

# Dr. Mahadevappa D. Gouri,

M.V.Sc., Ph.D (LPM), PGDBA, Ph.D. (AM), PGAW

Dept. of Livestock Production and Management

Veterinary College, Hebbal

Bengaluru – 560024

Contact: [mdgouri@rediffmail.com](mailto:mdgouri@rediffmail.com),

(M): 9632733011, 9343400108

# Fodder production and management of ruminants



# Definition and current status

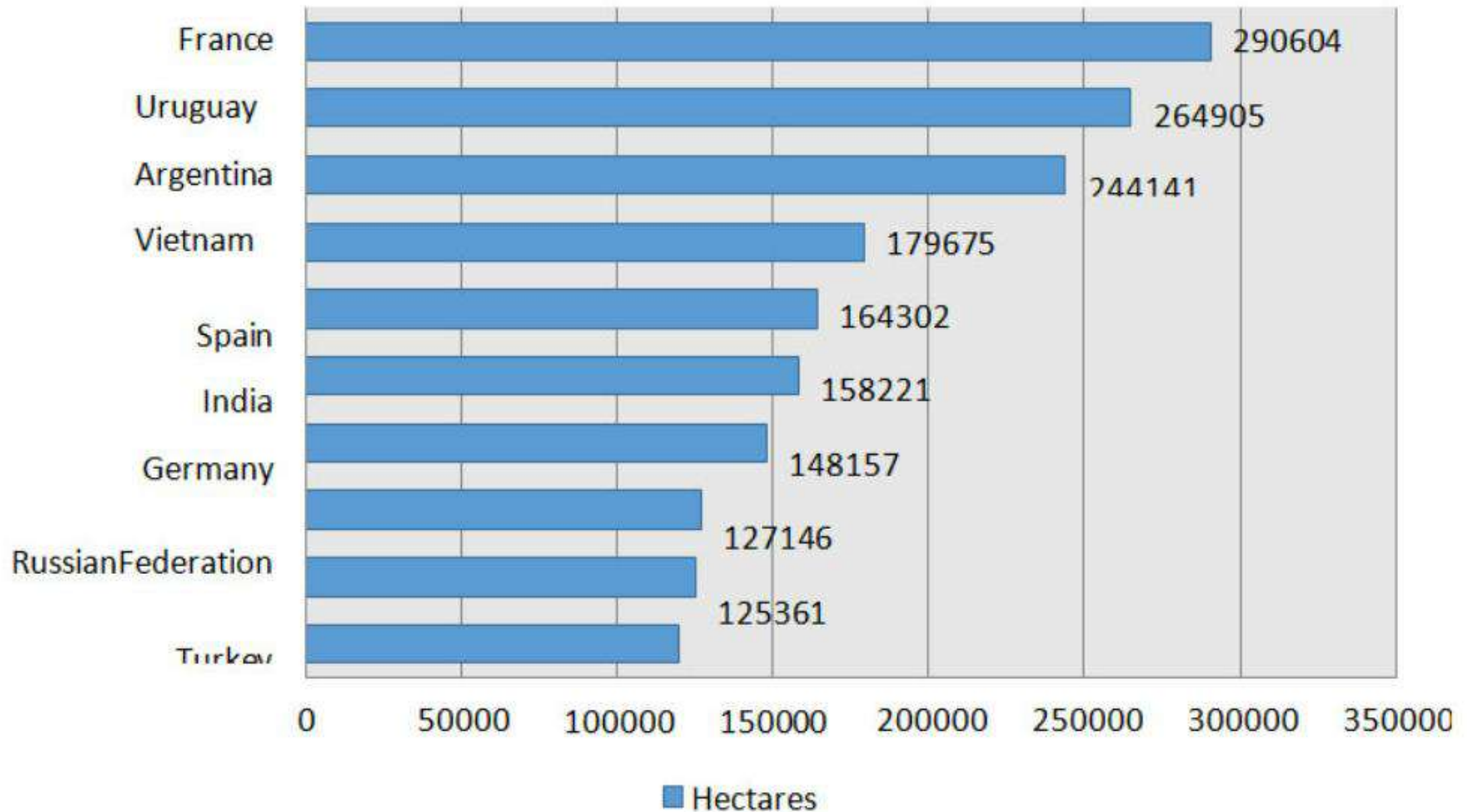
- **Organic livestock production** is a means of food production with a large number of rules directed towards a high status of animal welfare, care for the environment, restricted use of medical drugs and the production of a healthy product without residues (pesticides or medical drugs).
- World - 186 countries -involved in organic activities
- Organic farmland now covers - >71.5 million hectares
- **Organic farming is in a nascent stage in India**
  - **2.78 million hectare** of farmland- (2020)-Union Ministry of Agriculture and Farmers' Welfare.
  - This is two per cent of the **140.1 million ha** net sown area in the country.
  - During 2021- Madhya Pradesh- highest organic agriculture- **1.6 million ha**
  - Rajasthan -481 thousand hectares of organic farming land.

# Organic agricultural land (in-conversion areas) by region growth (2017-18) and 10 years growth

Source: FiBL survey 2020

Region	Organic agr. land 2017 (ha)	Organic agr. land 2018 (ha)	1-year growth (ha)	1-year growth (%)	10 years growth (ha)	10 years growth(%)
Africa	1'999'846	2'003'976	+4'130	+0.2%	+1'003'847	+100.4%
Asia	6'002'017	6'537'226	+535'209	+8.9%	+2'956'766	+82.6%
Europe	14'382'480	15'635'505	+1'253'025	+8.7%	+6'406'273	+69.4%
Latin America	7'995'447	8'008'581	+13'134	+0.2%	+348'989	+4.6%
North America	3'223'057	3'335'002	+111'945	+3.5%	+682'377	+25.7%
Oceania	35'894'365	35'999'373	+105'008	+0.3%	+23'847'268	+196.2%
World	69'492'495	71'514'583	+2'022'327	+2.9%	+35'243'503	+97.2%

### Top ten countries with the highest increase of organic land 2018

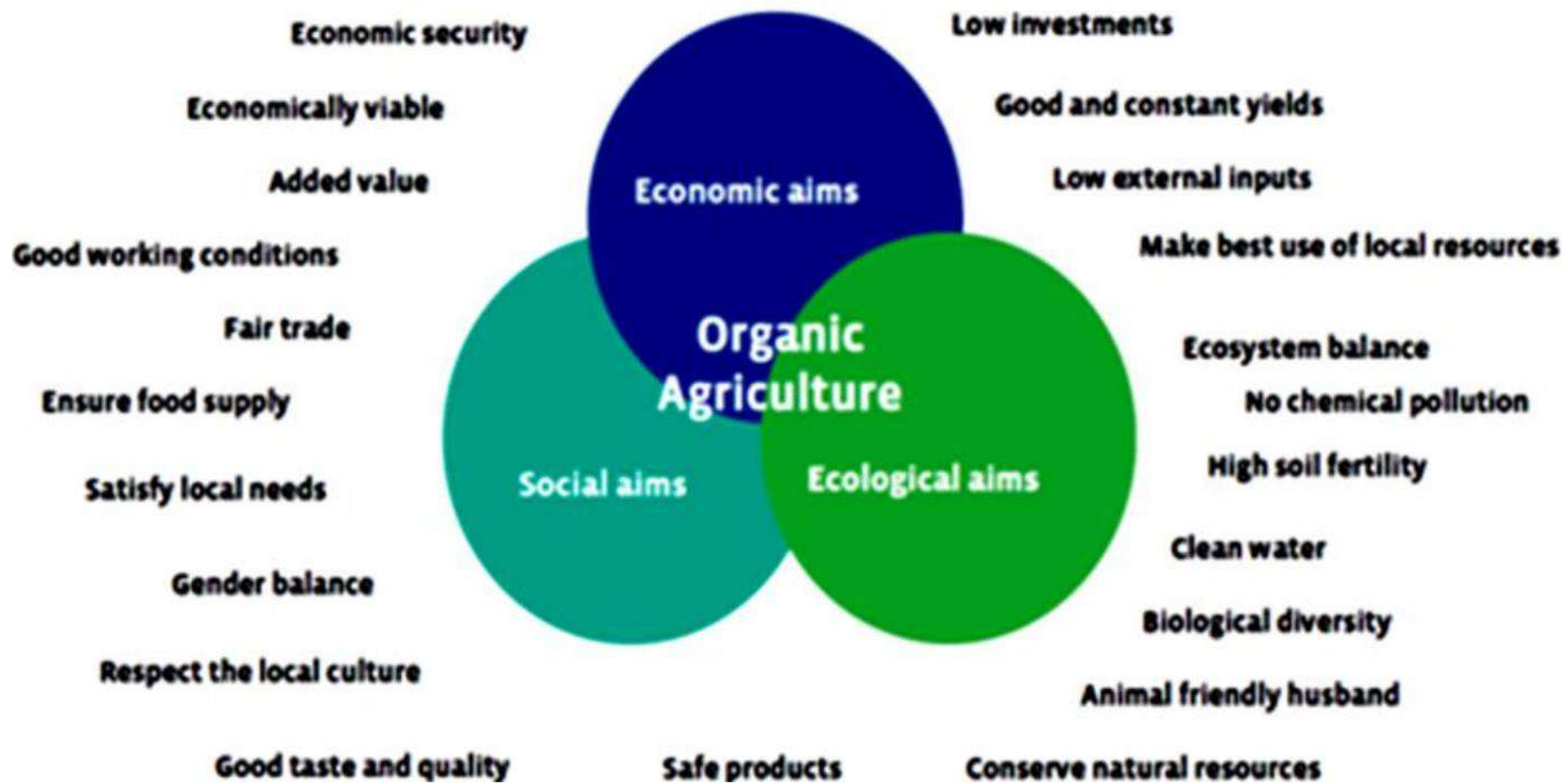


## Scenario of green fodder availability and future requirement

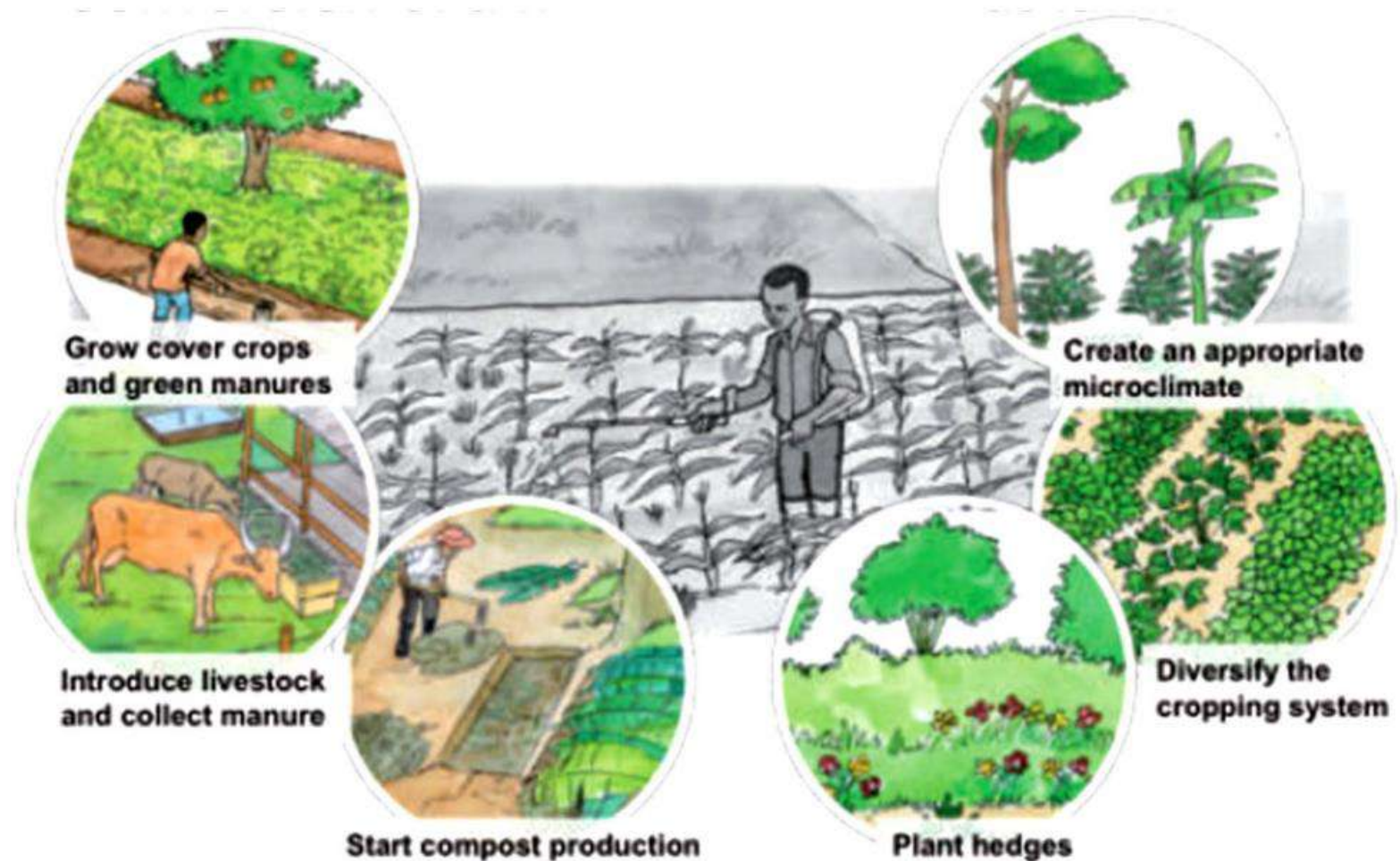
Year	Supply (in million tones)	Demand (in million tones)	Deficit as % of demand (actual demand)
1995	379.3	947	59.95 (568)
2000	384.5	988	61.10 (604)
2005	389.9	1025	61.96 (635)
2010	395.2	1061	62.76 (666)
2015	400.6	1097	63.50 (696)
2020*	405.9	1134	64.21 (728)
2025*	411.3	1170	64.87 (759)

Source: Draft Report of Working Group on Animal Husbandry and Dairying for Five-Year Plan (2002-2007, Govt. of India, Planning Commission, August-2001.

- Total area under fodder cultivation – 8.4m ha – 5.23% (2 decades)
- Not sufficient – meet requirements of growing livestock
- Poor quality forages

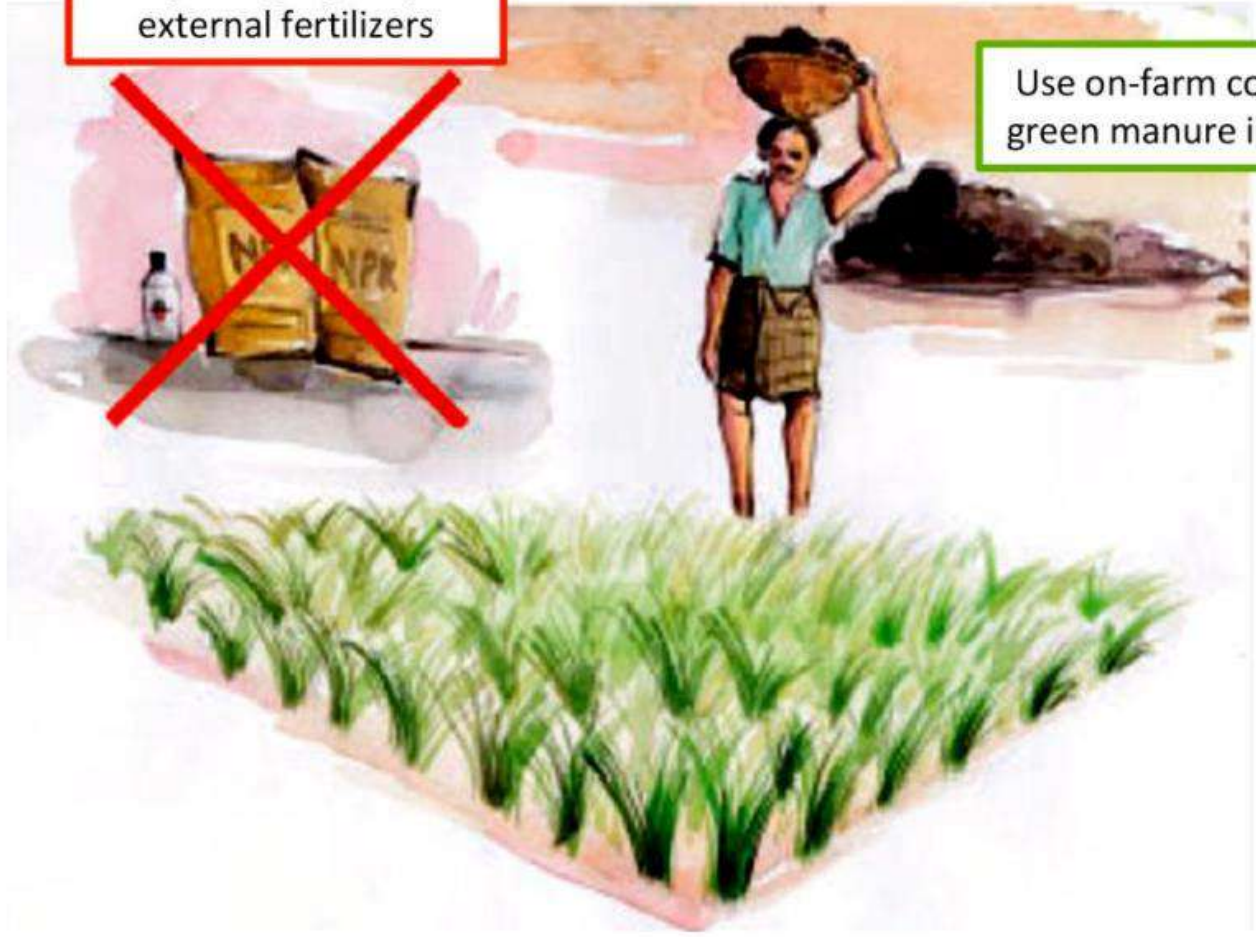


# Conversion of high external input farm

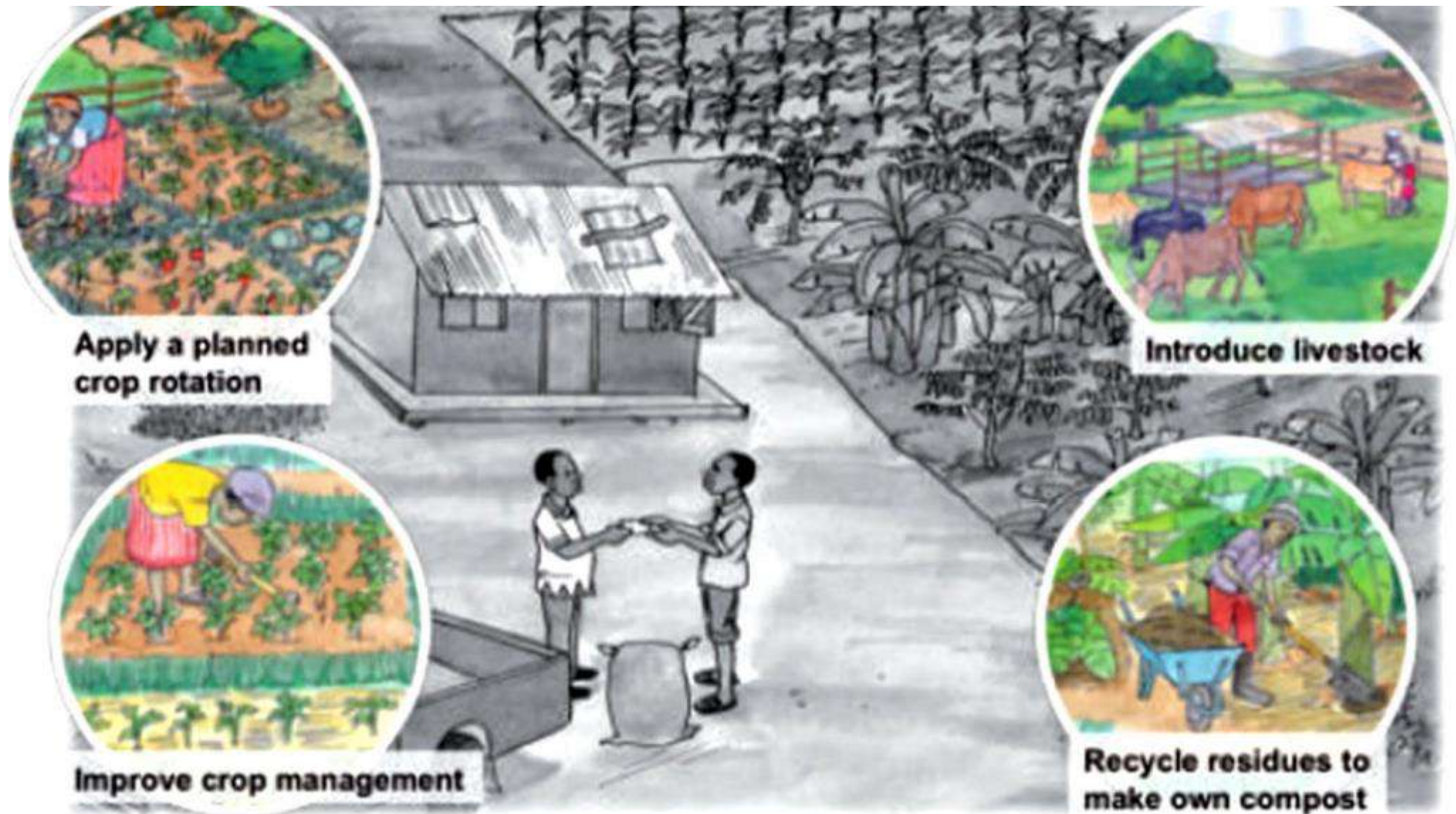




Stop using high input external fertilizers



Use on-farm compost, green manure instead !



**FIGURE 2-5 - CONVERSION OF A LOW EXTERNAL INPUT FARM**

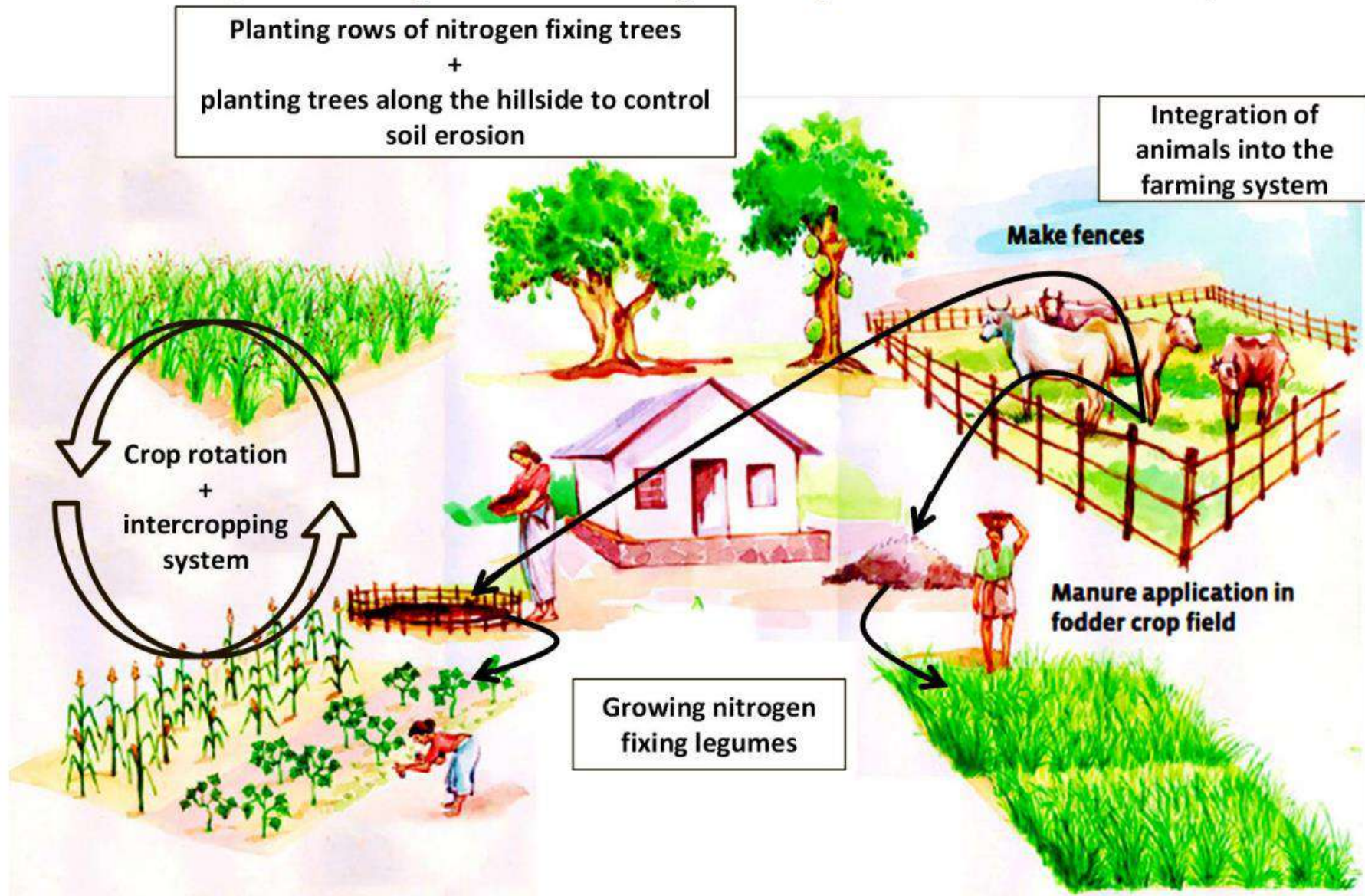
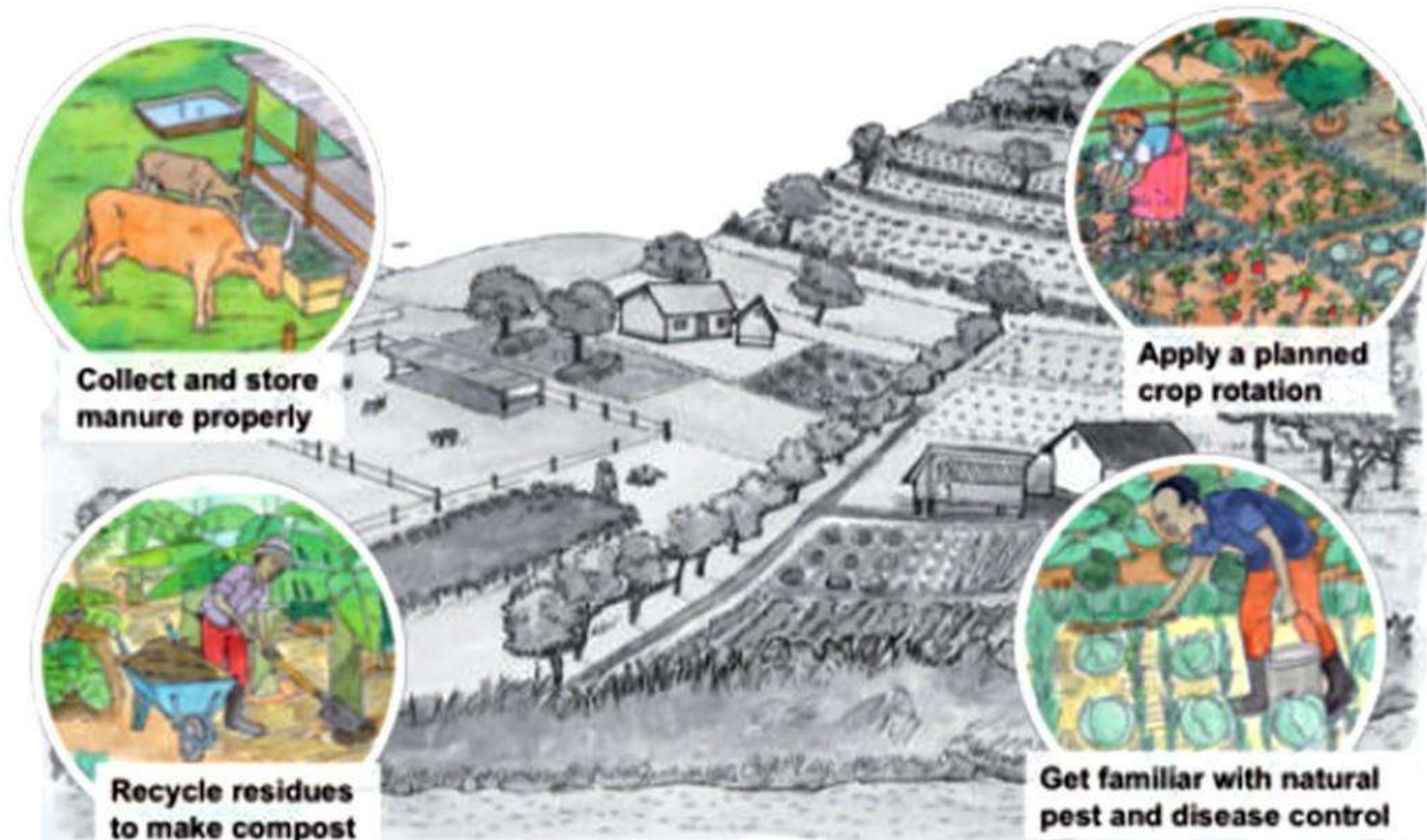


FIGURE 2-6 - SOME ORGANIC FARMING METHODS TO TEST IN YOUR OWN FARM



**FIGURE 2-7 - CONVERSION OF A MIXED FARM**

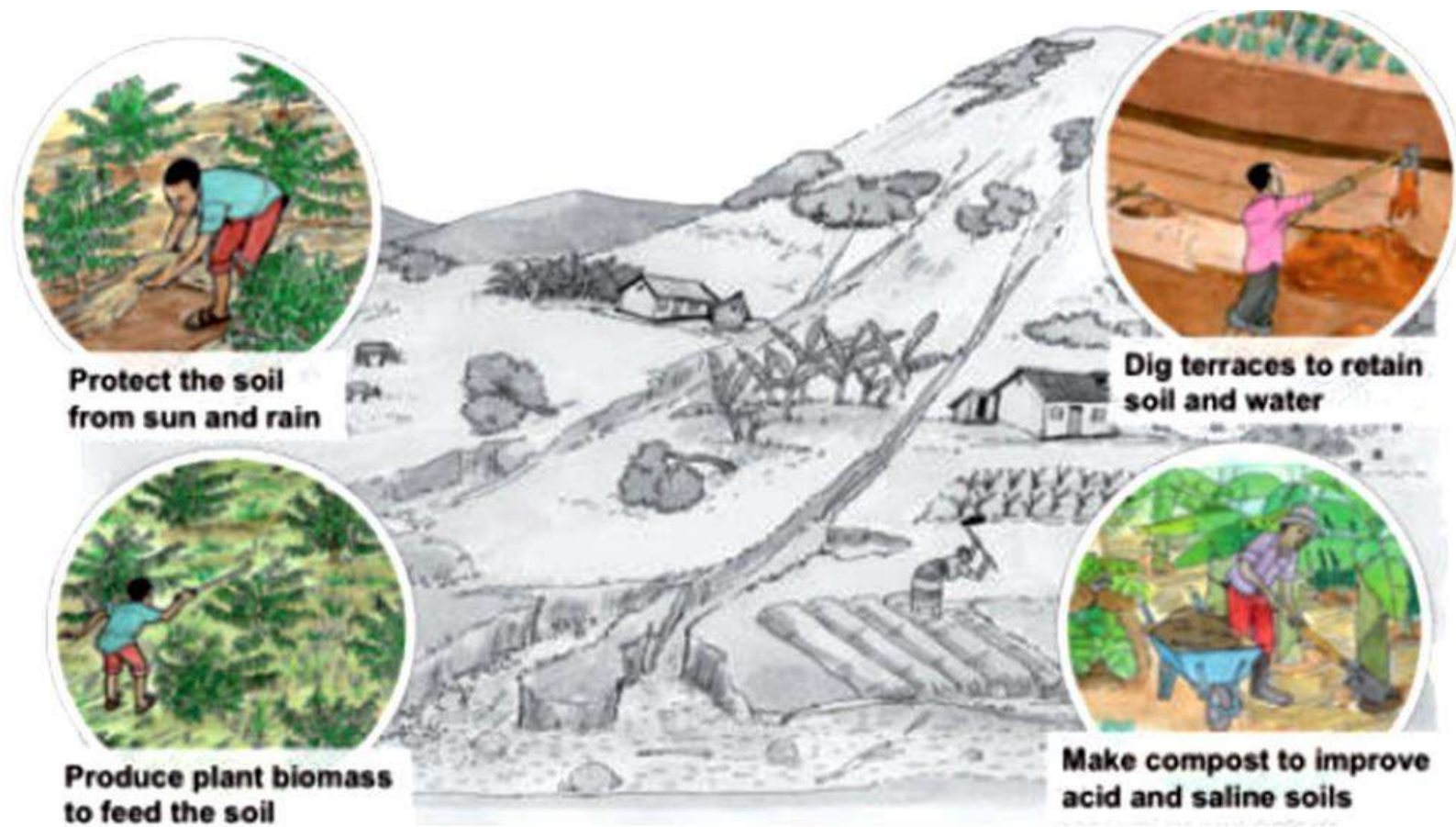


FIGURE 2-8 - CONVERSION OF DEGRADED LAND

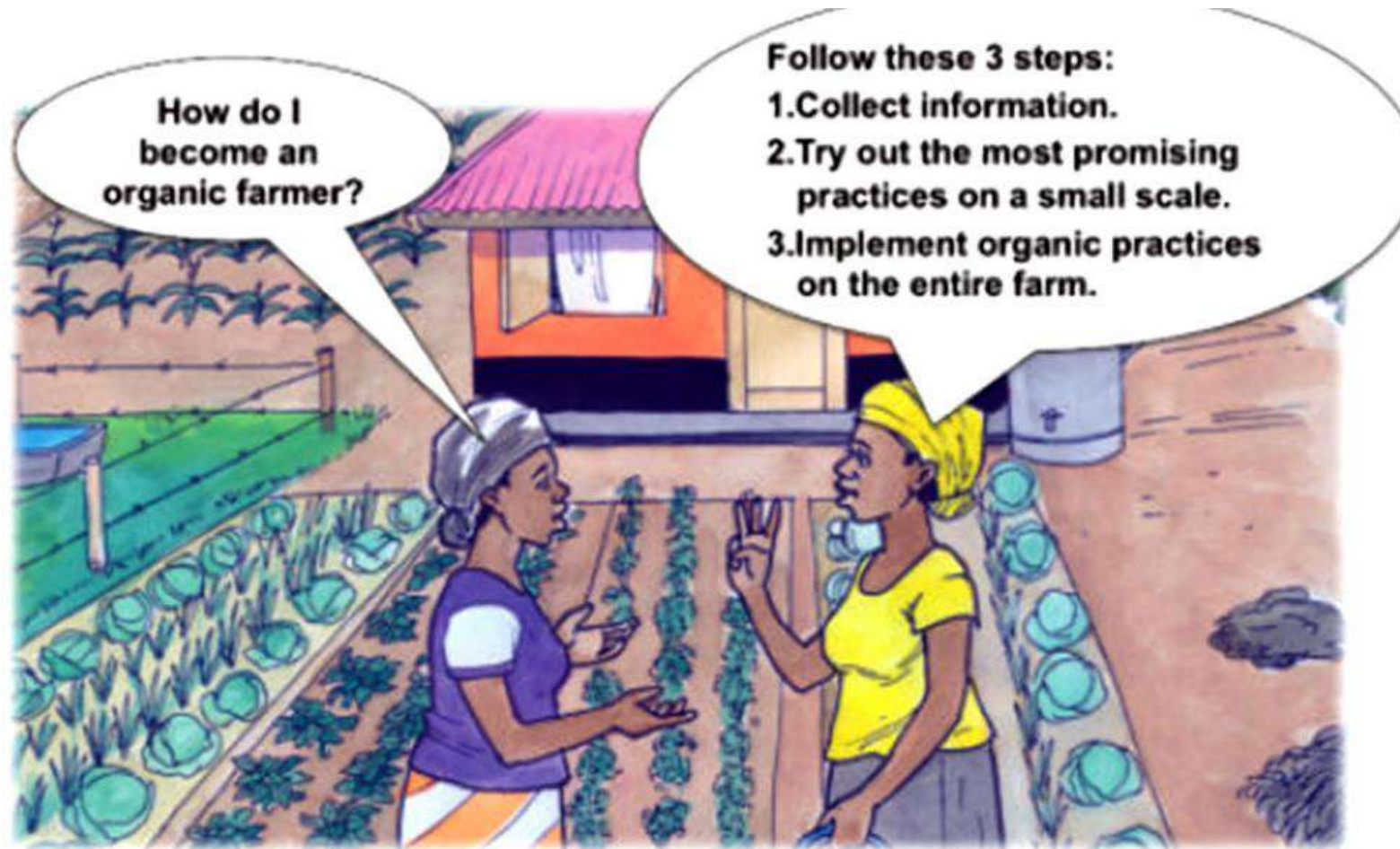


FIGURE 3-1 - HOW TO BECOME AN ORGANIC FARMER?

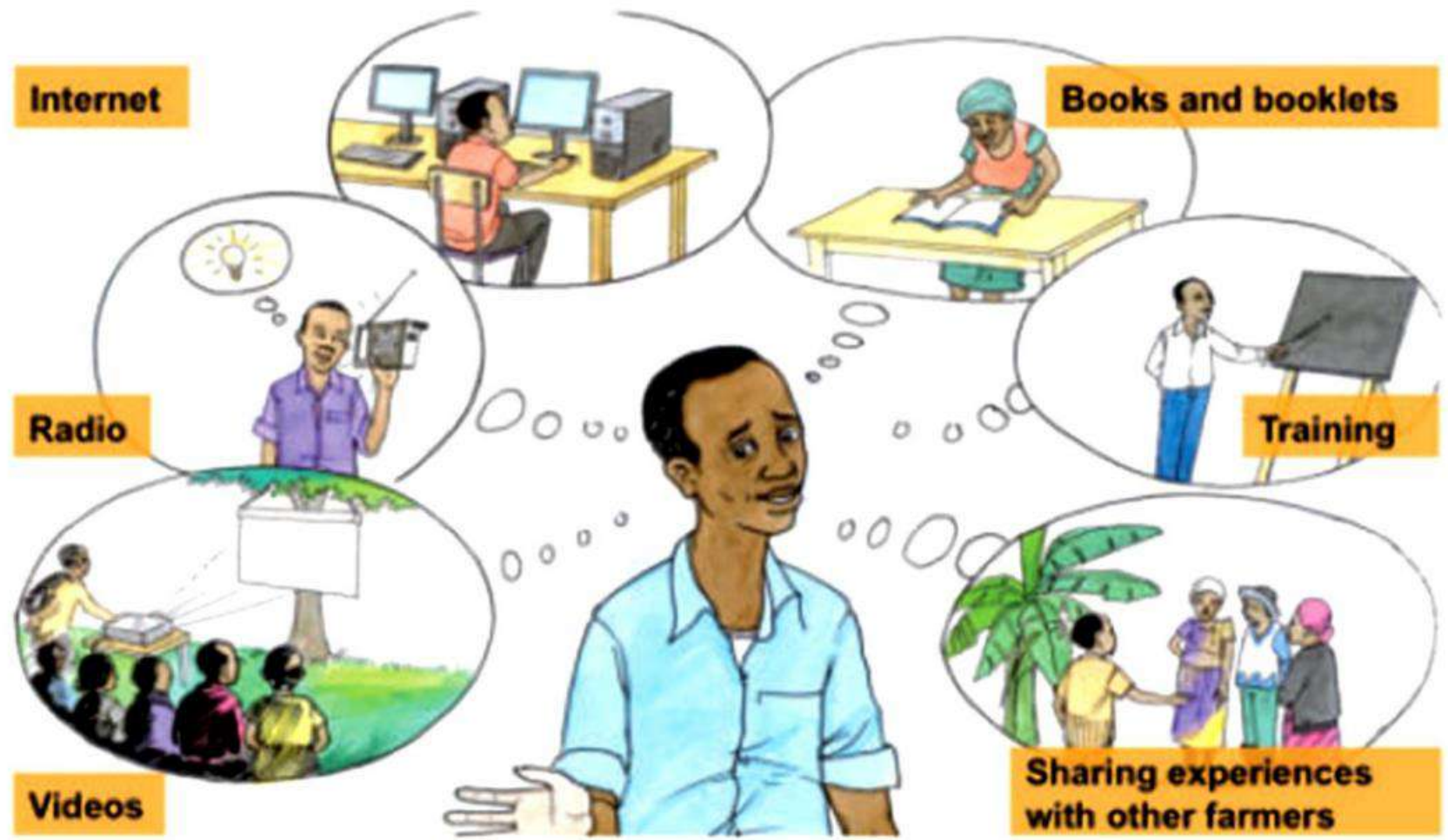


FIGURE 3-2 - HOW TO GET INFORMATION ON ORGANIC AGRICULTURE?



FIGURE 7-11 - APPROPRIATE TREATMENT OF FARMYARD MANURE



A Bolivian recipe  
for 1500 kg of  
Bocashi

*(to be adapted  
to the local  
conditions)*



- 400 kg of animal dung (cattle, chicken, rabbit, sheep, goat)
- 400 kg straw from oats, wheat, rice or rye
- 400 kg of soil from the place, without stones and clumps
- 120 kg of charcoal in small pieces
- 20 kg of bran, concentrate for cattle or flour
- 1 kg of lime (in zones with acid soils)
- Some kg of yeast, fermented maize or already prepared Bocashi
- 1 litre of sugar cane molasses
- 225 litres of water

FIGURE 7-12 - HOW TO PREPARE YOUR OWN BIOFERTILIZER (MICROBIAL FERTILIZER)



***Rhizobium***

- A bacterium.
- Lives in soil, around and inside of the roots of legumes.
- Forms a symbiosis with leguminous plants.
- Fixes atmospheric nitrogen.



***Azotobacter***

- A bacterium.
- Lives free in the soil.
- Can fix nitrogen.



***Azospirillum***

- A bacterium.
- Lives in soil.
- Is able to live on its own in soil, or in close associations with plant roots.
- A brasilense is able to fix nitrogen.



***Pseudomonas***

- A diverse group of bacteria.
- Can use a wide range of compounds that plants give off when their roots leak or die.
- Various functions: e.g. Solubilizing phosphorus and making it available.



***Mycorrhiza***

- A fungus-root symbiosis. Lives with the roots of nearly all plants.
- Lives in the root and extends itself into the soil.
- Helps the plant by gathering water and nutrients.
- Improves soil structure.

**FIGURE 7-13 - SOME OF THE ACTIVE INGREDIENTS FOUND IN MICROBIAL FERTILIZERS**

**TABLE 7-2 - MINERAL FERTILIZERS ALLOWED IN ORGANIC FARMING – A BASIC OVERVIEW**

Fertilizer	Origin	Characteristics	Application
Plant Ashes	Burned organic material	<ul style="list-style-type: none"><li>• Mineral composition similar to plants</li><li>• Easy uptake of the minerals</li><li>• Wood ashes rich in K and Ca</li></ul>	<ul style="list-style-type: none"><li>• To compost (best)</li><li>• Around the base of the plants</li></ul>
Lime	Ground limestone, algae	<ul style="list-style-type: none"><li>• Buffers low pH (content of Ca and Mg secondary)</li><li>• Algae: rich in trace elements</li></ul>	<ul style="list-style-type: none"><li>• Every two to three years when soil-pH is low (avoid excessive use: reduction of availability of P, more deficiencies of micro-nutrients)</li></ul>
Stone Powder	Pulverised rock	<ul style="list-style-type: none"><li>• Trace elements (depending on the composition of the source)</li><li>• The finer the grinding the better the adsorbance.</li></ul>	<ul style="list-style-type: none"><li>• To farmyard manure (reduces volatilisation of N and encourages the rotting process)</li></ul>
Rock Phosphate	Pulverised rock containing P	<ul style="list-style-type: none"><li>• Easily adsorbed to soil-minerals</li><li>• Weakly adsorbed to organic matter</li><li>• Slow reaction</li></ul>	<ul style="list-style-type: none"><li>• To compost</li><li>• Not to reddish soils (irreversible adsorption)</li></ul>

**Rotate between  
goats, sheep and  
cattle to avoid  
selective grazing**



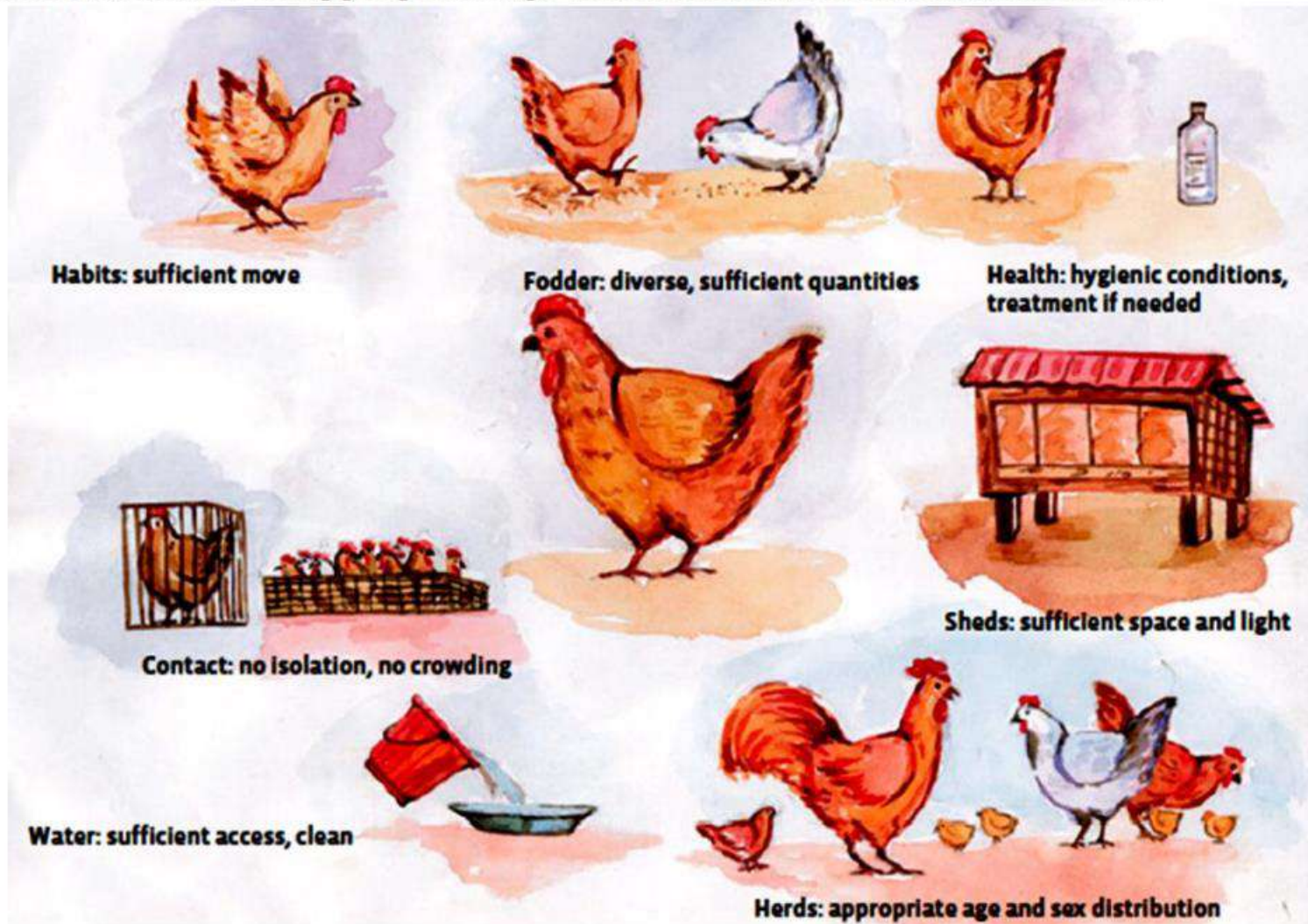
**FIGURE 9-3 - PASTURING FOR WEED CONTROL**



FIGURE 12-1 - ANIMALS INTEGRATED INTO THE FARM, SHOWING THE FLOW OF FODDER, DUNG AND PRODUCTS



RE 12-2 - REASONS TO KEEP FARM ANIMALS - A COW IS NOT JUST A COW! FARM ANIMALS CAN HAVE MANY FUNCTIONS FOR A FARMER

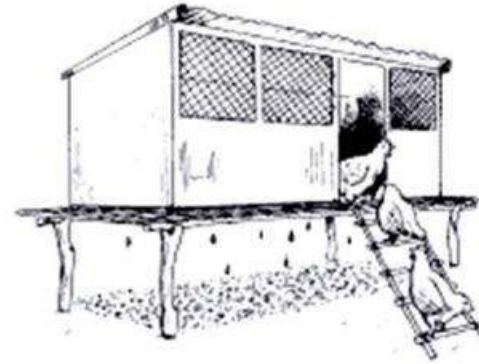


3 - WHAT FARM ANIMALS NEED - FOR EXAMPLE CHICKENS HAVE VARIOUS NEEDS WHICH SHOULD BE FULFILLED SIMULTANEOUSLY

sheltered pits or heaps to collect and store manure.

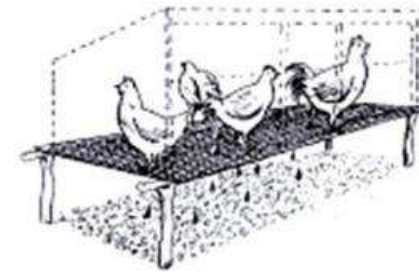
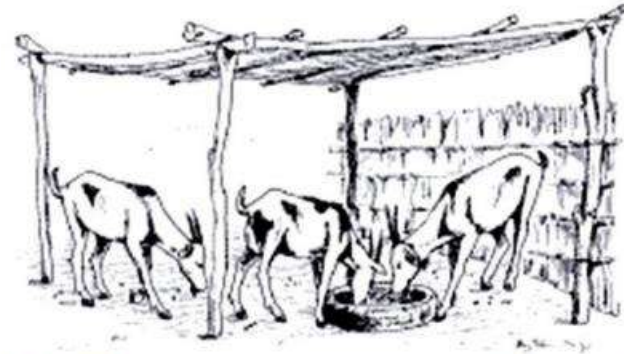


**Cattle shed**



**Chicken shed**

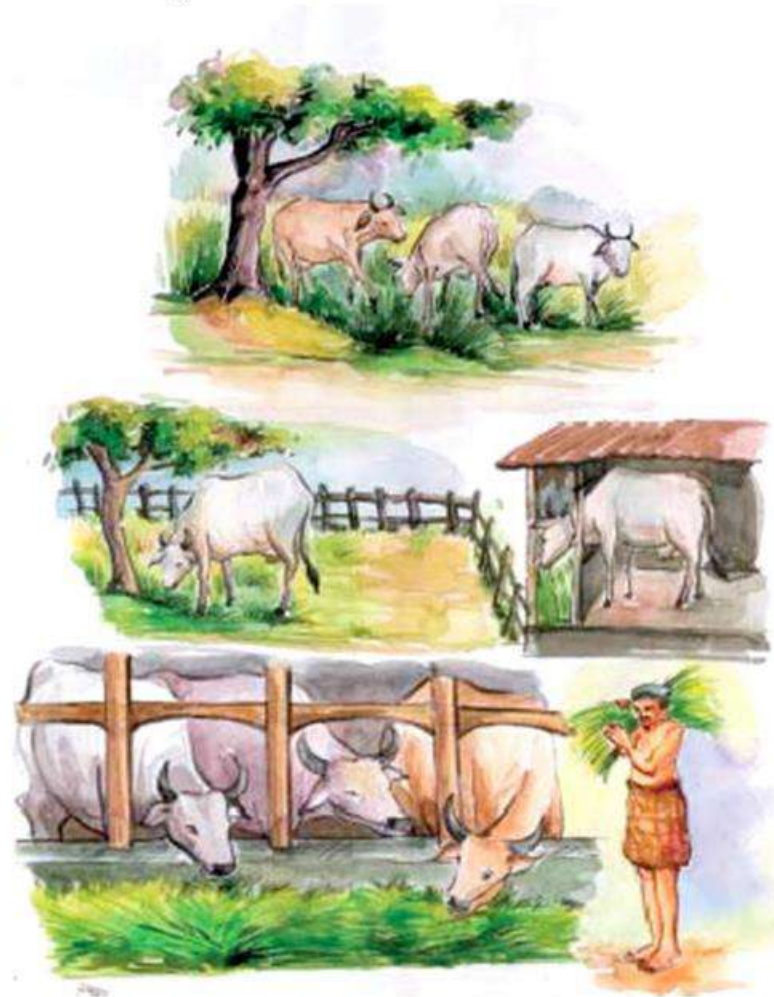
**Goat shed**



**FIGURE 12-4 - TRADITIONAL SIMPLE SHEDS IN SENEGAL (CATTLE SHED, GOAT SHED, CHICKEN SHED)**



Combining grazing and shed feeding as an ideal solution?



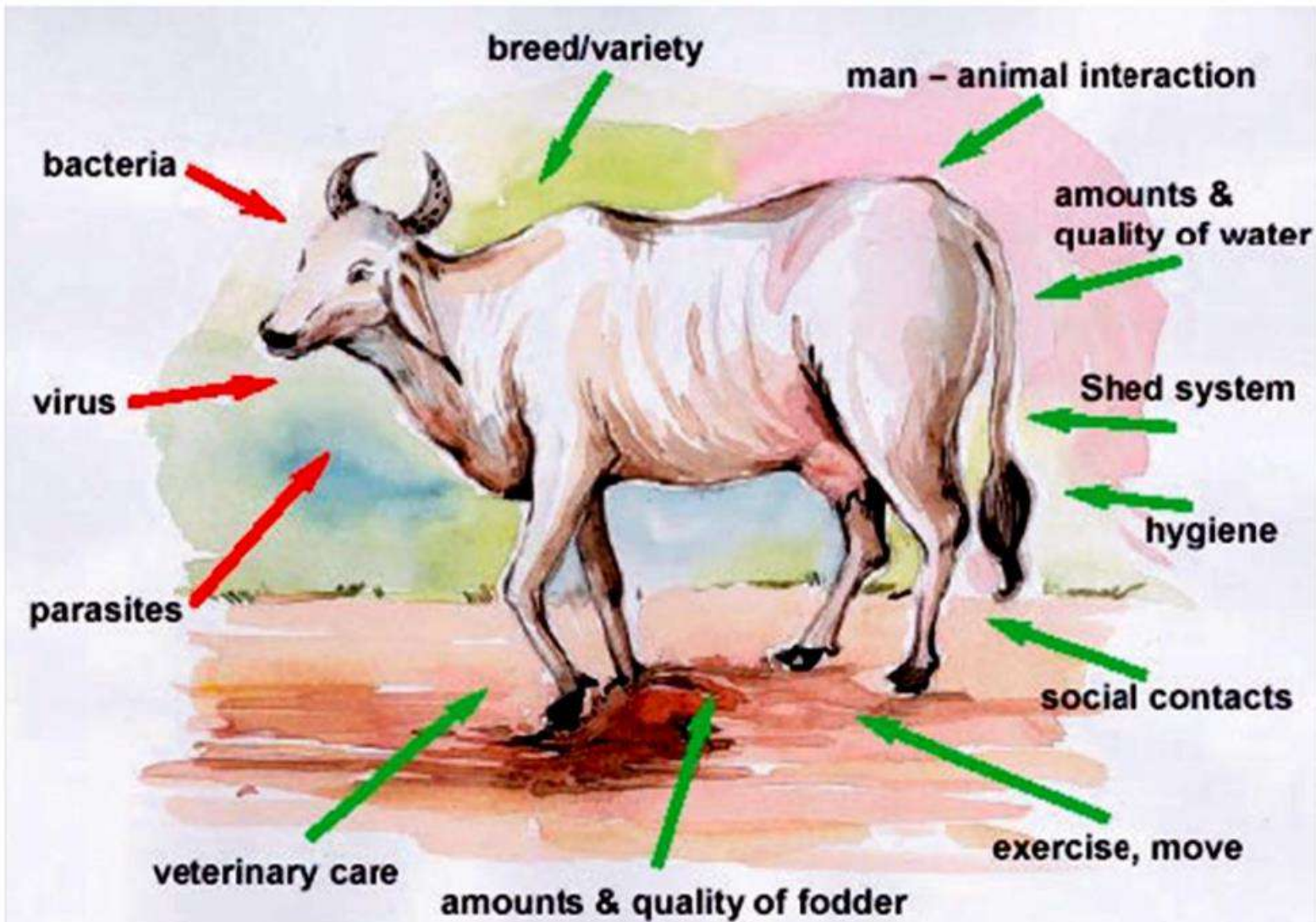
### Grazing:

- Less labour
- More land required
- Lower productivity
- More move/exercise
- Dung is spread on the pastures

### Shed feeding:

- More labour
- Less land required
- Higher productivity (?)
- Less move /exercise
- Dung can be collected easily

FIGURE 12-6 - THE PROS AND CONS OF GRAZING AND SHED FEEDING, AND THE COMBINATION OF BOTH SYSTEMS AS A PROMISING OPTION



Bacteria, viruses and parasites attacking the farm animal which fights back with its immune system. The farmer can influence both sides of this balance.

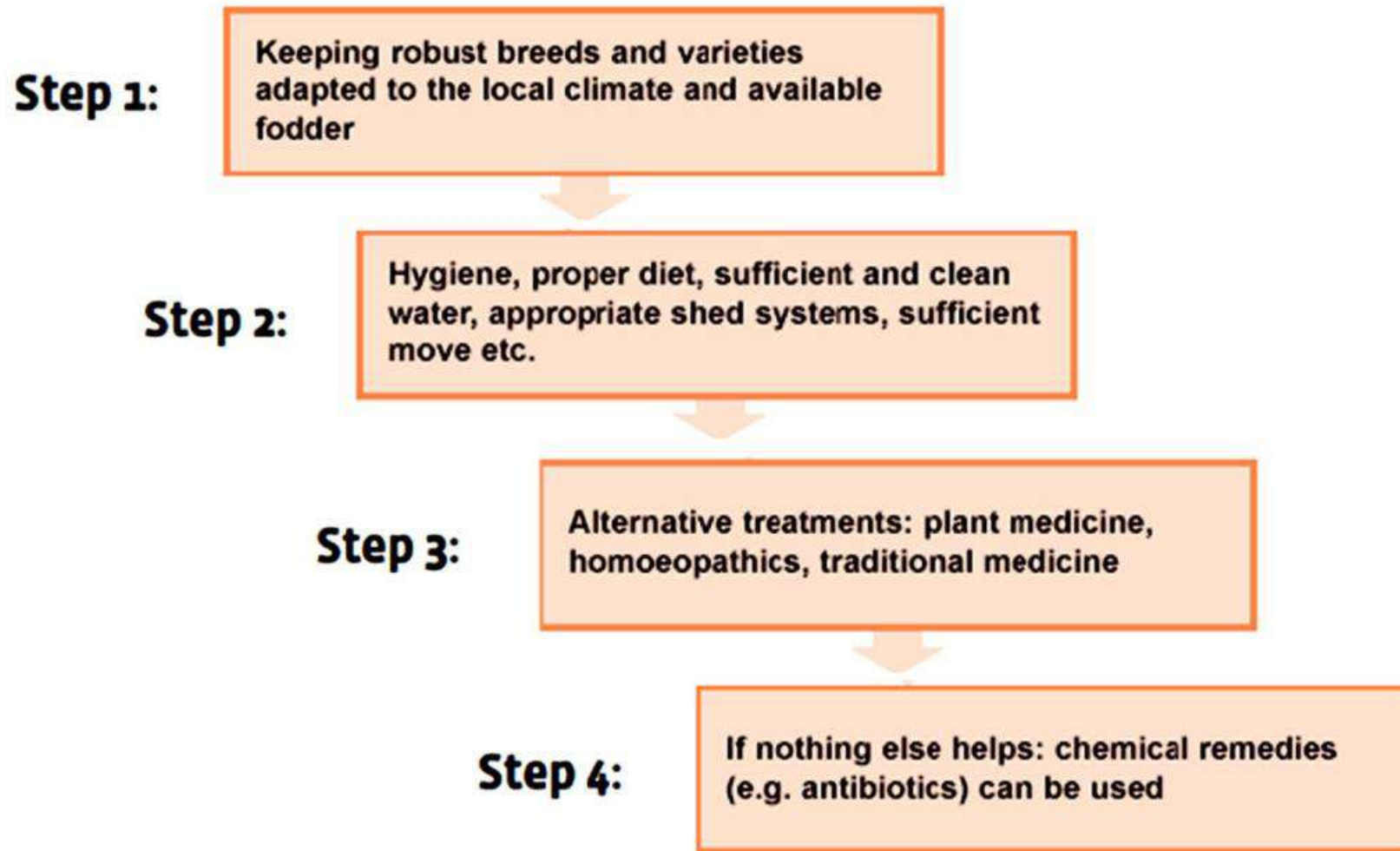
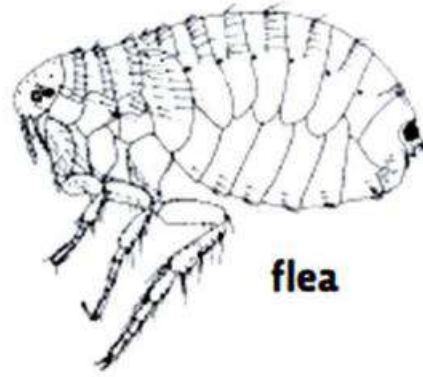


FIGURE 12-9 - PREVENTION BEFORE CURING -

ONLY WHEN ALL PREVENTIVE MEASURES FAIL ANIMALS SHOULD BE TREATED, PREFERABLY WITH ALTERNATIVE REMEDIES

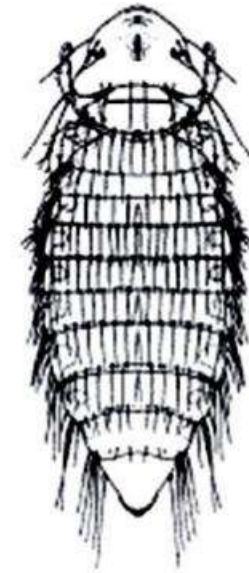


**Sweet flag (*Acorus calamus*)**



**flea**

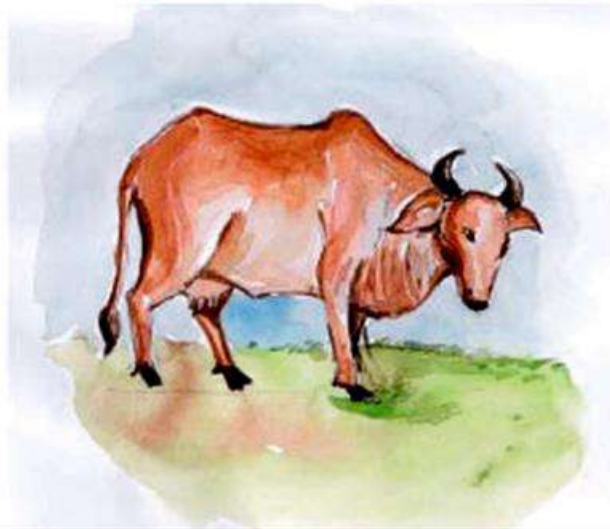
**lice**



Sweet flag (*Acorus calamus*) can be used to treat fowls against lice, but also to reduce house fly populations. (Source: „Ectoparasites in the Tropics“, Matzigkeit, 1990)

***The «ideal» organic poultry breed***

- Feeding on kitchen wastes and farm by-products
- Satisfying egg production
- Useful as meat
- Good health, good resistance against diseases



***The «ideal» organic cattle breed***

- Utilising roughage and farm by-products
- Satisfying milk production
- High fertility
- Good resistance against diseases
- Long life with continuous production

Organic animal breeding should optimize the overall use of farm animals, with consideration given to the local conditions and available fodder: breeding goals for poultry and cattle breeding.

# Outline of the topic

## Fodder Production for dairy cows

- Legume
- Non-legume
- others

## Management of ruminants

# Outline of the presentation – Fodder production for dairy cows



## Fodder Production

- **Classification**

- Legumes and Non-legumes -Annuals and Perennials
- High protein cereals
- Conventional
- **Emergency fodders**
- Hydroponics
- Azola

- **Cultivation**

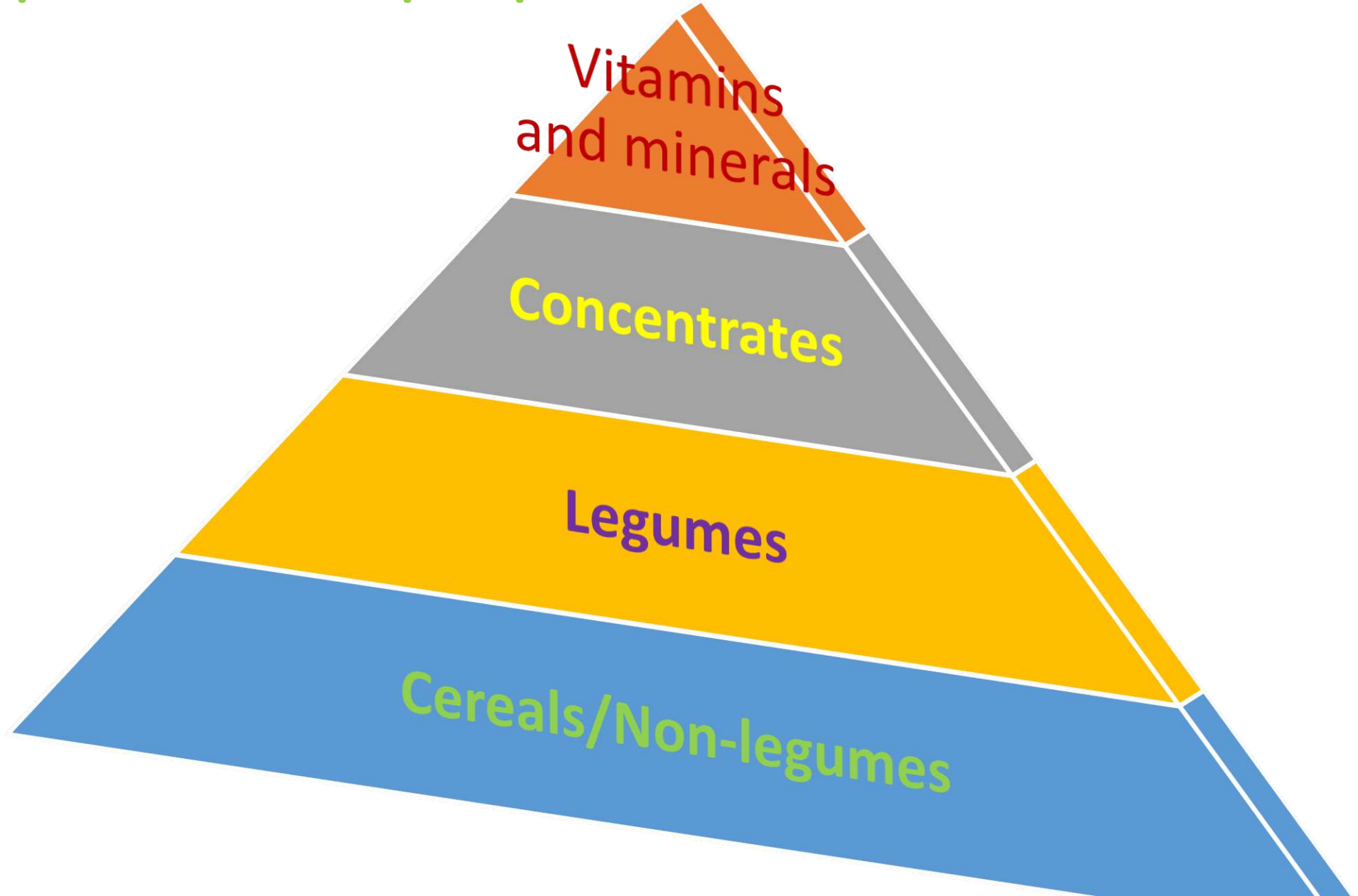
- Land preparation and Sowing
- Manuring
- Harvesting
- Yield

Vermicompost  
/ Biogas slurry  
/ Farm Yard  
Manure  
Application

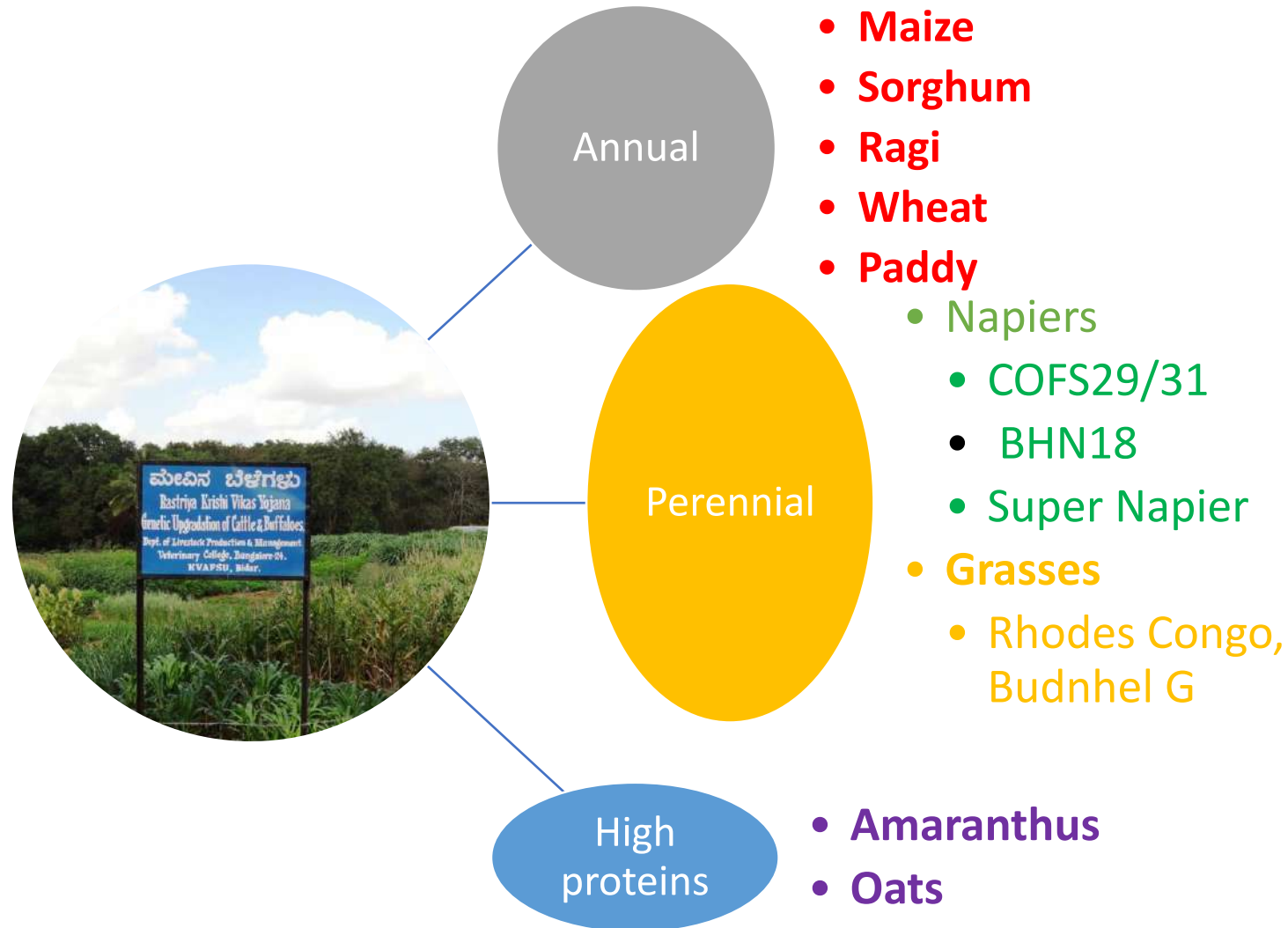
- *For Irrigated lands*
- **25 tons/ hectare in two divided doses**
- *For Rainfed lands*
- **12.5 tons/hectare of land**



# Requirement / proportion of fodder in the diet



# Cereal / Non-legume fodders



A wide-angle photograph of a lush green grass field. The grasses are tall and dense, filling the entire frame. The color is a vibrant, healthy green. The sky is not clearly visible, appearing as a bright, washed-out area at the top of the image. The overall scene is peaceful and natural.

# **GRASSES - Varieties**

# Rhodes – King of all grasses



# Bundel Guinea



# Bracharia humidicola



# Multi-cut Bajra



# Yellow Maize





# Maize (African Tall)



# Multi-cut Jowar



# Napier's - Varieties



COFS 29/31



Co4



Co3



# Super Napier







# High protein cereals

# Grain Amaranth



# Oats (*Avena sativa*)



# **Legumes – Fodder varieties**

**ΛΑΡΙΕΤΙΕΣ  
ΓΕΦΥΜΕΣ – ΕΟΦΟΕΛ**

# Luecerne



# Stylosanthus hamata



# Stylosanthus scabra



# Hedge lucerne





# Fodder groundnut



# Intensive cultivation of Moringa and Sesbania

# Moringa / Drumstick fodder





17/01/2012 08:53



# Sesbania





21/02/2012 07:44



18/02/2012 07:59











Emergency fodder

# Cactus (Opuntia spp)





# Azolla





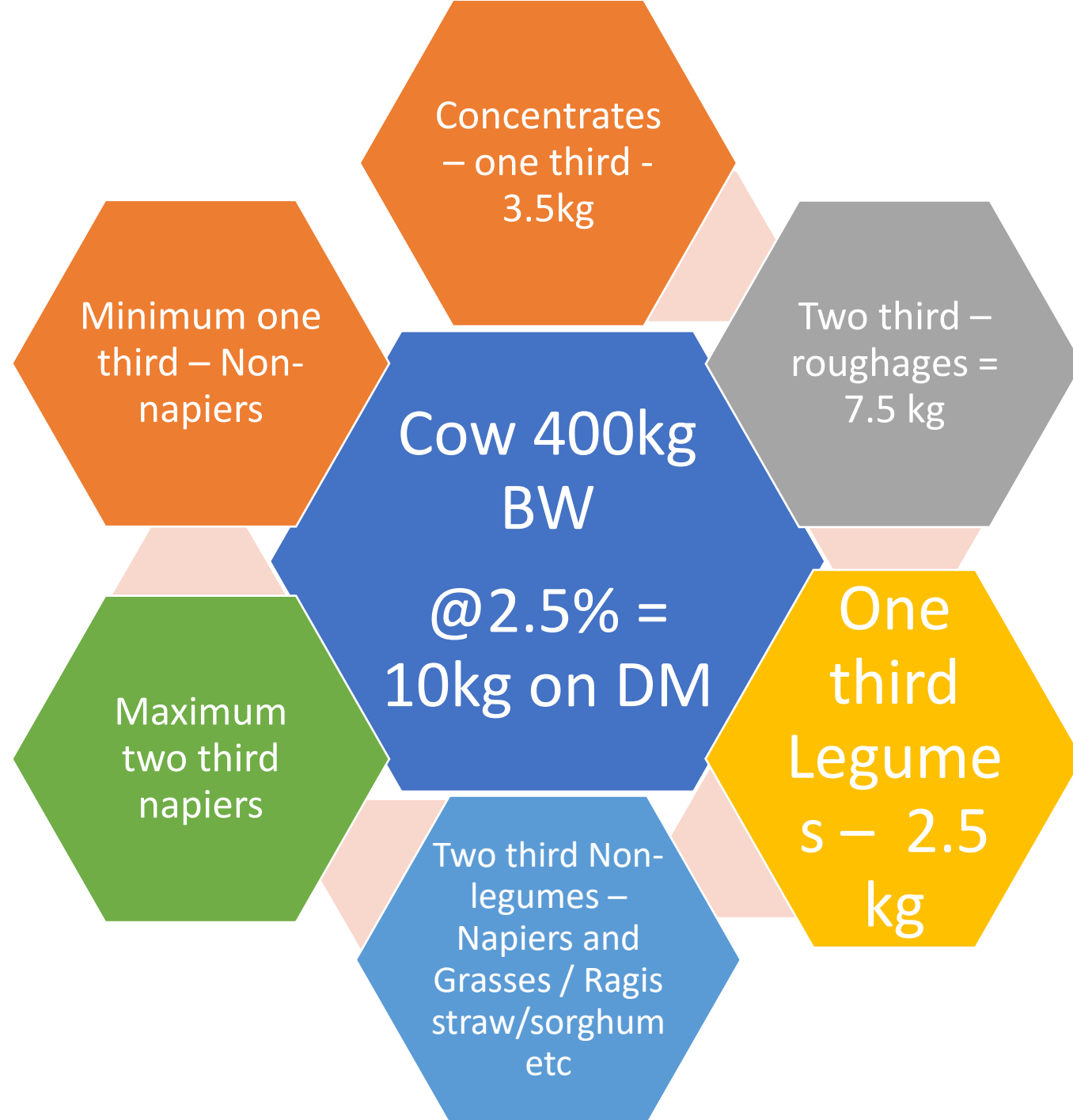




# **Hrdroponic Fodder Production (Quality Fodder production)**



# Feeding Management of Ruminants



# General Rules - Livestock

- Livestock fed **100 per cent** organically grown good quality feed
- Produced from farm itself (**at least 50%**) or within the region from organic farms
- **Animal welfare** - Expression of normal **behaviour and digestive** needs is a mandate
- **Balanced ration** as per the **standards of feeding**
- **By-products** from organic processing industry can be used
- No **coloring agents** allowed

# Under exceptional cases – Not possible to obtain from organic sources

- Can be allowed from accredited sources – conventional farms
- Max percentages of such feeds shall not be more than the following during first year
  - **Ruminants – 15 %**
  - **Non-ruminants – 20%**

This will be reduced to within 5 yrs to

  - **Ruminants – 10 %**
  - **Non-ruminants – 15 %**
- The above are dependent of
  - Unforeseen natural or man-made events
  - Extreme climatic conditions
  - In early stages of organic agriculture

# Following are not included

- Synthetic growth promoters of stimulants
- Synthetic appetisers
- Preservatives
- Artificial colouring agents
- Urea
- Farm animal by-products to ruminants
- Droppings, dung or other manure
- Feed subjected to solvent extraction (hexane) or addition of other chemicals
- Pure amino acids
- Genetically engineered organisms or products



# Following are allowed

- Vitamins, trace minerals and supplements – from natural origin – appropriate quality and quantity
- All ruminants should have ad libitum access to good quality roughages
- The preservatives such as – Bacteria, fungal and enzymes, Molasses and plant based products

**Synthesised substances or unnatural sources e.g. acetic, formic and propionic acids, vitamins and minerals should not be used**

# Young stock raising

- Using a systems – depend of organic milk preferably form own species
- In emergencies – Accredited certified milk of non- organic systems of dairy based milk substances can be used but should be free from antibiotics or synthetic additives

# General Husbandry Management

- Animal welfare – should be able to express their normal behavioural patterns
- Management practices – Good health and welfare of animals
- Optimum flock size – housing as per the standards
- No overcrowding
- Sufficient free movement
- Fresh air and natural day light, temperature, rain and wind – **comfort zone**
- **Protection – harsh climatic conditions**
- **Free access to fresh water and feed according to the needs of the animals**
- **Landless animal husbandry is not allowed**
- **Herd animals not to be kept individually, except – sick animals, advance pregnant animals**





# Length of Conversion Period

- To establish – some time / period – interim period =  
Conversion period
  - Conversion as per the standards
  - May be accomplished over period of time
  - Animal products may be sold as “product of organic agriculture” only after the farm or relevant part of it has been under conversion for at least 12 months and providing the organic production standards have been met for appropriate time – 30 days (Dairy and Egg production)
  - Organic meat – when standards have been met for 12 months

# Brought in Animals

- Two day old chick for meat production
- 18 day old hen for egg
- 2 week – other poultry
- Piglets – up to 6 weeks and after weaning
- Calves – 4 weeks – must have received colostrum and are fed a diet consisting mainly of full milk
- Breeding stock - @ 10 % /year –same species – this can be relaxed in
  - Unforeseen events
  - Enlargement of farm
  - Establishment of new type animal production
  - Small holdings

# Breeds and Breeding

- Breeds – adopted to local conditions
- Breeding programmes – natural behaviour and directed to good health
- Natural reproduction techniques
- AI – is allowed only up on necessity
- Embryo transfer techniques – not allowed
- Hormone treatments – not allowed- may use only under medical emergencies



# Mutilations

- Not allowed
- Following can be
  - Castrations
  - Tail docking of lambs
  - Dehorning
  - Ringing
  - Mulesing

**Use anaesthetics to prevent sufferings**

# Veterinary Medicine

- Natural medicines and methods
  - Homeopathy
  - Ayurvedic medicines
  - Acupuncture
- Prevention – important
- Medicines withholding periods should be displayed
- Use of alternate medical treatment is mandate
- No synthetic growth hormones
- Vaccination used only – known diseases
- Genetically engineered vaccines not allowed

# Transport and Slaughter

- To minimise the stress
- Distance and frequency – less
- Medium – appropriate
- Inspected regularly during transport
- Watched and fed – depending on weather and duration of transport
- Handling during transport and slaughter – calm and gentle
- Killing animals in front of other animal not allowed
- Resting time to release stress
- Each animal stunned before being bled to death



Bar Bench  
AN INDEPENDENT NEWS



# Slaughter - considerations

- Stress caused
- Fitness of animal
- Loading and unloading
- Mixing different group/sex of animals
- Quality and suitability of transport and handling equipment
- Temperatures and Relative humidity
- Hunger and thirst
- Specific needs and of each animal
- No chemical or tranquillisers – given
- Transport time not to exceed more than 8 hours per day

# Record keeping

- Receipts and labels
  - Breeding records
  - Identifications methods and sales records
  - Herd health records
    - Calendar, note book
    - Card life and vet records (name & address of the vet)
    - Treatments given – restricted or allowed
- Test results – water test, somatic cell counts etc

**FARM ANIMAL IS A LIVELIHOOD SOURCE LET IT BE TREATED WITH LOVE , AFFECTION AND COMPASSION, IT NEEDS UTMOST CARE**



# THANKS

