d) On preventive management
Preventive measures (1\textsuperscript{st} step)

- Proper selection of breeds
- Vaccination
- Quarantine measures
- Regular monitoring
Resistance: immune system $\uparrow = \text{treatment}$

- Inborn
- Breeding
- Immune system: intact skin, gastric juice, ...
- Gained
- Vaccination
- Feeding, housing, naturalness, care, stress, attitude farmer
- Healthy
- Diseased
- Treatment
  - Prognose for curing
  - Animal welfare
- No
  - Frequent milking
  - Herbs
  - Antibiotics, ...
- Yes
Animals are used to farm pathogens

- Bringing ‘new’ animals into the herd has high risk
  - Don’t introduce animals from other farms
  - Avoid contact with other farm’s animals
  - Make appointments about sanitation/vaccination

- Using common grazing area’s introduces strange pathogens
- Indigenous breeds are less sensitive than exotic breeds
- Well working immune system desired
Risk for claw disease:

Excessive movement of the 3rd phalanx within the claw capsule is the primary cause of sole ulcers and white line disease and can be influenced by:

- Hormonal changes around parturition
  - Relaxin and estrogen will increase laxity of the 3rd phalanx
- Management & facilities
  - Daily lying time and standing time
  - Concrete floors
  - Stall surface (sand versus concrete and mattresses)
  - Feed bunk space
  - Overstocking
  - Milking time and frequency
  - Access to stalls & stall design and dimensions
  - Distance from milking parlor

The digital cushion protects the corium from trauma inflicted by the 3rd phalanx, and its dimensions and composition are affected by:

- Body condition score
- Stage of lactation
- Milk production
- Parity (age)

Claw horn overgrowth will cause an unbalanced weight-bearing surface, resulting in overloading of the claw and intra-claw capsule trauma. Claw horn overgrowth can be affected by:

- Confinement
- Concrete floors
- Wet floors
Good milking: mastitis prevention

From GART manual

**GOOD HAND MILKING PRACTICES**

- Milking place: quiet, clean, relaxed
- Cow: tasteful feed, wipe udder/teats, (restrain?), massage udder, clip hair
- Milking technic: check milk for flakes, squeeze the milk, not pull teats, 12 h interval, antiseptic teat dip, treat lesions
- Milking equipment: clean after milking and dry in sun
<table>
<thead>
<tr>
<th>Age</th>
<th>Vaccinate against</th>
<th>Application</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-8 months for heifers</td>
<td>Brucellosis</td>
<td>S/C - Once in a lifetime</td>
<td>During threats of outbreak the whole breeding herd may be vaccinated. S19 live vaccine can cause brucellosis in humans.</td>
</tr>
<tr>
<td>3 months to 3 years</td>
<td>Anthrax and Blackquater</td>
<td>S/C - Yearly or upon warning of impending outbreak</td>
<td>Vaccine is cheap. Anthrax is deadly for humans and animals.</td>
</tr>
<tr>
<td>2 weeks and above</td>
<td>CBPP</td>
<td>Yearly in endemic areas. In other areas upon warning of impending outbreak. (through tail tip).</td>
<td>To be administered by trained veterinarians. Animals can loose their tails from this vaccination.</td>
</tr>
<tr>
<td>1 month and above</td>
<td>ECF</td>
<td>S/C under the ear. Vaccine is commercialized in Tanzania.</td>
<td>Only to be used by licensed Veterinarians</td>
</tr>
<tr>
<td>2 weeks and above</td>
<td>Foot and Mouth disease</td>
<td>S/C - Every 6 months in endemic areas.</td>
<td>Different strains exist. Consult you veterinarian on the choice of vaccine.</td>
</tr>
<tr>
<td>3 months and above</td>
<td>Rabies</td>
<td>I/M or S/C - Annually and when there is an outbreak</td>
<td>A vaccine that can protect already affected herds (within a week after the outbreak)</td>
</tr>
<tr>
<td>6 months and above</td>
<td>Rift Valley Fever</td>
<td>S/C - After heavy rains or when there is a risk of outbreak.</td>
<td>Pregnant animals may abort if live vaccine is used. In humans RVF can be deadly so control is very important</td>
</tr>
<tr>
<td>1 month and above</td>
<td>Lumpy skin</td>
<td>S/C - Preventive when there is a risk of outbreak.</td>
<td>With live vaccine, separate cattle from sheep and goats, as the vaccine can cause pox in sheep and goats.</td>
</tr>
</tbody>
</table>
Preventive measure less expensive than diseased animals

- Keep robust breeds/crosses
- Prevent heavy calving
- Don’t introduce ‘strange’ animals
- Avoid contact with neighbours animals
- Provide adequate feed and water
  - Meet requirements of animals
- Provide adequate shelter
- Provide adequate care
- Vaccinate against diseases you cannot avoid
e) on diseases
<table>
<thead>
<tr>
<th>organism</th>
<th>Disease</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virus</td>
<td>flue</td>
<td>Sanitation, desinfection, vaccination</td>
</tr>
<tr>
<td>Bacteria</td>
<td>Tuberculosis, mastitis, salmonellosis</td>
<td>Antibiotics, vaccination.</td>
</tr>
<tr>
<td>Protozoa</td>
<td>Coccidiosis</td>
<td>Antibiotics</td>
</tr>
<tr>
<td>Fungi</td>
<td>Ringworm</td>
<td>Prevention</td>
</tr>
<tr>
<td>Internal parasites</td>
<td>Worms, liver flue</td>
<td>Dewormers, rotational grazing</td>
</tr>
<tr>
<td>External parasites</td>
<td>Lice, flies, ticks, mites</td>
<td>Antiparasitca</td>
</tr>
<tr>
<td>Diet composition</td>
<td>Off feed, acidosis</td>
<td>Supply proper diet</td>
</tr>
<tr>
<td>Minerals</td>
<td>Milk fever</td>
<td>Supply minerals/ trace-element</td>
</tr>
<tr>
<td>Plastic, wire, soil</td>
<td>Digestion</td>
<td>Clean surroundings</td>
</tr>
</tbody>
</table>
Abortion and still birth

- Brucellosis, Campylobacter, Trichomonas, Rift Valley Fever, bovine Viral diarrhoea (BVD), Neospora.
- High fever because of Anaplasmosis, East Coast Fever, Pox or acute mastitis
- Other non infectious reasons (shock, fear, poisonous plants, moulds, mineral/vitamin lack, inbreeding)

- Diagnose (laboratory) when more abortions occur
  - Blood/other material collected by veterinarian
- Dangerous for humans: wear plastic gloves
- Burry (deep enough) or burn foetus and placenta
- Disinfect place where abortion took place
- Milk can be highly infectious for calves and humans
- Retained placenta is common
- Make sure bull is not infected
Respiratory diseases

- **Haemorrhagic Septicaemia (HS):**
  - Vaccination, antibiotics, quarantine

- **Contagious Bovine Pleuro-Pneumonia — CBPP:**
  - Vaccination, isolated sick animals

- **East Coast Fever:**
  - Vaccination, tick control (dipping twice/week), pour on, pyrethrum grease in ears and below tail base

- **Pneumonia in young calves:**
  - Colostrum within 3 h, hygiene, dry place, no cold draft, antibiotics

- **Tuberculosis:**
  - Hygiene, strengthen immune system, isolated sick animals, sterilize milk for calves, sunlight kills bacteria
Different ticks (most important on cattle)

- Blue tick, or cattle tick (Boophilus sp). Transfers Anaplasmosis and Babesiosis

- Brown Ear tick (Rhipicephalus sp) around the ears and under the tail. Transfers East Coast Fever (ECF)

- Hyalomma ticks. Transfers Sweating sickness

- Amblyomma ticks, boring right into the skin of the animals, thereby becoming very difficult to remove by hand. Transfer Heartwater disease.
Tick born disease

• **Anaplasmosis**, acute fever caused by a parasite *Anaplasma marginale*, which multiplies in red blood cells, causing severe anaemia. Incubation period is 2 - 12 weeks. Dipping/spraying, resistance, vaccination.

• **Babesiosis** *(Redwater)*, fever producing disease by the protozoan parasites *Babesia bigemina* and *Babesia bovis*. Dipping/spraying, resistance, vaccination.

• **Bovine Petechial Fever**, haemorrhages, fever, oedema, and abortion caused by *Ehrlichia ondiri*. Keep cattle away from forest edges and from reed- and bushbuck

• **Heartwater**, caused by *Ehrlichia ruminantium*. Indigenous breeds more resistant. Dipping/spraying, don’t introduce infested stock, infection&treatment method

• **Sweating sickness**, toxic condition that affects the skin and visible mucous membranes, caused by a toxin attracted to skin, secreted by females of *Hyalomma truncatum*. Dipping/spraying, resistance, Let ticks attached for 4 days to produces immunity.
Flies and Mosquito Borne Diseases

- **3-Day Sickness (Ephemeral Fever),** does not persist in recovered cattle and most recovered cattle have life-long immunity, spread by midges and mosquitoes. Vaccination in endemic areas, no treatment needed.

- **Bluetongue,** an infectious, non-contagious virus disease spread by *Culicoides imicola.* Vaccination, *pour on*

- **Rift Valley Fever (RVF),** acute or peracute, viral disease. Vaccination, *pour on,* confinement of stock.

- **Trypanosomiasis,** protozoal infection *caused by* genus *Trypanasoma and spread by* Glossina tsetse. Tolerant breeds, trapping flies, dipping/spraying, *pour on*
Management disease

- **Frothy bloat, gas** in their stomach because of lush green pastures. **Free gas bloat** is an obstruction of the oesophagus. Feed some dry feed before grazing, avoid abrupt changes in diet. Supply anti-foam agents.
- **Bovine Viral Diarrhoea**, Incidence is low but mortality is high. Infection in different stages of pregnancy creates persistent infected calves, antibody negative calves, abortion. Remove infected calves from the herd.
- **Enteroxamia (Dysentery)** acute diarrhoea, abdominal pain and convulsions. Death may occur within a few hours, but less severe cases may survive. Vaccination of the dam
- Foot and mouth disease, highly contagious viral infectious disease. **Disinfection, vaccination**
- **Haemorrhagic Septicaemia (shipping fever)** is an acute bacterial disease, caused by Pasteurella multocida. Vaccination, boost immune system, herd quarantine
Management diseases 2

- Mastitis, not visible (sub-clinical) and visible (clinical). Different pathogens and other causes. **Preventive solutions preferred (changes in management) and as less treatments as possible.**

- Milk fever does not occur in indigenous cows. It is caused by too low calcium available at the onset of lactation at calving. **To keep mobilisation of Ca from the bones active, feed low calcium diet in the dry period**

- Acetonemie occurs when fat from the body is used in times of energy shortage, at peak production. **Feed more energy to prevent using own body reserves**

- Hypomagnesie
## Shortage of minerals, trace-elements and vitamins

<table>
<thead>
<tr>
<th>Element</th>
<th>Signs of shortage</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium (Ca)</td>
<td>Bones, milk fever</td>
<td></td>
</tr>
<tr>
<td>Phosphorus (P)</td>
<td>Bones, digestion</td>
<td></td>
</tr>
<tr>
<td>Zinc (Zi)</td>
<td>Hair, skin, claws</td>
<td></td>
</tr>
<tr>
<td>Copper (Cu)</td>
<td>Hair, blood, fertility</td>
<td></td>
</tr>
<tr>
<td>Magnesium (Mg)</td>
<td>Neromucular system</td>
<td></td>
</tr>
<tr>
<td>Potassium (K)</td>
<td>Low feed and water intake</td>
<td>Young plants</td>
</tr>
<tr>
<td>Sodium (Na)</td>
<td>Feed intake, water metabolism</td>
<td></td>
</tr>
<tr>
<td>Chloride (Cl)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cobalt (Co)</td>
<td>Vitamin B12</td>
<td></td>
</tr>
<tr>
<td>Vitamin A</td>
<td>Still birth</td>
<td>Fresh grass</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>Bones, low growth</td>
<td>Ca + sunlight</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>Fertility, immunity</td>
<td></td>
</tr>
</tbody>
</table>
Causes of mastitis

- Via the hands of the person milking
- Through milking bucket and cloth
- Via flies
- Via the liners of milking cup (if milking machine is used)
- Via the mouth of the suckling claves
- Through environmental contamination of the stable or the outdoor run (wet and dirty beddings)
- Through contaminated water
- Via contaminated teat dips
- Via intra-mammary infusions
- Teat skin lesions and wounds
Mastitis lowers yield

Graph showing the impact of mastitis on milk yield over time. The graph compares three groups: DTS, AB+, and AB. The x-axis represents days, ranging from -15 to 25, and the y-axis represents kg of milk, ranging from 20 to 36. The DTS group shows a significant drop and recovery, while the AB+ group shows a steady decrease, and the AB group fluctuates more than the other two.
Diarrhoea of the young calf


- **Clostridial diarrhoea**, few days old strong calves with good appetite. Onset sudden with depression, weakness, bloody diarrhoea, abdominal pain and death within few hours. Clostridia produce a toxin which kills very fast. Most die before treatment can be started.

- **Viral infections**, due to Rotavirus or Coronavirus, 5 - 15 days old and up to 3 months of age. Most continue to drink milk. Faeces are several days soft to liquid, containing much mucous. Response to fluid and electrolyte and nutritional support is usually very good.

- **Cryptosporidiosis**, in the second week of life, with persistent diarrhoea not responding to treatment. Mixed with other organisms it may be severe and life-threatening.

- **Coccidiosis**, diarrhoea up to weaning age. Thin watery with blood look red at first and become dark. Calves may not eat and become dehydrated.

- **Dietary diarrhoeas**, calves >3 weeks old and shows pasty faeces of a gelatinous consistency. Initially calves are bright and alert and have good appetites but if the diet is not corrected they become weak and emaciated.
Skin disease

- **Bovine Farcy**, caused by *Nocardia farcinica*. Prevent wounds. Isolate or cull affected animals, no cure.
- **Elephant Skin Disease (Besnoitiosis)** affects skin, subcutaneous tissue, blood vessels and mucous membranes. Protozoal parasite Besnoitia besnoiti. Separate sick animals, control ticks/flies.
- **Lumpy Skin Disease (LSD)** caused by a poxvirus. Vaccination
- **Pseudo-lumpy Skin Disease (PLSD)**, harmless herpes virus.
- **Mange**, small mites under the skin. Don’t introduce it in the herd, acaricide dipping, washing.
- **Photosensitization**, plant poison and sunlight. Remove from paddock and from sun
- **Worm Nodule Disease**, small lumps full of worms and larvae just under the skin. Ivermectin.
**Worms**

- **Adult tape** (segmented) **worms**, different types with different livecycles and hosts. **Drugs.**
- **Larval tape worm** (different types in humans and dogs). Treat humans and dogs, use pit latrines.
- **Liver fluke** (*fasciola gigantica* and *fasciola hepatica*). *Avoid wet land, rotational grazing*
- **Lung worm** (*Dictyocaulus viviparous*). Boost resistance, remove animals to clean paddock, vaccinate.
- **Round worms** (different types with dif. livecycles), rotational grazing, grazing >6 cm, rest pasture, drugs.
A three-host tick livescycle

1. Gravid female lays thousands of eggs on the grass
2. Eggs hatch into larvae (4-6 weeks)
3. Engorged larvae shelter in the grass and moult into nymphs (4-6 weeks)
4. Engorged nymphs shelter in the grass and moult into adults (10-20 weeks)
5. Adult male / female tick
6. Engorged female mates with male

Medium to large size mammals, small mammals and birds

Small mammals, rodents and birds
Livecycle gastrointestinal parasites
Livecycle giant liverfluke

- Eggs
- Miracidium
- Cercaria
- Small flukes on the grass
- Freshwater snail

6 weeks

10-12 weeks
General prevention of eye problems

- Apply tick grease or other repellants around the eyes.
- Manually remove ticks.
- When spraying make sure NOT to spray directly into the eye.
- Do not hit the animal around the eyes.
- Do not herd where there are many thorny plants or plants with irritating sap.
- Use only leafy trees and shrubs for fencing in animal pen.
- Separate animals with infectious eye diseases from the rest of the herd.
- Control Camel pox.

Pink eye – Eye worms – Squamous Cell Carcinoma
f) on farm solutions
Direct treatment (3\textsuperscript{rd} step)

- In case preventive measures are insufficient
- Treatment with chemical drugs and antibiotics only in case of infection
- Stick to the required waiting period before selling products as organic
Claws: painful, cows don’t eat

Prevention: good feeding, good housing, good floor food bath with copper, zinc, formaldehyde

Treatment: pedicure when necessary medicine in case of interdigital dermatitis, mortellaro
SCC at drying off and in begin of lactation, with and without antibiotics

![Graph showing SCC at drying off and in begin of lactation, with and without antibiotics. The x-axis represents weeks, from -9 to 8, and the y-axis represents celgetal*1000. The graph compares SCC values with and without antibiotics.](image)
g) on advisory
Changing housing
Changing breed

What do you want.

What can you offer.

What fits best.
Changing ration
More hygiene
Use local available therapy

Table 1: List of ethno-veterinary medicinal plants for treatment of livestock ailments in study area

<table>
<thead>
<tr>
<th>No.</th>
<th>Code</th>
<th>Local Name</th>
<th>Botanical/Scientific Name</th>
<th>Family Name</th>
<th>Habit</th>
<th>Preparation</th>
<th>Ingredients add</th>
<th>Use</th>
<th>Mode of application</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.1</td>
<td>Dorie</td>
<td>Ipomea sp.</td>
<td>Convolvulaceae</td>
<td>Climber</td>
<td>Grinded seed mixed with water and then applied</td>
<td>water</td>
<td>Actinobacillosis, Menstruation disorder*, Abdominal pain*</td>
<td>Oral</td>
<td>Veterinary Human</td>
</tr>
<tr>
<td>2</td>
<td>2.2</td>
<td>Jilo</td>
<td>Acnella caudicuza Del.</td>
<td>Asteraceae</td>
<td>Herb</td>
<td>Roasted leaves ground and mixed with salt and then applied</td>
<td>Salt</td>
<td>Actinobacillosis, Bugunch*</td>
<td>Topical</td>
<td>Veterinary Human</td>
</tr>
<tr>
<td>3</td>
<td>3.1</td>
<td>Unknown</td>
<td>Monopias stellariosides (Presl) Urb.</td>
<td>Lobeliaceae</td>
<td>Herb</td>
<td>Crushed the whole parts and then mixed with little water</td>
<td>Water</td>
<td>Internal Parasite**, Abdominal pain**, Abdominal swelling**</td>
<td>Oral, Nasal</td>
<td>Veterinary Human</td>
</tr>
<tr>
<td>4</td>
<td>6.1</td>
<td>Chegogit</td>
<td>Cynoglossum lancorohant Forsk.</td>
<td>Boraginaceae</td>
<td>Herb</td>
<td>Chopped root or crushed and dried root mixed with butter</td>
<td>Butter</td>
<td>Mastitis</td>
<td>Topical</td>
<td>Veterinary</td>
</tr>
<tr>
<td>5</td>
<td>6.2</td>
<td>Roruga</td>
<td>Solanum angivi Lam.</td>
<td>Solanaceae</td>
<td>Shrub</td>
<td>Dried and crushed leaves mixed with butter</td>
<td>Butter</td>
<td>Mastitis</td>
<td>Topical</td>
<td>Veterinary</td>
</tr>
<tr>
<td>6</td>
<td>7.1</td>
<td>Ananure</td>
<td>Ajuga integrifolia Buch.-Ham, ex D. Don</td>
<td>Lamiaceae</td>
<td>Herb</td>
<td>Chopped leaves mixed with water</td>
<td>Water</td>
<td>Internal Parasite**</td>
<td>Oral</td>
<td>Veterinary Human</td>
</tr>
<tr>
<td>7</td>
<td>8.1</td>
<td>Gerawa</td>
<td>Vernonia ansygulina Del.</td>
<td>Asteraceae</td>
<td>Tree</td>
<td>Crushed seed mixed with water and filtered</td>
<td>Water</td>
<td>Equine Colic, Pastureuillosis, Abdominal pain, malaria*</td>
<td>Oral, Nasal</td>
<td>Veterinary</td>
</tr>
<tr>
<td>8</td>
<td>8.2</td>
<td>Embuyu</td>
<td>Solanum incanus L.</td>
<td>Solanaceae</td>
<td>Shrub</td>
<td>Chopped leaves mixed with water and then sieved</td>
<td>Water</td>
<td>Pasteureillosis</td>
<td>Nasal</td>
<td>Veterinary</td>
</tr>
<tr>
<td>9</td>
<td>11.1</td>
<td>Kizbeta</td>
<td>Dalbergia lactea Vatke</td>
<td>Fabaceae</td>
<td>Shrub</td>
<td>Crushed leaves mixed with water and then applied</td>
<td>Water</td>
<td>Mastitis, Internal Parasite, local Swelling*</td>
<td>Oral</td>
<td>Veterinary Human</td>
</tr>
<tr>
<td>10</td>
<td>12.1</td>
<td>Lalisa/Ale</td>
<td>Tragia brevipes Pax</td>
<td>Euphorbiaceae</td>
<td>Climber</td>
<td>Chewed the root and swallowed</td>
<td>Noon</td>
<td>Abdominal pain*</td>
<td>Oral</td>
<td>Human</td>
</tr>
<tr>
<td>11</td>
<td>13.2</td>
<td>Bessana</td>
<td>Cotton macrostachyus Del.</td>
<td>Euphorbiaceae</td>
<td>Tree</td>
<td>A Chopped bark is filtered and then orally administer</td>
<td>Noon</td>
<td>Equine Colic, abdominal pain, Bloat</td>
<td>Oral</td>
<td>Veterinary</td>
</tr>
<tr>
<td>12</td>
<td>15.1</td>
<td>Qalnithata</td>
<td>Periplaga linearifolia Quant.-Dill, &amp; A. Rich.</td>
<td>Asclepiadaeae</td>
<td>Climber</td>
<td>Crushed leaves mixed with water and then applied</td>
<td>Water</td>
<td>Mastitis</td>
<td>Oral</td>
<td>Veterinary</td>
</tr>
<tr>
<td>13</td>
<td>15.2</td>
<td>Qomoqo</td>
<td>Echinops amplexicaulis Oliv.</td>
<td>Asteraceae</td>
<td>Herb</td>
<td>Root is grinded and mixed with water</td>
<td>Coffee</td>
<td>Ulcerative lymphangitis</td>
<td>Oral</td>
<td>Veterinary</td>
</tr>
</tbody>
</table>
Treat with chemicals only when really needed

Be aware:

- What to use it for
  - Antibiotics don’t work against virus
- Respect the withdrawal period
  - Some days - weeks after last use
- Cause residuals in animal products
- Cause resistant pathogens
  - Antibiotics are not effective anymore
- Can be harmful for the soil
  - Via manure in the soil
When animals don’t cure, culling might be the best solution for the animal and the farmer

- Don’t infect other animals
- Save medicine and time
- Don’t suffer longer
- Don’t take a place of a healthy animal
- Save feed for rest of the herd
- Care can be given to other animals
Always feed and water available
Manuals
Thank you for sharing

When you can’t digest it all in once, the information will be available on the website
Mode of administration vaccines

- Subcutaneous (S/C) – under the skin
- Intramuscular (I/M) – in the muscles
- Orally (P/O (Per Os)) – via the mouth/water/feed
- Intranasal - on the nose
- Intraocular - in the eye
- Scarification - via scratches in the skin
- Follicular - via the follicles
Mineral interaction