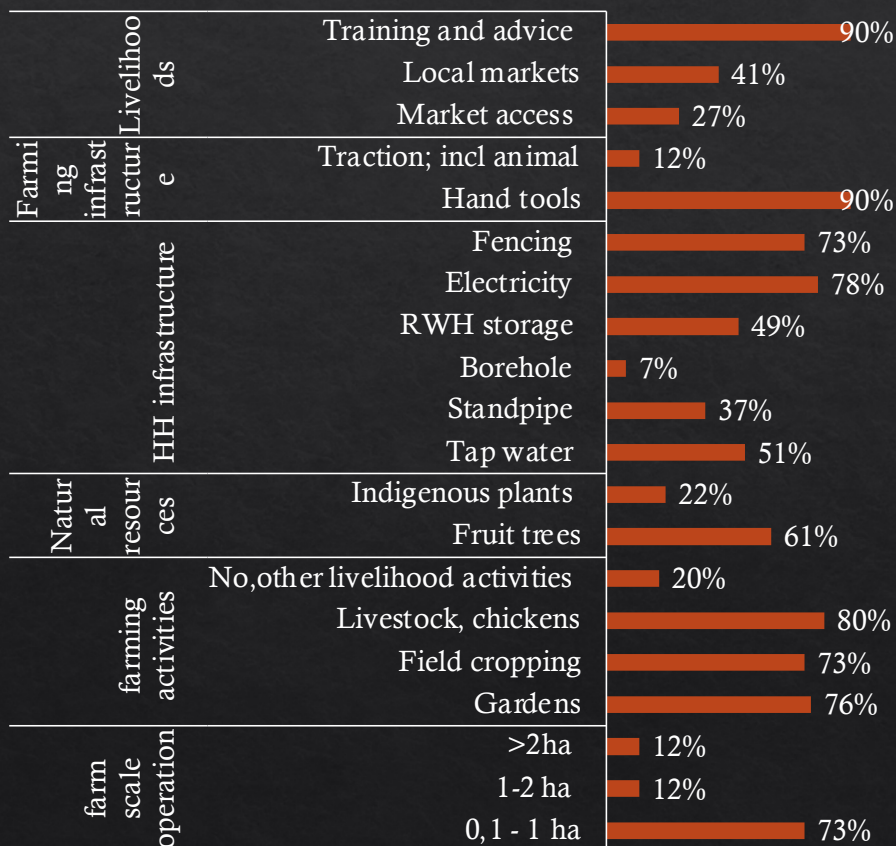
We are being punished by God for not living correctly

Climate change is a reality and we will need to find different ways to do thing to survive

It feels as if the end of the world is coming

Individual interviews and walkabouts

Baseline information: Vulnerability assessment



- ◇ Lay of the land; land use patterns, ecological stresses, climate stresses
- ◇ Local adaptations



Ezimbovini (KZN) walkabout:- shows heat and moisture stress in sweet potatoes, garden crops such as cabbages and CA intercropping trial with maize and beans

Potential adaptive measures

In all villages farmers have some ideas, or many, of potential practices for CCA

Area	Village	Natl resources/ landscape	Water (manage and increase available water)	Soil health and fertility (incl Manage soil movement)	Crops	Livestock	Other
Bergville	Thamela		RWH		Mulching Manure and fertilizer		Savings groups bulk buying
Bergville	Ezibomvini		Spring protection	Compost	Natural P&D control	Plant fodder	
			RWH storage tanks; Jo-Jo tanks	Furrows	Conservation Agriculture	Fodder supplementation	
			Infield rainwater harvesting	Contours	Mulching Tunnels		
			Drip kits	Diversion ditches			
			Greywater; tower gardens	Stone bunds			
			Infiltration pits/ banana circles				
			Small dams				

*Suggestions for
Natural
resource
management
lag behind for
most groups*

Stone bunds

- Rainfall: >150mm/year
- Temperature: >5°C
- Topography: 0,5%-5%
- Soil: all types – where stones and rocks are easily available

- Gardens, fields
- <0,1ha, 0,1-1ha, >2ha
- Low cost, local resources,
- Labour intensive

DESCRIPTION

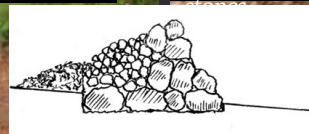
-Pack stone lines on contours to control water movement

- The stones are keyed into a shallow ditch and larger stones are packed downslope from the smaller stones to avoid stone lines from breaking and allow slow movement of water through the stone lines

-Planting can be done below the stone line as more water accumulates there, or just above the stone line in the accumulated silt and soil

Stone lines are constructed on contour and can be done at any scale.

A view showing the stones keyed into a ditch with larger stones downslope of the smaller



Small stone lines are used to control run-off from a road and channel water into the gardens

Brinjals planted in accumulated silt above a garden level stone line

Bananas planted below a substantial stone line



Bucket Drip kits

- Gardens
- <0,1ha,
- Medium cost, medium skills, including learning and mentoring
- Medium maintenance – drippers need to be checked and cleaned regularly ; medium labour intensive to set up, maintenance easy.

DESCRIPTION

- Stones and sand are placed in a bucket (20L) for filtration of greywater to be used in dripping system
- The drip kit is assembled on site making your own string drippers and choosing width of lines and spacing of drippers.
- 2 lines 30cm apart and 5 m long is good for a trench bed and provides 4mm of irrigation.
- Watering is done on a daily basis



A well functioning string dripper that makes a wetted circle around the dripper

Bucket with stones; a cloth bad of sand is added on top to complete the filter



Making the string drippers



Attaching the dripper lines to the feeder pipe from the bucket



210l drum drip irrigation system used in a tunnel



Mulching the beds adds to efficient water management



A bucket drip kit irrigating a 1mx 3m trench bed with mixed



PRIORITIZATION OF PRACTICES:

Oaks, Lepelle, Finale – Limpopo – Criteria used to assess impact of implementation of different practices

Oaks, Finale, Lepelle: Impact of CRA practices								
SCALE: 1=low; 2 = medium, 3= high (agreement between participants)								
CRITERIA PRACTICES	Easy to do	More food	Better growth	Good water man	Better soil fertility	Score	Rank	COMMENTS
Trench beds	1	3	3	3	3	13	5	Very good for growth, soil health and water management. The best practice- but difficult to dig
Mulching	3	3	3	3	3	15	2	Less irrigation providing more food
Furrows	2	2	3	3	3	13	4	more moisture, better growth, carries some fertility in the water
Rock bunds	2	3	3	3	3	14	3	deep irrigation, catches more fertile soil
Adding organic matter to the soil	3	3	3	3	3	15	1	easier than trench beds
Crop varieties	1	1	1	1	1	5	7	we do not have the knowledge-but will be easy once we know
Planting times	2	1	1	1	1	6	6	would be nice to have a calendar to remember.



CRA implementation examples Limpopo 2019/20



1

2

3

4

5

6

7

8

- 1 CA intercropping
- 2. Harvesting trad crops; sorghum, juko beans
- 3. S&W conservation; stone lines
- 4. Check dams
- 5. Shallow trench beds
- 6. Small dams (lined with bentonite)
- 7. Mango production; pruning, fertilization
- 8. Water committees; drilling boreholes

Impact: Resilience snapshots; Individual interviews

Resilience indicators	Increase for Limpopo	Increase for KZN	Comment
Increase in size of farming activities	Gardening; 1% Field cropping; – 98% Livestock; 6%	Gardening – 18% Field cropping – 63% Livestock – 31%	Cropping areas measured, no of livestock assessed Dryland cropping has reduced significantly due to drought conditions and infertile soil
Increased farming activities	No	No	All involved in gardening, field cropping and livestock management
Increased season	Yes	Yes	For field cropping and gardening- autumn and winter options
Increased crop diversity	Crops: 21 new crops Practices: 11 new practices	Crops: 12 new crops Practices: 8 new practices	Management options include; drip irrigation, tunnels, no-till planters, JoJo tanks, RWH drums,
Increased productivity	Gardening; 120% Field cropping: 15% Livestock: 6%	Gardening – 72% Field cropping – 79% Livestock – 25%	Based on increase in yields (mainly from tunnels and trench beds for gardening CA for field cropping
Increased water use efficiency	45%	25%	Access, RWH, water holding capacity and irrigation efficiency rated
Increased income	13%	13%	Based on average monthly incomes, mostly through marketing of produce locally and through the organic marketing system
Increased household food provisioning	Vegetables; 7-10kg/week Fruit; 5-10kg/week Dryland crops (maize, legumes, sweet potatoes); 5-10kg/week	Maize- 20kg/week Vegetables – 7kg/week	Food produced and consumed in the household
Increased savings	Not applicable	R150/month	Average of savings now undertaken
Increased social agency (collaborative actions)	2	2	Learning groups, farmer centres, local water committees
Increased informed decision making	5	5	Own experience, local facilitators, other farmers, facilitators, extension officers
Positive mindsets	2-3	2-3	More to much more positive about the future: Much improved household food security and food availability



Impact: Participatory impact assessment

	Soil; health and fertility	Money; income and savings	Productivity ; acceptance of practice, saving in farming – equipment, labour	Knowledge; increased knowledge and ability to use	Food; how much produced and how healthy	Water; use and access	Social agency; Support, empowerment	Total
Conservation Agriculture	22	21	26	28	18	23	18	156
Savings	6	15	14	15	12	11	15	88
Livestock	19	11	18	7	5	12	11	83
Gardening	14	15	12	13	15	17	21	107
Crop rotation	16	12	13	12	12	15	10	90
Intercropping	12	13	15	12	11	11	9	83
Small businesses	11	17	15	10	20	11	9	93

In KZN positive impact of CRA and associated practices in order of importance: CA, gardening (tunnels, agroecology) , small businesses (farmer centres, poultry), savings, livestock (integration – fodder, health)

Conclusions

- ◇ Systemic approach
 - ◇ Grounded in local contextualisation
 - ◇ For appropriate community led implementation and
 - ◇ Participatory impact assessment for
 - ◇ Incremental and cyclical improvements and behaviour change

Effective model for
CCA; locally
contextualised and
owned

Appropriate for partnering
in different contexts

Inclusion in IDPs, DDM