Smallholder Irrigation Schemes in South Africa: A Review of Knowledge Generated by the Water Research Commission

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Content of the presentation

- Smallholder irrigation schemes in South Africa
- Knowledge portfolio of the WRC
- What has been learnt?
- Concluding remarks

Smallholder irrigation schemes in South Africa

What are smallholder irrigation schemes?

Irrigation: the artificial application of water to land for the purpose of enhancing plant production.

Irrigation scheme (narrow): agricultural project involving multiple holdings that depend on a shared distribution system for access to irrigation water

Irrigation scheme (broad): includes a conglomerate of entities that correspond with the narrow definition.

Smallholder (on a South African irrigation scheme): black person who holds an allotment of the order of 0.1 ha to 10 ha

Smallholder irrigation schemes in South Africa

How important are smallholder irrigation schemes?

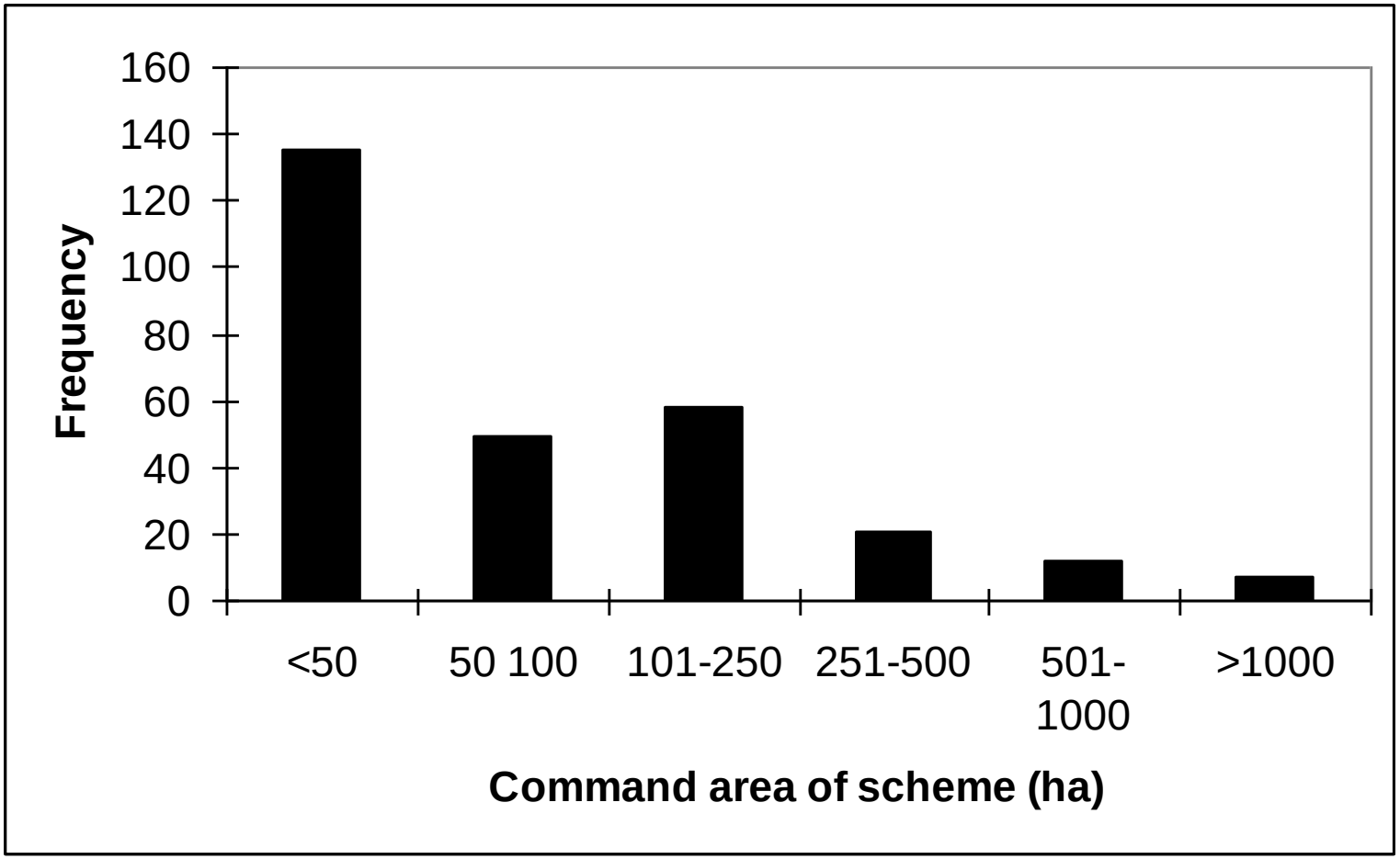
Criterion	Total for South Africa	Total smallholder irrigation schemes	Proportion of total (%)	Importance
Irrigated area (ha)	1 300 000	45 261	3.5	Low
Smallholder irrigation area (ha)	100 000	45 261	45.3	High
Total farmer population	4 000 000	30 607	0.8	Low
Irrigation farmer population	250 000	30 607	12.2	Medium





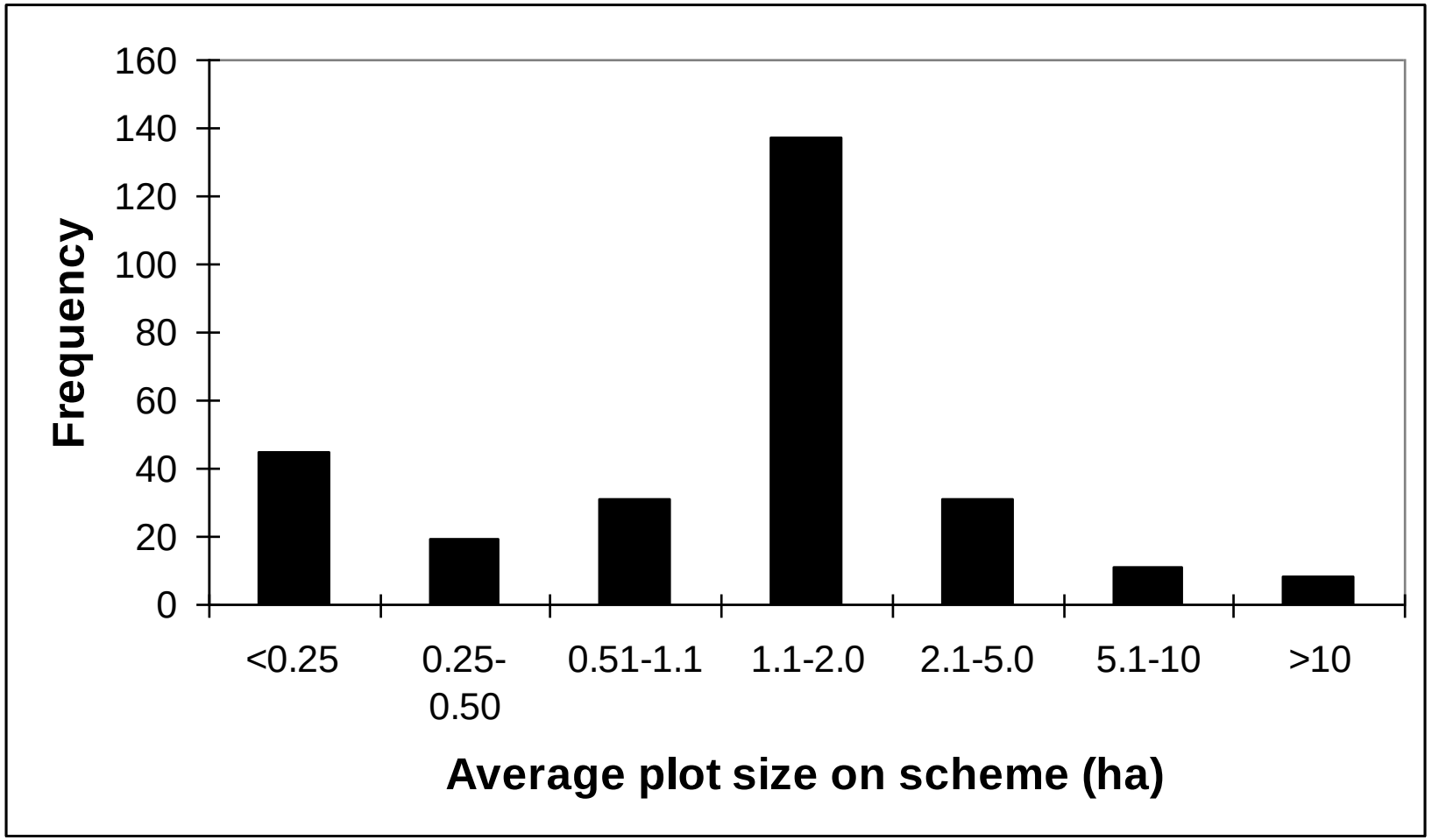
Smallholder irrigation schemes in South Africa

Command areas of smallholder irrigation schemes (N = 288)



Smallholder irrigation schemes in South Africa

Average plot size on smallholder irrigation schemes (N = 288)



Smallholder irrigation schemes in South Africa

Main irrigation methods by province (ha)

Province	Surface	Overhead	Micro	Total
Eastern Cape	2 332	7 200	110	9 642
Free State	20	0	0	20
KwaZulu-Natal	1 543	5 078	0	6 621
Limpopo	10 009	11 205	2 825	24 039
Mpumalanga	120	870	0	990
North West	0	3 524	0	3 524
Western Cape	367	58	0	425
All	**14 391**	**27 935**	**2 935**	**45 261**





Smallholder irrigation schemes in South Africa

Inactive smallholder irrigation schemes by irrigation method

Irrigation method	Number of schemes	Proportion (%)	Area affected (ha)	Proportion (%)
Surface	18	20	1684	12
Overhead	53	30	7540	27
Micro	6	37	754	26
All	**77**	**27**	**9978**	**22**

N = 288





Weir on the Dzindi River

The strip is divided into sections and each section is irrigated by diverting the lead furrow

Smallholder irrigation schemes in South Africa

Main limitation to scheme functioning (Departmental view)

Province	Management	Conflict	Water	No of schemes
Eastern Cape	0	13	4	74
Free State	0	0	0	1
KwaZulu-Natal	10	0	0	22
Limpopo	70	1	4	154
Mpumalanga	1	0	0	8
North West	0	0	0	2
Western Cape	0	0	4	8
All	**84**	**14**	**12**	282

Knowledge portfolio of the WRC

- Period of research: 1994 and ongoing
- Number of published reports: 15 + 1 CD Rom
- Topics :
  - Setting the scene (2)
  - Assessments (5)
    - Food plots; Micro-irrigation, IMT, Sustainability; Tenure & support services
  - Guidelines (7)
    - Planning & design; Sustainability; Micro-irrigation; Rehabilitation; Revitalisation
  - Management practices (2)
    - Canal schemes; Pumped schemes





What have we learnt?

Scheme development or revitalisation: **Horses for courses**

- Smallholder schemes are diverse
- Plot holders on the same scheme are diverse
  - **Irrigation scheme typology**
    - Irrigated food plot scheme (small plots, anywhere)
    - Peasant scheme (1 to 2 ha plots close to towns)
    - Commercial farmer scheme (5 to 20 ha plots)
    - Equity labour scheme (complex designs, remote location)

What have we learnt?





Design and technology: **Keep it simple and flexible**

- Complex designs and sophisticated technology increase dependency and reduce sustainability
- Once farmers get used to labour saving technology, they rarely want to look 'back'
- Pumping costs money and specialist maintenance
  - **Canal irrigation and short-furrow irrigation**
    - Is effective for traditional crops;
    - Can be water use efficient;
    - Is transferred from farmer to farmer:
    - Has no operating costs;
    - Routine maintenance can be performed by farmers

What have we learnt?

Institutions: **Farming on a scheme is a group activity**

- Clear rules are critical for success
  - Sharing of water;
  - Maintenance of infrastructure;
  - Tenure arrangements;
  - Accessing markets cooperatively;
- Does the game need a referee?
  - Rule entrepreneurs and free riders are always part of the collective;
  - Maintaining order is unpleasant.
  - Public investment deserves protection

What have we learnt?

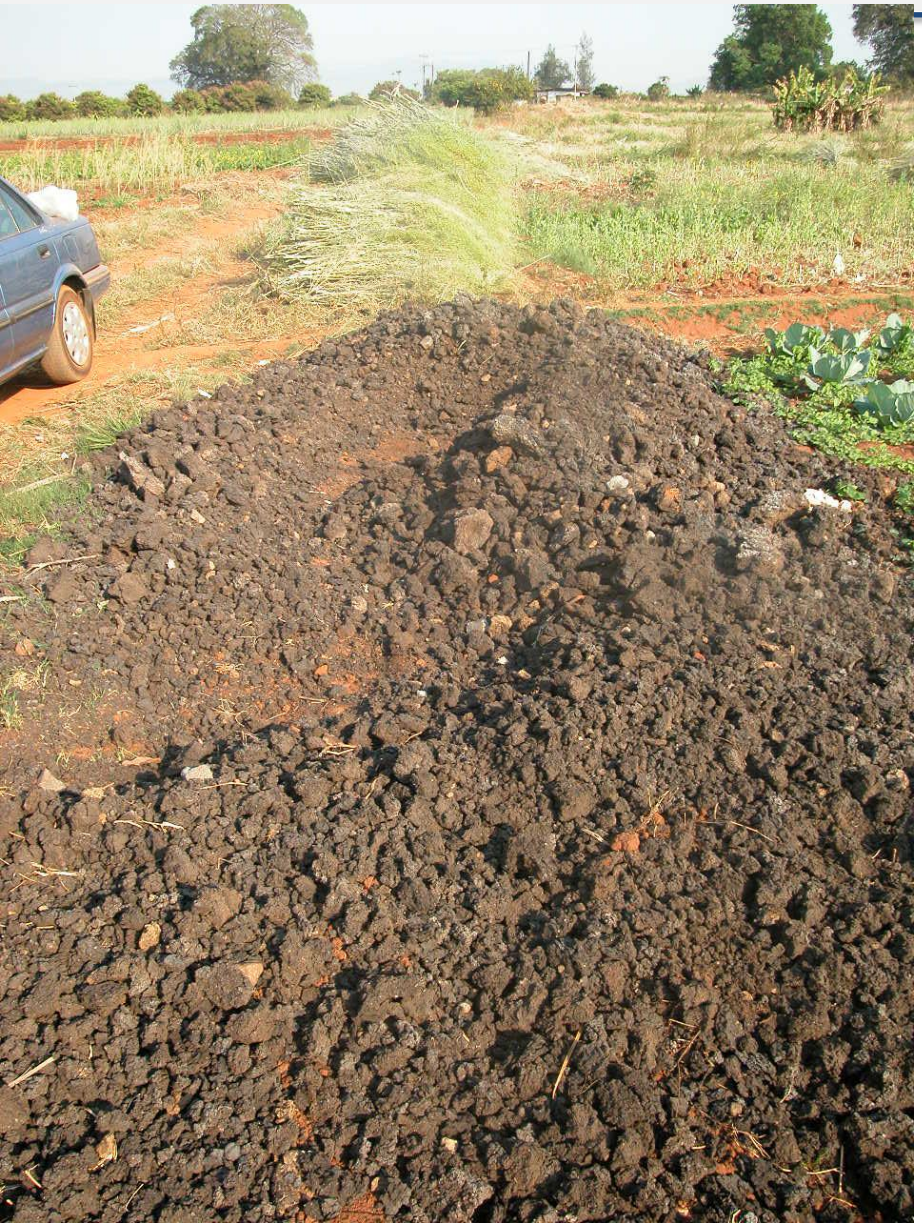
Farming systems: **Assist farmers to do what they do better!**

- Increase gross income or reduce operating costs?
  - Food first;
  - Traditional crops;
  - On-farm resources;
  - Local resources;
  - Local markets;





Local resources



Animal manure as an alternative to chemical fertilisers

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What have we learnt?

Agronomic practices: **Back to basics**

- Optimise crop growth factors
- Prevent crop damage
  - Green maize production;
  - African leafy vegetables
  - Integrating crops and animals





Farmer evaluation of cultivars in a farmer-managed experiment

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Determining the fertiliser requirements of Chinese cabbage in pots

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and in the field

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What have we learnt?

Linkages: **What creates rural livelihoods?**

- Labour versus machine: an argument for reverse engineering

- Enterprise development for local service provision

- Forward linkages can create many sustainable livelihoods

One tractor enterprise serves about 30 ha of irrigation land

Five to seven animal draught enterprises are needed to replace one tractor enterprise

Street traders harvesting Chinese cabbage in a smallholder field:

At Dzindi there is one fresh produce street trader for every plot holder

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Maize is produced on most smallholder irrigation schemes

Local mill processes maize grain into maize meal

Broiler production can add value to locally produced grain and become a local source of fertiliser

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On-farm heat treatment of soya beans by boiling

Drying boiled soya beans in the sun

Milling grain on-farm or at the local mill

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Blending the soya and maize meal into a broiler diet

Testing the on-farm diet

Concluding remarks

Where are the university-government research and development partnerships?

Research on community gardens and independent irrigators?





Is WRC generated knowledge implemented?

‘the worst scenario (for smallholder irrigation scheme development) is where central management not only takes all decisions unilaterally on a top-down basis but also conducts all on-farm operations’

Crosby *et al*. (2000)





Functioning canal irrigation scheme

Canal irrigation scheme revitalised into a floppy scheme farmed by a white commercial farmer (joint venture)

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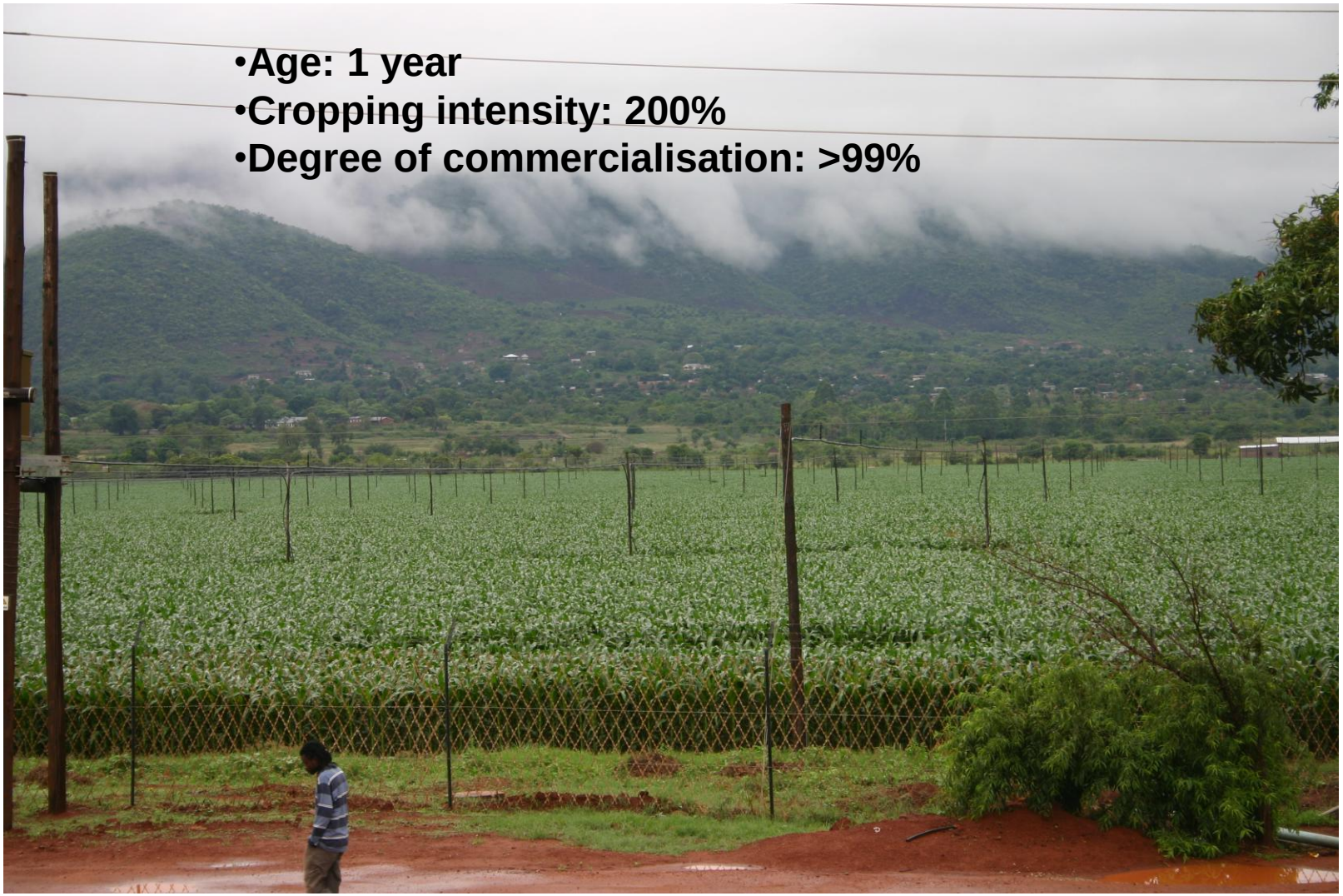
Floppy scheme in summer: maize follows potatoes



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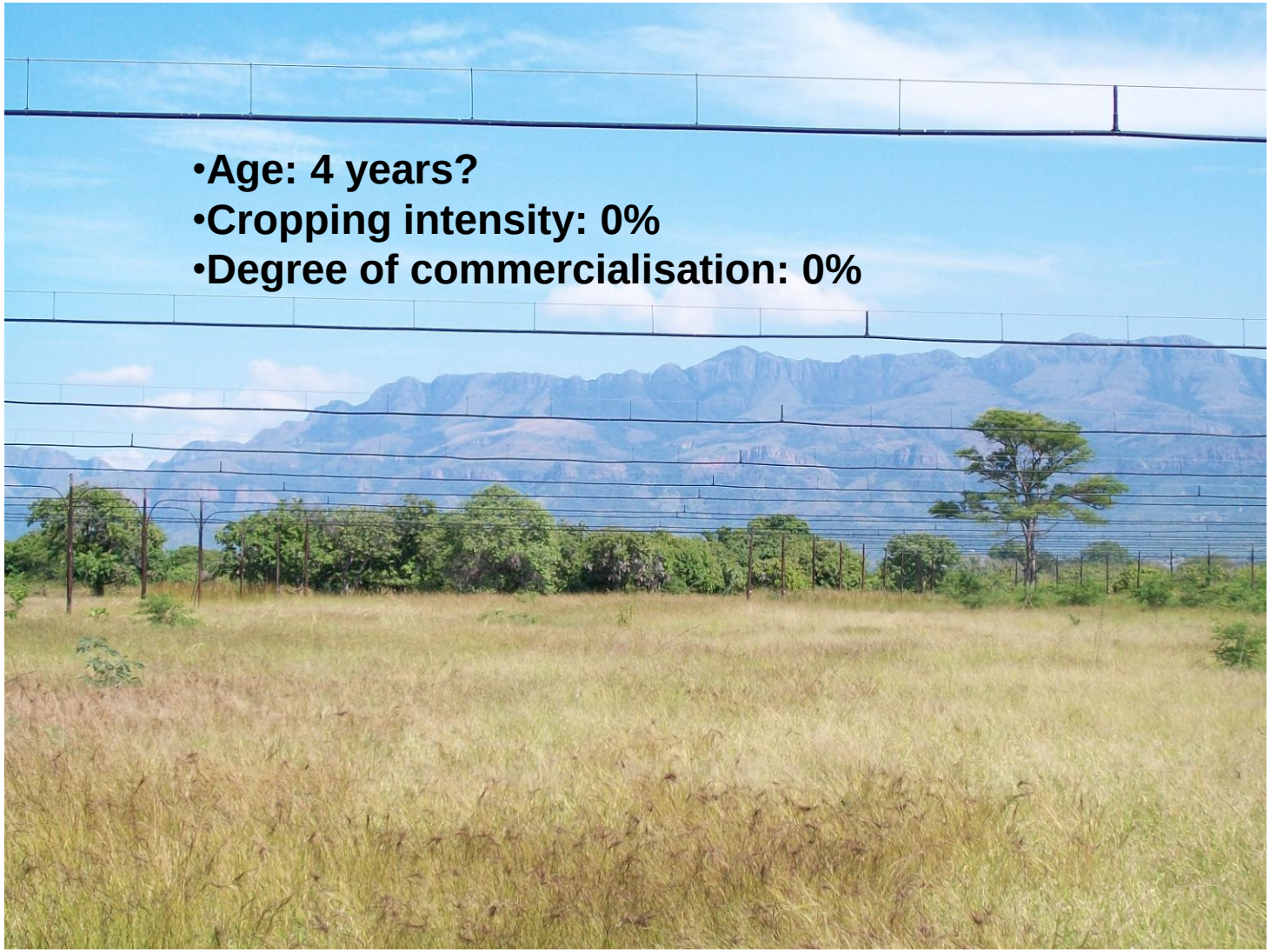
Floppy scheme after joint venture hits a snag



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Floppy scheme: The end

Someone has a new fence around his garden

Thank you

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