Affordability/Budget Research:

* Budget < Profit each sheep makes \* sheep they lose
* Number of sheep they lose:
  + On average, small livestock owners have 150 sheep
  + <https://escholarship.org/content/qt58r1g4wj/qt58r1g4wj_noSplash_c05614f4da5bcb8ba3ab41e0a5266bc8.pdf?t=qf25mm>
    - "Reported rates of small livestock loss to predation range from 3-13% and 0.5-19% from communal farming areas"
  + Minimum loss: 4.5 sheep, Maximum loss: 28.5 sheep
  + Therefore, constraint:
    - Hard constraint: *Must* not exceed (R2000 \* 28.5 = R57000)
    - *Should* not exceed (R2000 \* 4.5 = R9000)
* Profit each sheep makes:
  + <https://www.tandfonline.com/doi/full/10.1080/20421338.2021.1879510>
    - South Africa has an estimated 28.8 million sheep, of which 7.4 million are owned by smallholder farmers
    - average sheep output was R2972 and R3023
      * Therefore, ≈ 3000 rand
    - average purchase price for sheep was R1320 and R1250
    - sheep farmers in Laingsburg, South Africa, to have a sheep output of R664 on average per year
    - The average profitability (profit efficiency) score was estimated at 65.5%
    - Therefore, the strict profit sheep make would be ≈ 3000 rand \* 0.655 ≈ 2000 rand
  + <https://www.gumtree.co.za/s-livestock-poultry/dorper+sheep+for+sale/v1c9140q0p1>
    - Average price for one dorper sheep is like 2000-3000 Ram, which is about 200ish CAD:
  + <https://www.farmanimalreport.com/2021/07/04/14-ways-to-make-money-from-sheep-farming/>
    - Possible revenue per year for 150 sheep is 22500:
  + <https://www.tandfonline.com/doi/full/10.1080/20421338.2021.1879510?casa_token=SSCu9HK5fpYAAAAA%3AFbjWeE5EVe70_OuQcgL_iR4TL7cvC7aUDx82dMzo6eqSRXTJZvsurbmlvasMTHCH4hUKqMuSYsvwg4E>
    - profit efficiency among smallholder sheep farmers in South Africa:
      * “The average profitability (profit efficiency) score was estimated at 65.5% meaning that an estimated 34.9% of the profitability is lost due to the combination of technical and allocative efficiencies in production.”
      * “Smallholder livestock production is a major economic occupation and creates employment for approximately 70% of people in rural areas around the world (Poole 2017)”
* Salary of shepherd
  + <https://www.salaryexpert.com/salary/job/sheep-shearer/south-africa#:~:text=R101%2C373%20(ZAR)%2Fyr>
  + R101,373 (ZAR)/yr
* Different approach (If we don’t get the answer to what their budget is or how much sheep they lose):
  + <https://www.treehugger.com/how-to-raise-sheep-3016859>
    - The best type of fence for sheep is a smooth-wire electric or woven wire non-electric fencing. You use electric net fencing for temporary paddocks. [16] Rotating sheep into different paddocks keeps them on fresh pasture. [17]
      * Assumption: They cannot afford such fencing
        + Risks:

Mixing is still a problem even when fences are there, they might be able to afford it but just don’t think it’s a good solution

They might have fences, there was no mention of fencing at all, hence we can’t assume there are no fences?

* + - * Budget < Price of fence/km \* Size of area
        + Choice of area?
* How they graze sheep/in what ways do the sheep wander off?
  + Rotational grazing? Usually rotational grazing would require fence, but stakeholder did not mention fencing
  + Stocking density in cow unit (1000Ibs.)
    - Dorper
    - Gauging the pasture quality in Mthatha [https://www.drdlr.gov.za/sites/Internet/ResourceCenter/DRDLR%20Document%20Centre/Agriculture%20Sector%20Analysis\_%20OR%20Tambo%20District%20Municipality.pdf]
    - <https://www.nyandenilm.gov.za/wp-content/uploads/2018/11/Final-Nyandeni-Agric-Sector-Plan.pdf> (they said nothing helpful about the carrying capacity…)
    - <http://libdspace.ufh.ac.za/bitstream/handle/20.500.11837/681/jenjezwa.pdf?sequence=1> ()
  + Mixed species/
* How many sheep do they lost each day or each week?
  + Frequency of updating the tracking data/daily? Weekly? Only when lost?

The ways to graze sheep:

<https://www.youtube.com/watch?v=xR5udiMms3o> (not in Africa but shows how to graze sheep)

<https://www.youtube.com/watch?v=3eGVTkrnYVc> (we might have to guess their grazing method, btw do they have large grassland?)

<https://www.youtube.com/watch?v=CRMmVx4aKSA> (do they also graze different species together?)

Geography/demography

Geography:

Communal grazing field near water dam

Mthatha:

formerly Umtata, is the main city of the **King Sabata Dalindyebo Local Municipality** in Eastern Cape province of South Africa and the capital of OR Tambo District Municipality.

Table

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Mthatha falls under OR Tambo District Municipality which is the poorest district in the Eastern Cape in terms of all poverty measures. It has the lowest HDI (0.45) and the highest poverty gap (2 231 million) in the Eastern Cape. The number of people living in poverty is also high in this district (64.6%), unemployment is at 65.5% and the literacy rate 42.2%.[[10]](https://en.wikipedia.org/wiki/Mthatha#cite_note-OLF-10)

According to SA Delivery, The average annual income of a black Mthatha resident is R15,762.[[12]](https://en.wikipedia.org/wiki/Mthatha#cite_note-SADELIVERY-12) The town has also been plagued by complaints around its roads.

<http://www.mthatha.co.za/umtata.html>

Mthatha:

“Subsistence agriculture and livestock raising are the primary economic activities in the area;” - <https://www.britannica.com/place/Mthatha>

Pop. 140000 – Not the smallest of towns.

Connections to an airport and rail – getting the product to them would be difficult because they are in another country but not impossible cause it can be shipped via air or rail.

Sheep:

Sheep are relatively small and easy to handle, compared with cows, horses, and pigs.

Sheep don't need perfect pastureland; they happily eat brushes, grasses, and weeds that grow in poor soil.2

The best type of fence for sheep is a smooth-wire electric or woven wire non-electric fencing. You use electric net fencing for temporary paddocks. [16] Rotating sheep into different paddocks keeps them on fresh pasture. [17] https://www.treehugger.com/how-to-raise-sheep-3016859

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