Strategies for improving productivity in small ruminants

Tormod Ådnøy

EAAP August 2014
Strategies for improving productivity in small ruminants

strategies -> choose, improving -> better (for whom?)

• Intro (Trends in Norway – and elsewhere?)
• Focus: **productivity = product / resource**
• Future
  • prices .. market

• Small ruminants and breeding
  – g * e? – need for different breeding goals?
Trends in Norway

Rangeland exploitation by ruminants: diminishing status

- Viking times and before: free men guard flocks
- Later: slaves guarded the flocks
- Last centuries: children tended the flocks
- Recently: nobody guarded the flocks daily
- Today: less grazing of mountain rangeland.
  - More feed (grass) available near farms.
  - Imported grain / concentrates is so cheap that the mountain rangeland resource is not fully exploited
Times change

• Status and value of small ruminants change

• Will production potential of rangeland be needed and have a high enough value to be used by small ruminants in the future?

• With high salaries, and comparatively low prices of oil, fertilizer and grain on the world market, maybe not!
  – or lambs meat and goat cheese is valued for taste and origin (not only for food value)
• Farmers in Norway have loved the break that going into the mountains to check sheep gave during the summer.

• Some young farmers today consider this a job they should get pay for and would and can rather go to Greece on holiday.

• Farmers kept slimmer before…

• What we want and what we need is not necessarily the same.
Will rangeland resources be needed?

With growing world population and limited arable land.

EITHER:
• 1) Price increase in world markets for oil, fertilizer, grains?

OR:
• 2) Productivity and efficiency keeps up with growing world population and salaries (in Norway..) remain high
What kind of sheep / goat do we need?

EITHER

• 1) Efficient transformers of rangeland feeds

OR

• 2) Efficient transformers of concentrated feeds
Norwegian White Sheep – a successful breeding story

- Lamb at one year old
- Get more than 2 lambs per lambing
- Grow fast during summer

- Require intensive feeding
  - good spring pastures
  - good summer (mountain) pastures
  - made for efficient use of imported feed

National breeding scheme – same for all environments
How would they do on extensive feeding?

– without extra concentrates –

• I don’t think we know
• How free is the market? Who decides what to produce?

• With <50% income tax a lot of market is decided by government

• Lamb meat and goat cheese produced with subsidies or for high end markets
Productivity

Google:

«**Productivity** is the ratio of **output** to **inputs** in production»


**Output** ... It is **national output** that makes a country rich, not large amounts of **money**. [3]

Output for small ruminant production

- Meat
- Milk
- Landscaping
- … Cultural heritage …

Meat and milk output is relatively easy to measure
Input
for small ruminant production

• Feed
  – Amount / – Quality / – Seasonal availability

• Labor

• Shelter
  – Heat / – Cold / – Predators / – Control

• Care
  – Health / – Medicine / – Vaccines / – Lambing

Many inputs are difficult to quantify
Animal husbandry – why?

Domestic animal:
- man supplies resources to get a product that man wants
- man exploits animal

- Chose animal according production (milk, meat, ..), - and according to available resource (feed, ..)
- But also give and improve resource according to animal (shelter, more concentrated feed, vaccines, ..)
- … … …
Resources for input – before studying productivity..

• We keep domestic animals to have better human use of resources
• Norwegian rangeland – 80% of surface – nice to walk in, but hard to eat for humans
• Ruminants can transform rangeland plant production to meat and milk
  – (photosynthesis etc … - original resources)

A pig or chicken could hardly help us make human food out of the rangeland resource
Unlimited and limiting resources in production

• «Best things in life are ‘free’» or almost unlimited:
  – Air
  – Water (in Norway)
  – Life (?animal genetic resources)
  – Sun -> photosynthesis (finite on Earth and per Ha)

• But some resources cost and are limiting:
  – Labor
  – Feeds
  – Medicine
  – Shelter
Productivity in many ways

- Protein productivity = protein output / protein input
- or protein output / area
- or protein output / labor

- Energy productivity
  - Amount of human food / Area = [Land Use Ratio (LUR)]^{-1}

- Product per Pollution
- Product per Feed
- Product per Imported feed unit
Productivity and price

productivity = output product / input resource
= ?

economic productivity = price*product / price*resource

- price: availability and how people value and are willing to pay (market)
  - varies geographically and in time – Future prices?

A farmer can only produce if he is economic productive ie output / labor is reasonable
Prices and value

Money is used to measure what we value:
want / need / can afford
«Best things in life are free» and many cannot be bought (but some cost)
life / family / friends / air / daylight / ..

We need to eat less and use more energy, but increase productivity
and do the opposite!
Product and price

• Market
  – supply and demand
  – alternative goods
    • (meat from chicken, beef, lamb, vegetarian alternatives, … )

• What we need and what we want
  – what we should want (climate change, obesity, ..)

Why do we value lamb’s meat and goat cheese?
Future, past, and policy today

• FAO tells us that food is getting scarcer
  – in 2005:
    population increase > food production increase
• Climate change due to gases
• 1960-70s:
  – Reidar Borgström (1912-1990): Mat för miljarder (Food for billions)
  – Nobel peace prize for Green Revolution to Norman Borlaug
  – Framtida i Våre Hender - Erik Damman
• Green parties in EU and in Norway
Money rules – mostly …

• I will buy where I think I get best value for my money when I purchase food
  – lamb, porc, ..

• A farmer will change from sheep to pig production to get higher income

• or find another job in the oil industry…

• Policy is more efficient if prices reflect policies
  – Greenhouse gas emissions should be taxed
    • Fossil fuel production and use
      – Food prices will increase with shortage?
Small ruminant productivity

- Some resources are best refined by small ruminants
  - some rangeland pastures

- Some products are most efficiently made by small ruminants
  - landscaping by keeping down bushes
Genotype * environment interaction?

• Do we know when another breed is needed – when environments are so different … ?

• We have bred for an environment where concentrates are available and cheap

• Do we need breeds for a future where food and concentrate feed are scarce?
Small ruminants

• Require less investments
  – number of goats has been doubled in some countries (not Norway and Europe) after 1995
• Adapted to many environments
• Meat, milk, and fiber
• Labor intensive?
Survival and mortality

• A dead goat does not give milk
• A sick goat gives less milk
• The animal we need supports the environment we have and can give it.
• Mortality or survival is often an important part of productivity
• genotype * environment effects for mortality and survival – important ! / – difficult to breed for ?
• Animal welfare
Breeding for productivity

• Should breeding increase productivity for the limiting resources
  – or for the abundant / free resources?
    – imported feeds
    – or abundant rangeland?
Conclusion for food scarcity

• Feed that can be used for food should be used for direct human consumption
• Resources that ruminants can use, and not humans, should be transformed to milk and meat.
• Ruminants’ role in a future with less food is to use less grains and more roughage

• If output product is measured per animal, then include the weight of the animal as a simple measure for input resource needed to increase productivity.
Conclusions with cheap imported feed resources compared to salaries:

• Chicken and pork meat is cheaper to produce.

If lambs meat and goat cheese is desired:
• subsidize farmers to use the 80% rangeland resource
• and/or exploit high end market

Norwegian settings – but not irrelevant for other countries?
Conclusion with cheap imported feed resources

• Let ruminants be ruminants – transforming feed resources inedible for humans to highvalued milk and meat

• Go for high labor productivity:
  – easy-care animals: less disease, less kidding/lambing difficulties, easy to gather from rangeland pasture
  – more product (milk, meat, ..) per labor (and other limited resource)
  – add grown weight to registrations – to limit increase in body size