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| --- | --- |
| Requirement | Cost efficiency, Affordability |
| Metric | South African Rand (R1 ≈ 0.084 CAD) |
| Criteria | Lower price is preferred |
| Constraint | Must not exceed (R2000 \* 28.5 = R57000) / yr or R380 / sheep / yr  Should not exceed (R2000 \* 4.5 = R9000) / yr or R60 / sheep / yr |

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) / yr
      * (R57000 / yr) / 150 sheep = R380 / sheep / yr
    - *Should* not exceed (R2000 \* 4.5 = R9000) / yr
      * (R9000 / yr) / 150 sheep = R60 / sheep / yr
        + This is approximately 5 CAD per sheep each year
* 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?