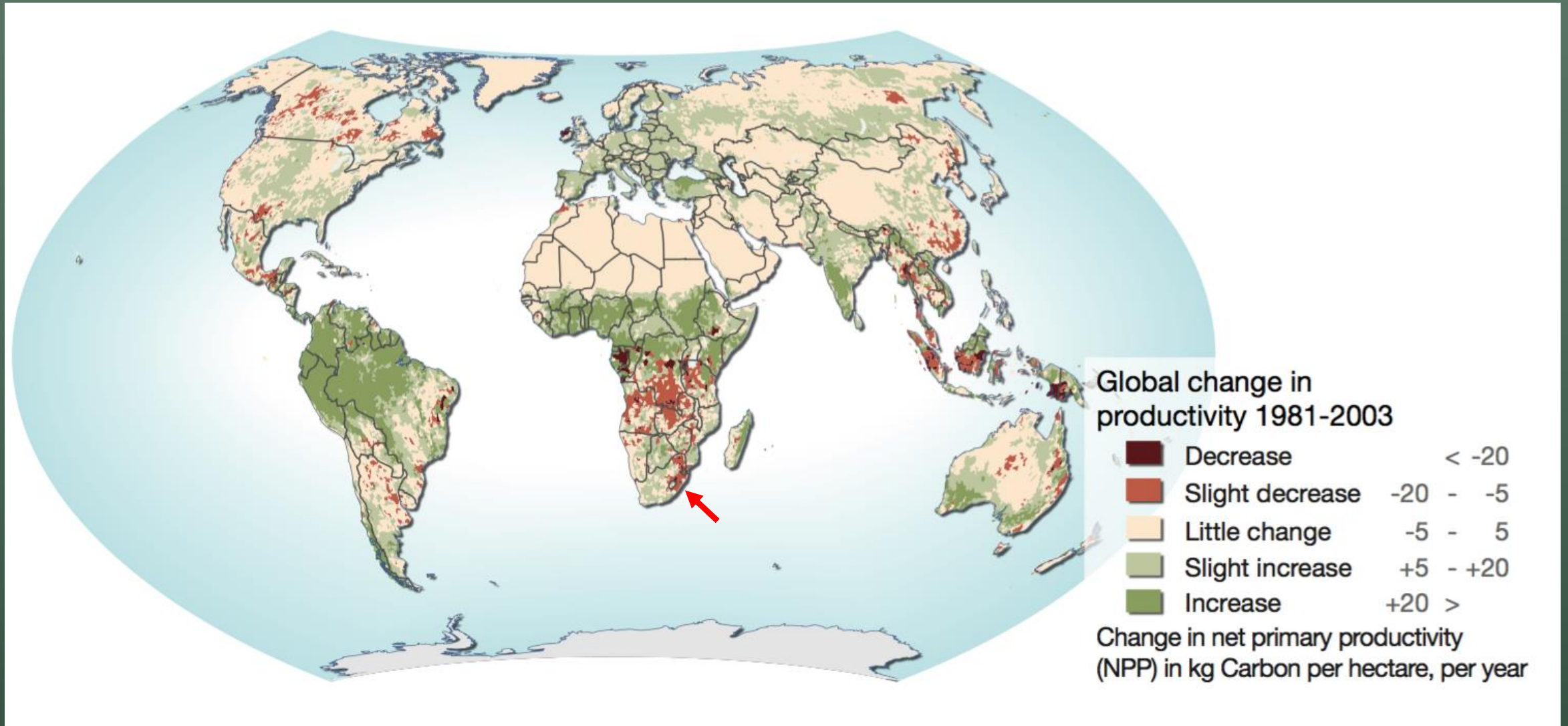


Decision Support System (DSS) for Climate Smart Agriculture (CSA) for Smallholder Farmers

Catherine Van den Hoof and Erna Kruger

WRC 2017-2020 project: Collaborative knowledge creation and mediation strategies for the dissemination of Water and Soil Conservation practices and Climate Smart Agriculture in smallholder farming systems.

Change in Farm Productivity

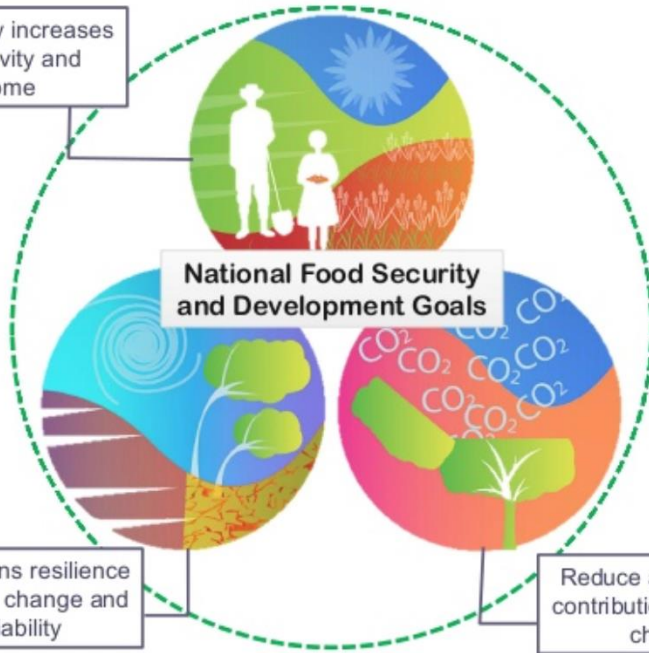


What is Climate Smart Agriculture (CSA)?

What is CSA?



Sustainably increases productivity and income



Strengthens resilience to climate change and variability

Reduce agriculture's contribution to climate change

- Minimize external inputs
- Maximise internal diversity
- Focus on soil health and natural soil building techniques
- Take care of the environment
- Use available water as efficiently as possible.
- Work together, learn together and plan together
- Local solutions and economies
- Farmer driven development
- Getting our hands dirty

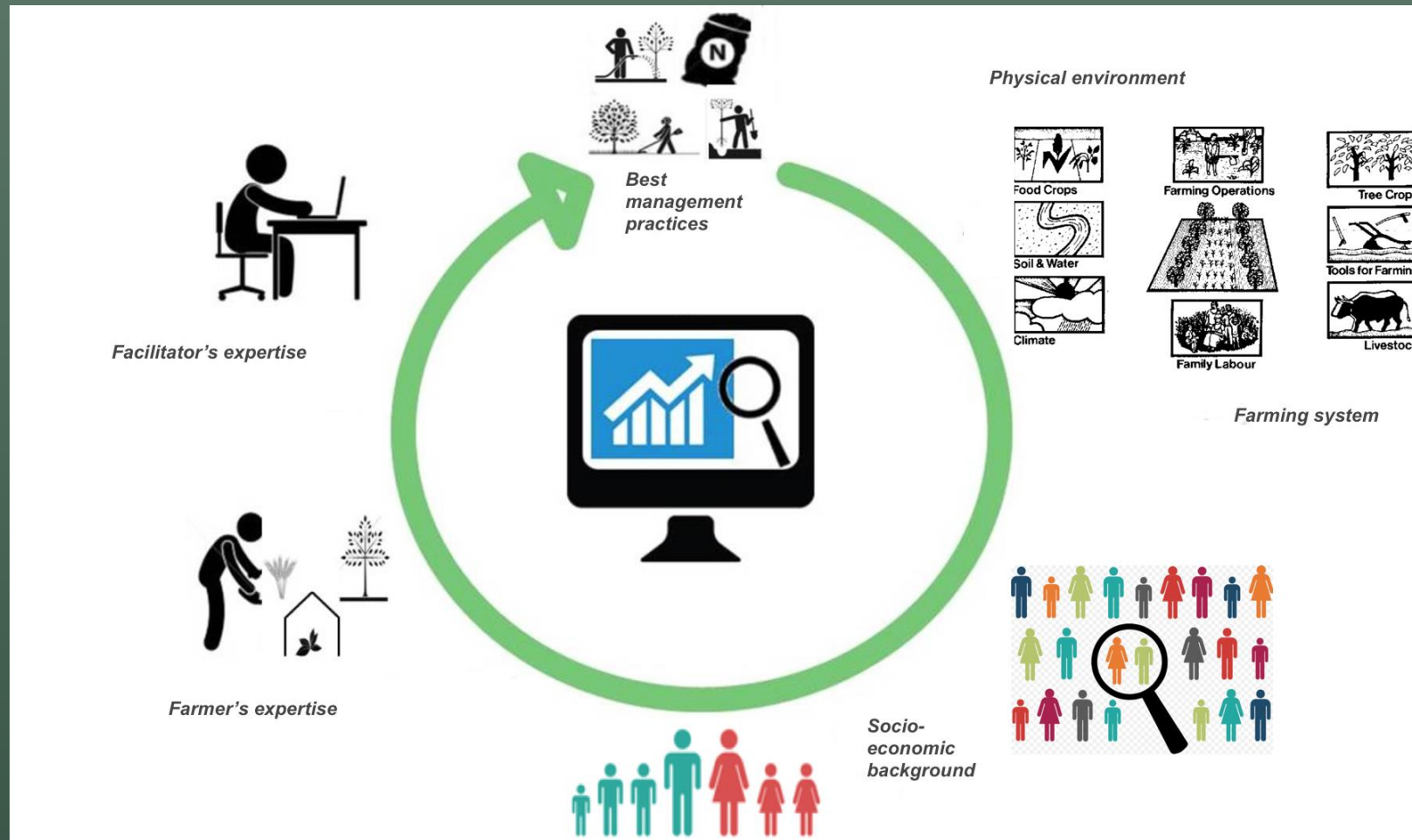


What is a Decision Support System (DSS)?



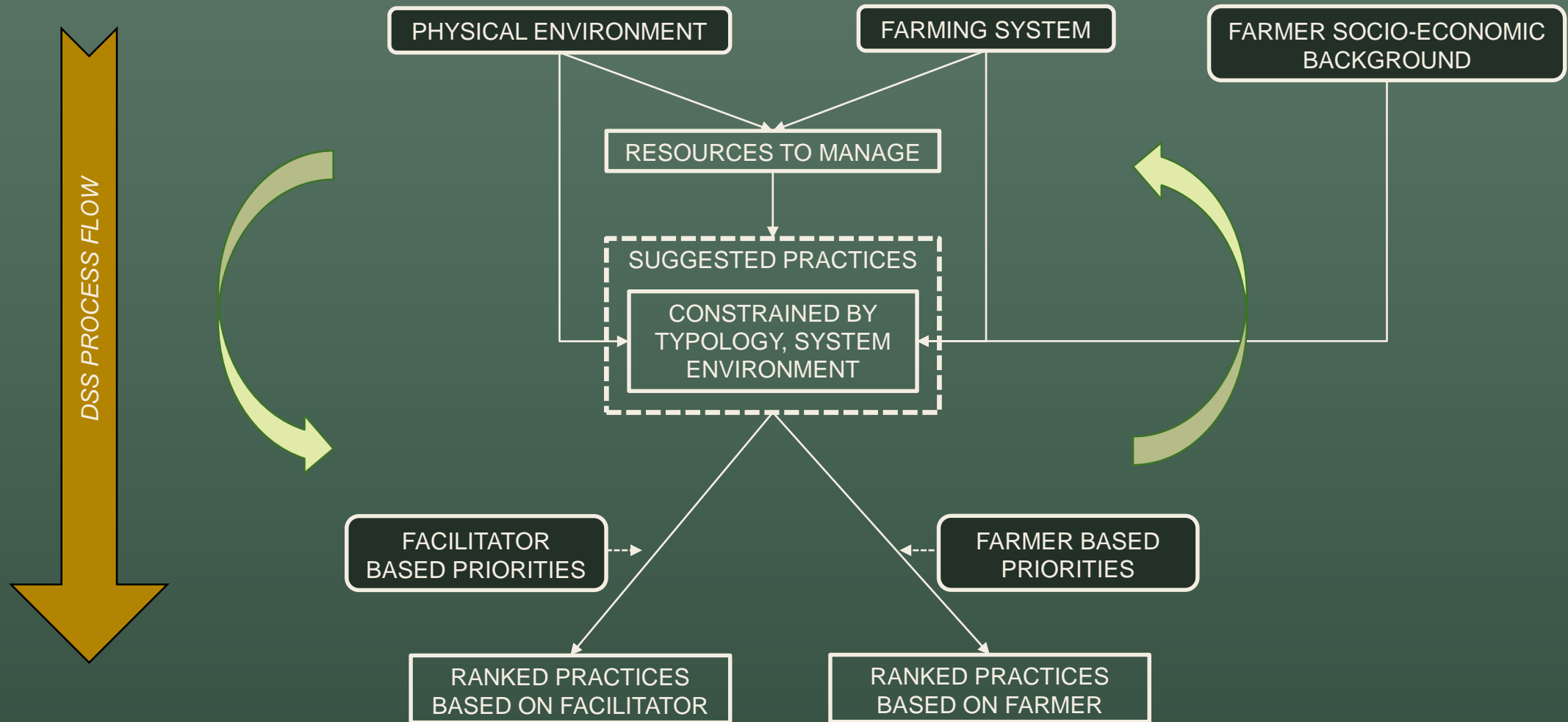
DSS are designed to help users make more effective decisions by leading them through clear decision stages and presenting the likelihood of various outcomes resulting from different options. These can be software tools, whose recommendations vary according to user's inputs, and they may suggest optimal decision path.

What is a Decision Support System (DSS)?

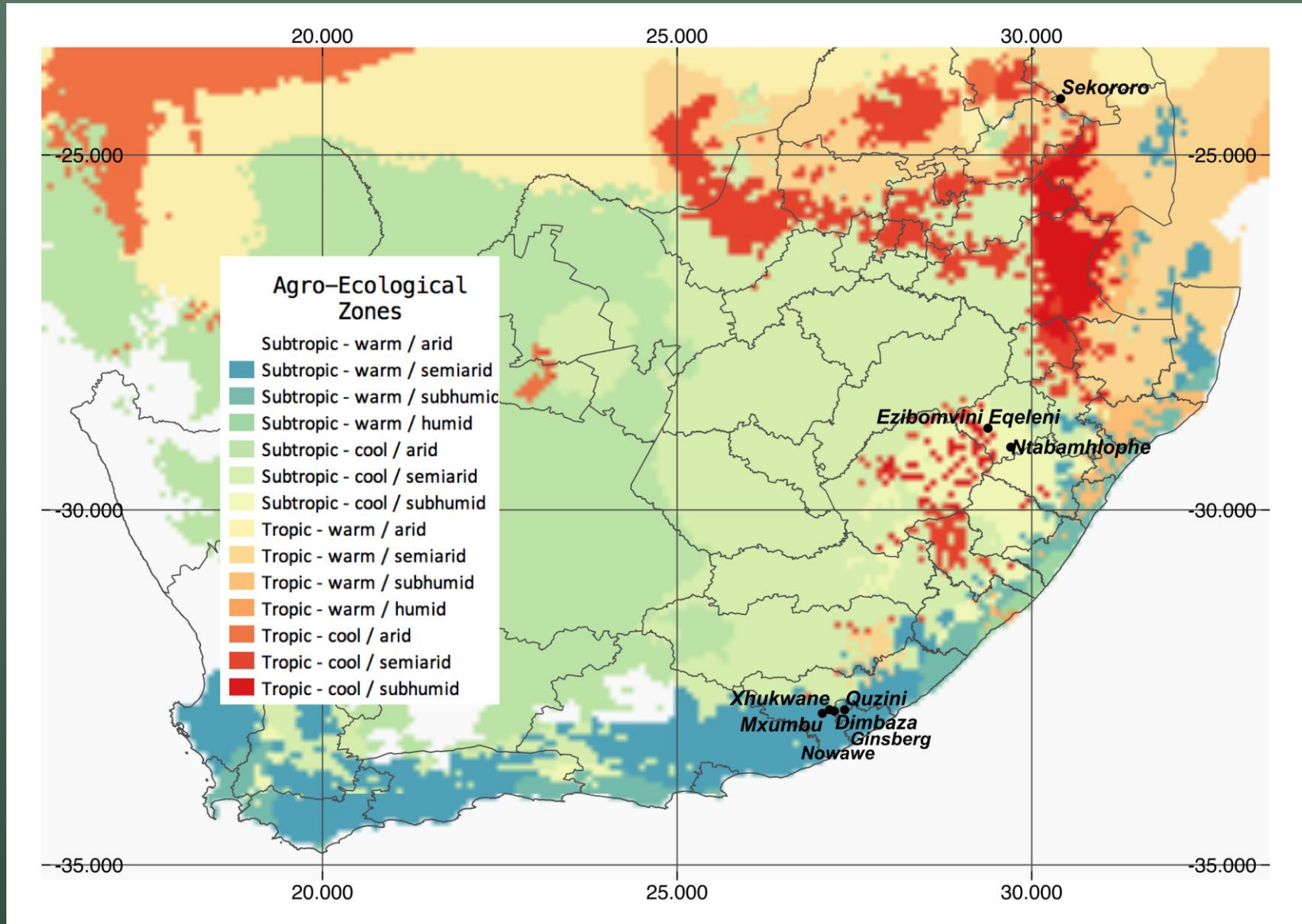


The objective of our DSS is to assist individual farmers or farming collectives in selecting appropriate options of managements practices to sustain and increase farm productivity given current climate, soil, topography, farming system and socio-economic conditions, and to strength their farming practices in light of climate change. The DSS considers individual circumstances, needs and aspirations.

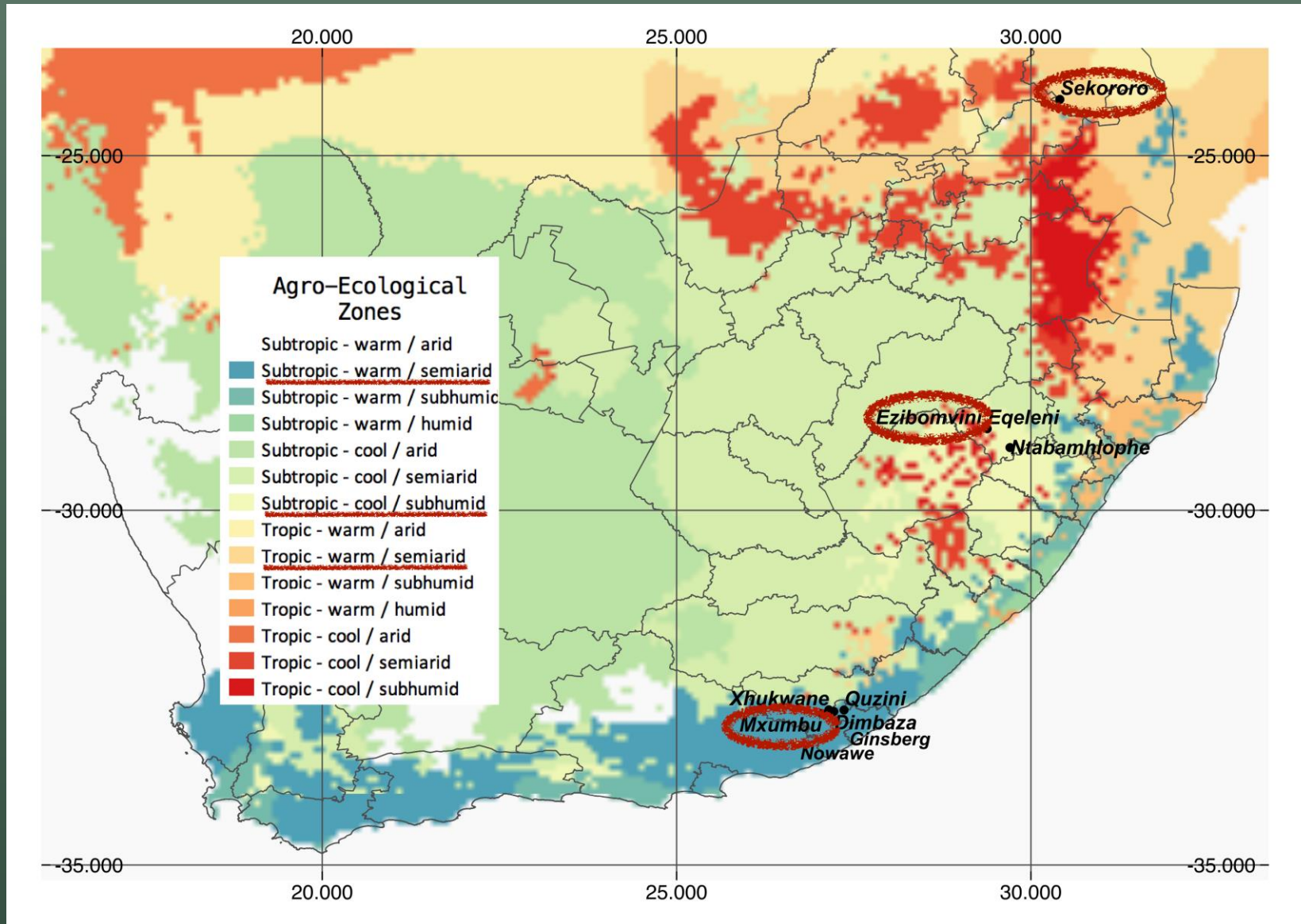
DSS for CSA - Best Management Practices



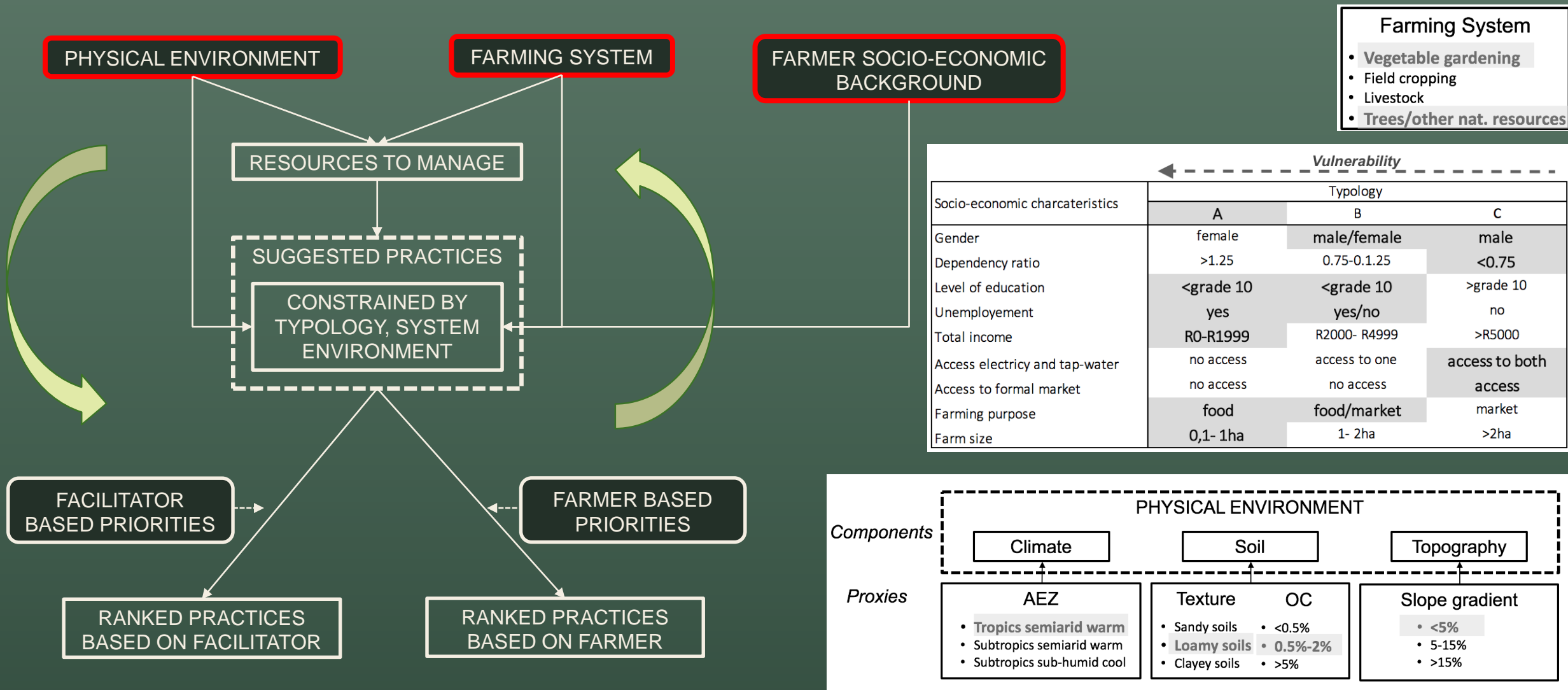
How Does the DSS Work in Practice?



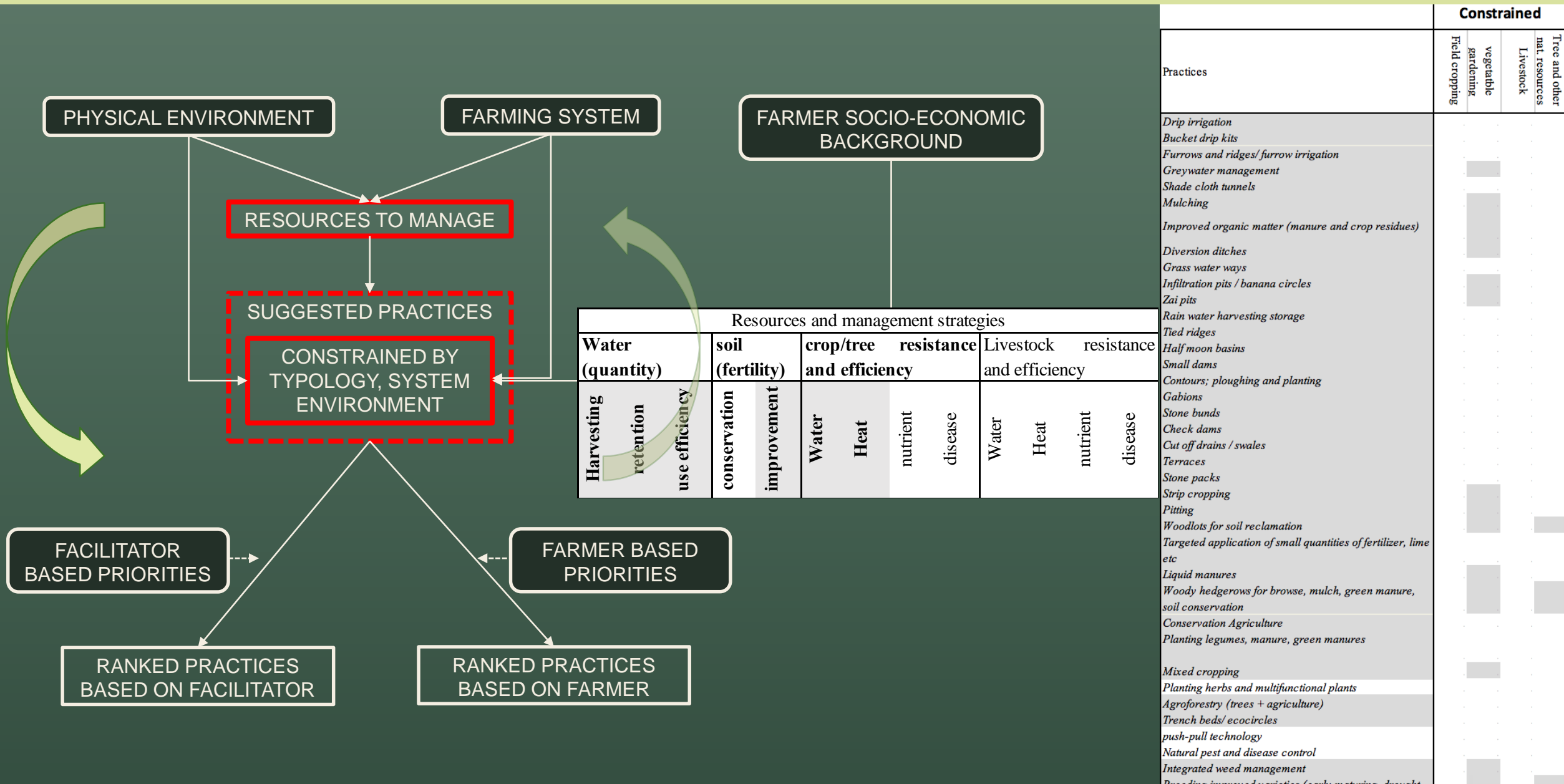
Example for 3 Smallholder Farmers



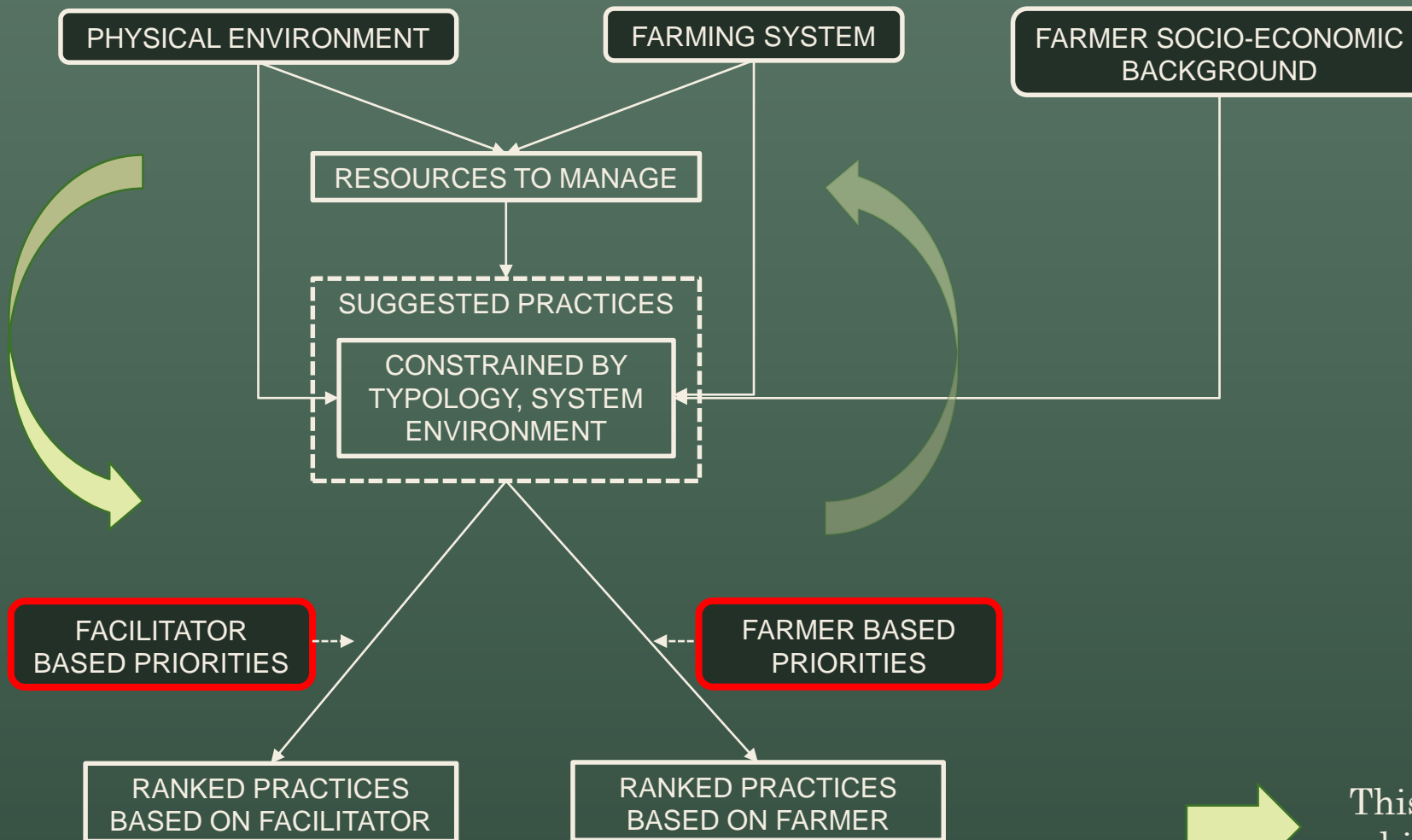
Input for DSS: e.g. Farmer in Sekororo



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

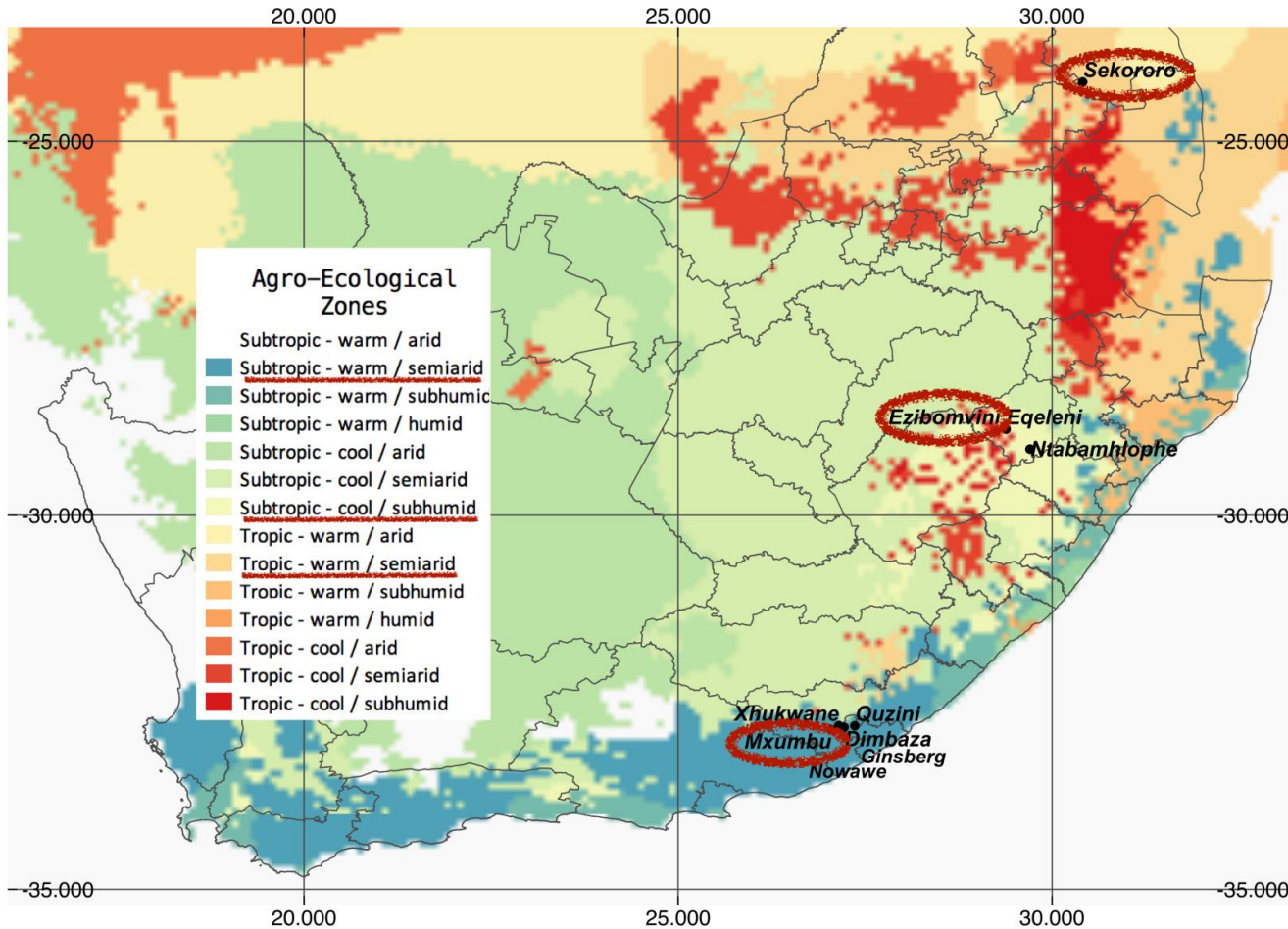
farmer concerning need for/benefit to:

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



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

Divergence in Suggested Practices



Focus on soil improvement however with less options in Mxumbu due to aridity, and less options still in Sekororo due to typology of farmer (A) and restricted farming practices.

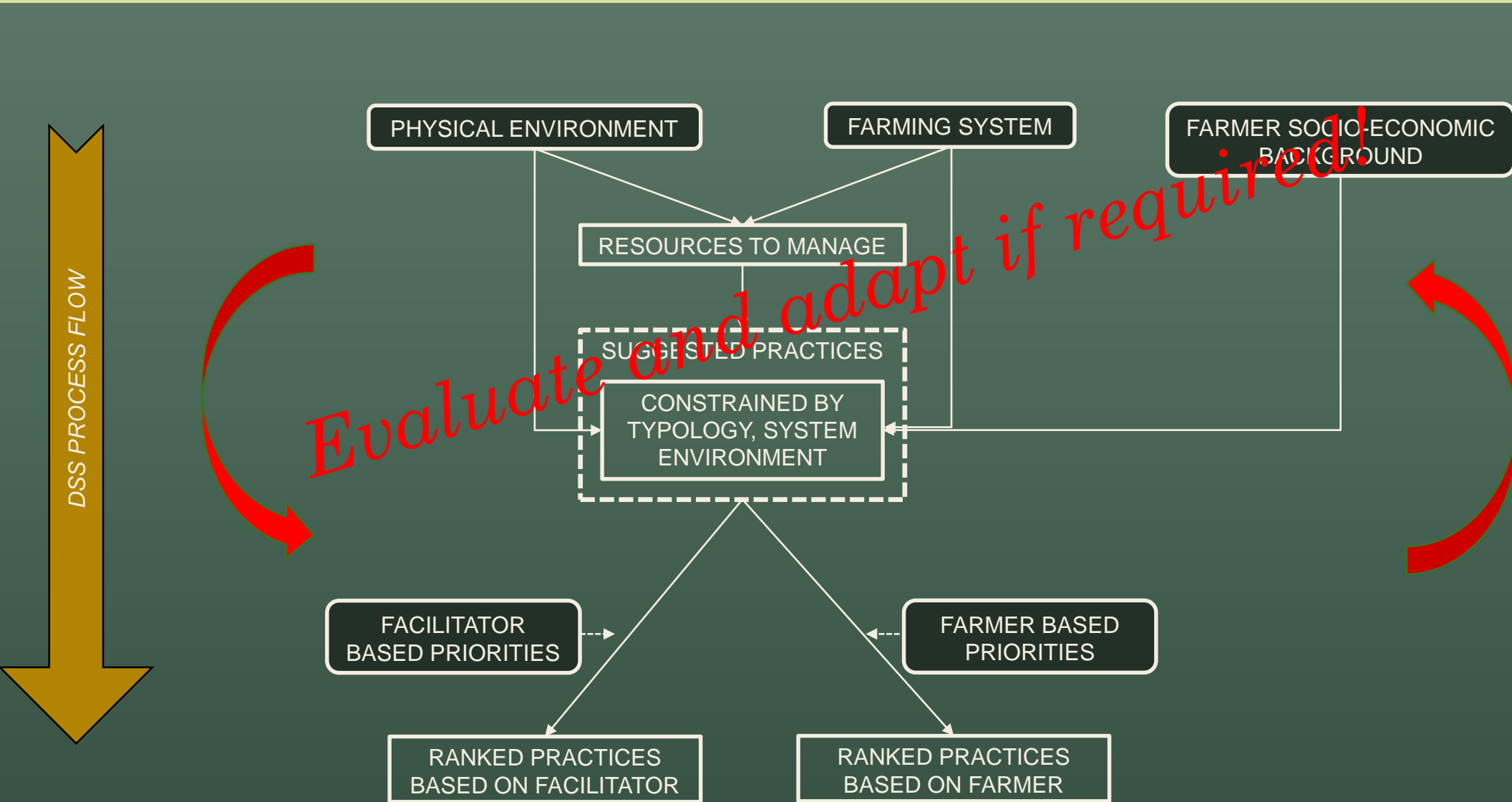
Practices	Sekororo					Ezibomvini					Mxumbu							
	warm semi-arid, flat, 0.5-2%OC					cool sub-humid, sloping, 0.5-2%OC					warm semi-arid, sloping, 0.5-2%OC							
	Typology A					Typology B					Typology C							
	Field cropping	gardening	vegetable	Livestock	nat. resources	Tree and other	Field cropping	gardening	vegetable	Livestock	nat. resources	Tree and other	Field cropping	gardening	vegetable	Livestock	nat. resources	Tree and other
Drip irrigation																		
Bucket drip kits																		
Furrows and ridges/ furrow irrigation																		
Greywater management																		
Shade cloth tunnels																		
Mulching																		
Improved organic matter (manure and crop residues)																		
Diversion ditches																		
Grass water ways																		
Infiltration pits / banana circles																		
Zai pits																		
Rain water harvesting storage																		
Tied ridges																		
Half moon basins																		
Small dams																		
Contours, bunding and planting																		
Gabion structures																		
Stone walls																		
Check dams																		
Cut off drains / swales																		
Terraces																		
Stone packs																		
Strip cropping																		
Pitting																		
Woodlots for soil reclamation																		
Targeted application of small quantities of fertilizer etc																		
Liquid manures																		
Woody hedgerows for browse, mulch, green manure, soil conservation																		
Conservation Agriculture																		
Planting legumes, manure, green manures																		
Mixed cropping																		
Planting herbs and other beneficial plants																		
Agroforestry (tree + arboriculture)																		
Trench beds/ espaliers																		
push-pull technology																		
Natural pest and disease control																		
Integrated weed management																		
Breeding improved varieties (early maturing, drought tolerant, improved nutrients)																		
Seed production / saving / storing																		
Crop rotation																		
Stall feeding and haymaking																		
Creep feeding and supplementation																		
Rotational grazing																		
Fire																		
Debushing and oversowing																		
Rangeland reinforcement																		
Bioturbation																		
Teaser sowing																		

Water saving/harvesting practices

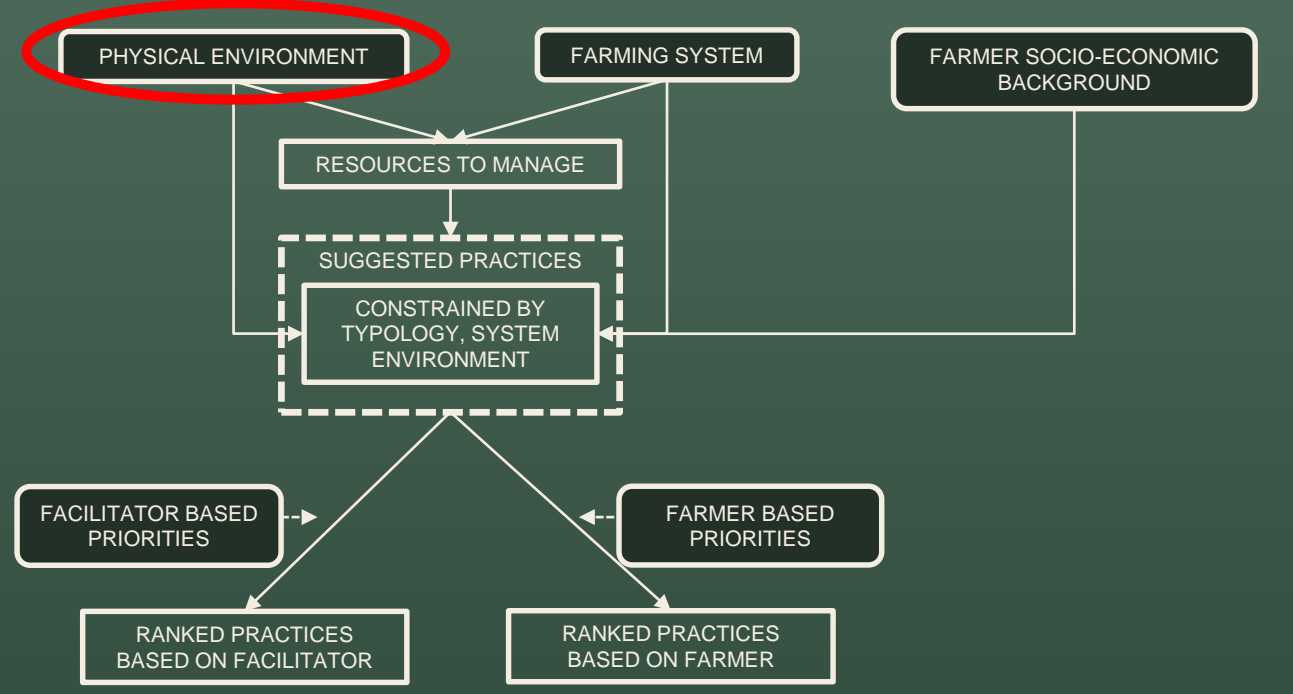
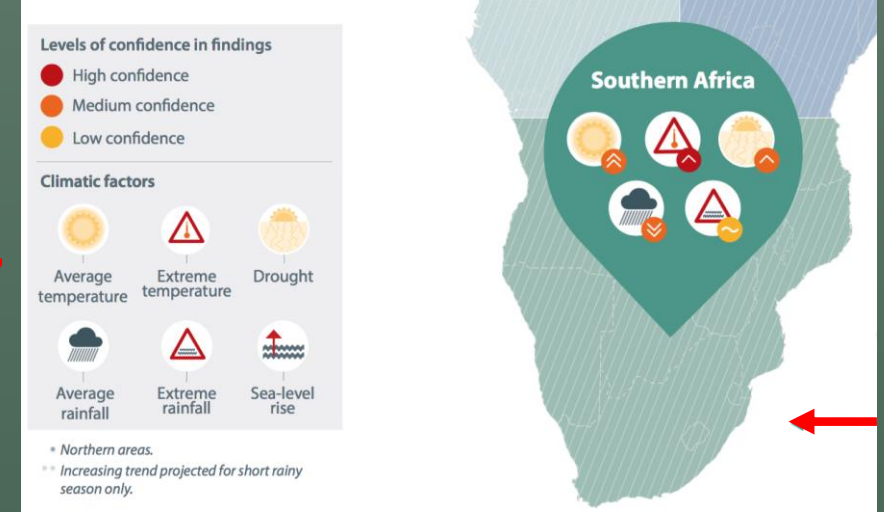
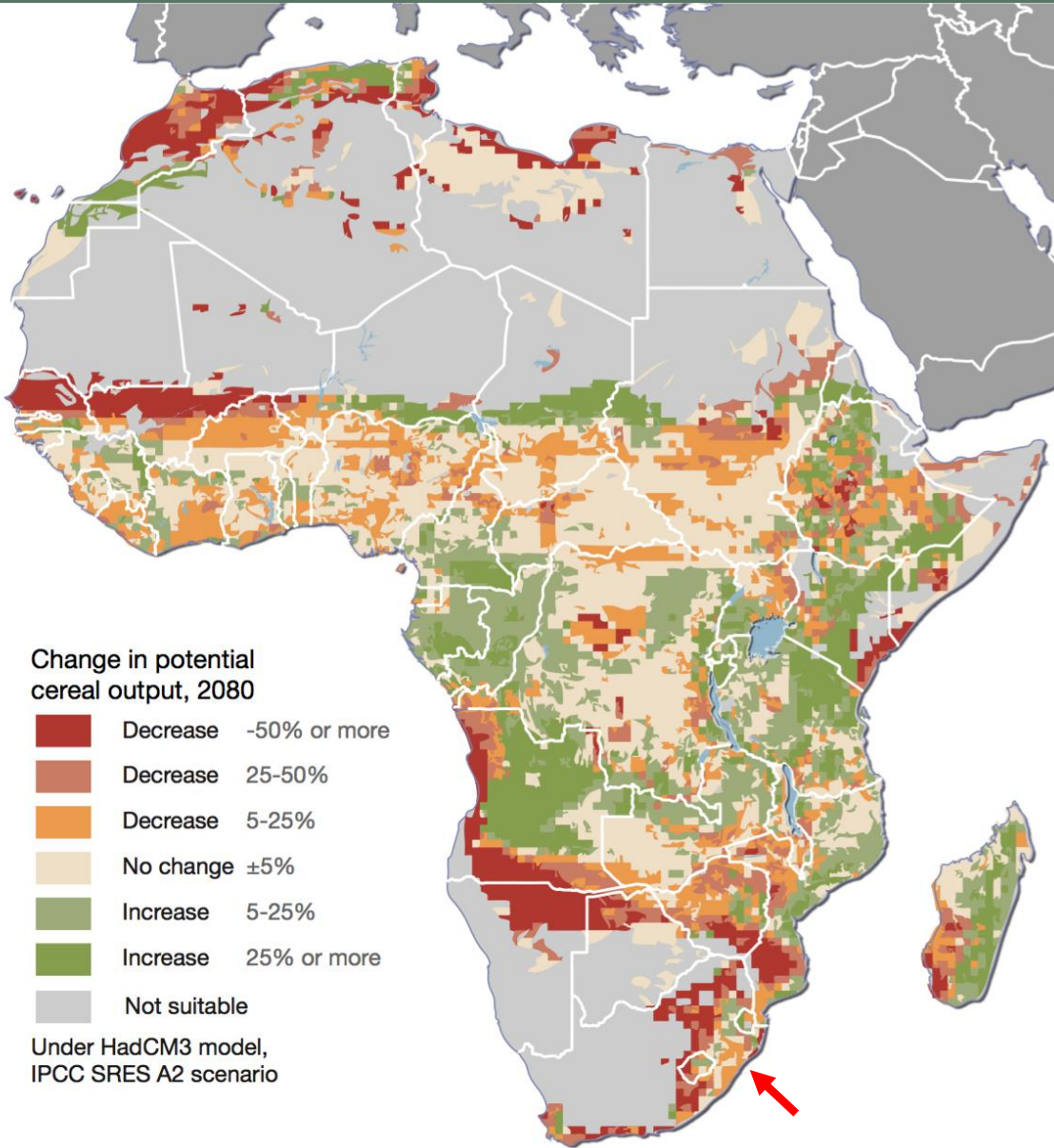
Soil improvement

Clay soils, sub-humid cool AEZ..

What Now?



... and in the Future?



Thank you!!