

Theme 4: Water management and supply

WATER SOURCES, DISTRIBUTION, STORAGE AND REQUIREMENTS (Level 3)

Topic	Training & information Content
4.1	Water sources, distribution, storage and requirements



1. You will learn about (learning objectives):

- Identify appropriate sources of clean water for cows
- Importance of water to the cow
- Qualities of good water
- Water distribution
- Treating/purifying and Supply of oxygen to water
- Water storage



2. Uses of water by a cow

- Water is a very important nutrient requirement for cows and should be given free access
- Water is needed for:
 - production of milk (milk is 87% water)
 - transportation of absorbed nutrients in the body
 - aids chemical reactions within the body
 - maintain normal body temperature
 - excretion of waste from the body



3. Qualities of good water

- Water for cows should be accessible all times and be of good quality to avoid causing problems to the cow
- Water qualities aspects include:
 - Clean
 - Good smell
 - Good colour
 - Free of impurities i.e. chemicals or toxins
 - Have naturally occurring minerals in right quantities
 - Have balanced pH



3.1 Qualities of good water Cont'd...

- It's important for households to assess water they use and if necessary test water to ensure it meets all acceptable standards
- During dry seasons, water quality declines; since concentration of pollutants in the water sources rises and most of the sources become stagnant



4. Sources of water

- Common water sources
 - Streams
 - Rivers and lakes
 - Wells
 - Boreholes
 - Springs
 - Water harvesting i.e. rainwater harvesting
 - Municipality water
 - Dams
 - Reservoirs
- To mitigate water supply shortages to the herd it helps to have diversified water sources



5. Surface water (streams, rivers, lakes and reservoirs)

- Water from streams, rivers and lakes are popularly used especially by farmers in the rural areas
- Water from these sources however are prone to contamination easily compared to other sources
- The herd is limited to drinking between 1-2 times only a day due to distance covered to watering points
- Most of municipality water is distributed from surface water



6. Underground water (springs, wells and boreholes)

- Refers to water found beneath earth's surface in fractures of rocks or soil pore spaces. To access some of this water, one can drill and pump water to the surface
 - Springs are naturally occurring and not commonly used as drinking points for cows
 - Wells are shallow in depth compared to boreholes and can be dug manually
 - Boreholes are dug by drilling machines due to the huge depth that has to be achieved



6.1 Underground water (springs, wells and boreholes) Cont'd...

- Underground water sources are used as a supplement source of water especially during dry seasons

Note: harvested water (rainfall) is not categorized as either surface or underground water sources



7. Difference between surface & underground water sources

Surface water

- Contaminated by animals themselves when drinking
- Prone to contamination by chemicals, run offs
- Is a fresh source of water (rainfall)

Underground water

- Contaminated when leaching occurs
- Extra cost for pumping water to the surface
- Less contaminated than surface water
- Mainly contains hard water



8. Water distribution

- Water distribution to cows can be done through various means:
 - Fetch and carry (rope and bucket)
 - Pumping water
 - Piping systems
- Water distribution systems should be carefully chosen to ease feeding of cows



8.1 Water distribution Cont'd...

- Distribution systems should be well maintained (cleaned) to reduce chances of further contamination
- Adequate water access encourages even distribution of manure and even grazing on pastures



9. Manual water distribution

Rope and bucket

- Commonly used by farms within their households and during season of water scarcity (access of boreholes and wells)

Manual water pumping

- This is a cheap and reliable means of pumping water from water sources compared to mechanical means of pumping. Common pumps used are hand pumps, rope and washer pump etc



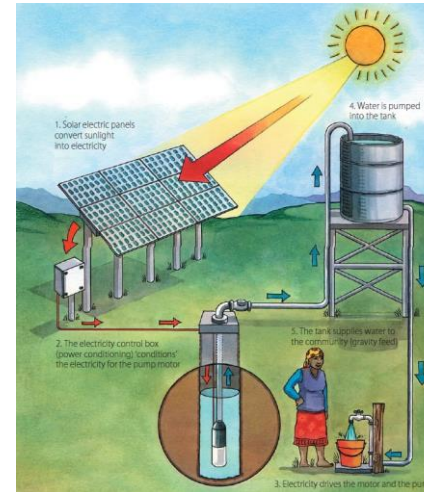
10. Mechanical water distribution

Mechanical water pumping (including solar driven)

- Pumping lifts water above ground level from the source and re-directs it to troughs or bowls

Piped systems

- Mostly used by peri-urban farmers who have access to water from the municipality water supply



Mechanical water pumping



Piped water

11. Difference between manual and mechanical distribution

Manual distribution

- Labour intensive
- Cost effective source of distribution
- Limited use to a certain depths (100 meters for rope and bucket)

Mechanical distribution

- Dependant on source of power
- Extra cost of maintenance



12. Water distribution to the herd

- Avail water close to the feeding area of the herd either in the zero grazing unit, grazing area or both for sufficient and easy access to the entire herd
- Cows should not walk long distance to get to watering points
- Water troughs should be strategically located to ensure that water is adequately distributed and all cows have access
- Locate troughs in shaded area



12.1 Water distribution to the herd Cont'd...

- Critical check points for access to water for cows;
 - Ensure no more than 20 cows use one water trough
 - Frequent cleaning of the troughs
 - Timely refill the troughs
 - A water trough should hold at least 5 gallons of water; large volume troughs helps to maintain the water cool
 - Ensure unlimited access to clear, clean, fresh water



13. Requirements of good water distribution

- Water availability and access are important for the animal's health
- Water distribution systems should;
 - Supply water to the intended place
 - Maintain water quality
 - Supply water in the right pressure
 - Prevent leakages
- Proper water placement should be considered



14. Do's in water distribution to cows

- Water in troughs should be removed and cleaned frequently (e.g., weekly)
- Test for bacterial or chemical contamination
- Remove manure build up near the trough
- Water troughs should be accessible for cleaning
- The area around the trough should be firm and dry



Dirty water troughs should be cleaned



Trough after cleaning and refilled with clean water

15. Water intake/requirements for a cow

- Cows take in more water than the amount of feed they take
- Cows tends to drink a lot during periods of great feed intake and after milking
- Adequate quality water is key in meeting the welfare of the cows as well as maximizing milk production
- Watering points should be placed in well drained areas
- Low water uptake result in reduced feed intake



16. Factors affecting cows' water intake/requirements

- Weather conditions i.e. temperature & humidity - during periods of excessive heat cows tend to drink more water
- Feeding system - Cows that walk long distances for feed tend to take up more water
- Productivity - High producing cows tend to take more water



16.1 Factors affecting cows' water intake/requirements Cont'd...

- Body size (weight) - Large animals have a higher water requirement
- Age - As young calves mature to mature cows their water intake rises as they develop
- Moisture content in feeds - Feeds with higher dry matter like hay influence cows to take up more water



17. Treating/purifying and Supply of oxygen to water

- Liver flukes can be found in wetlands or waterlogged areas
- When water is harvested in a water pan, do not allow the animals to walk into the water pan to drink water. Instead, pump the water into an overhead water tank and from there let it flow into the water troughs



Water pumped to overhead tank

Photo courtesy: Wilda Farm, KE

17.1 Treating/purifying and Supply of oxygen to water Cont'd...

Natural filtration

- Natural filtration can be used when a shallow well is created 70-100 meters behind (down stream) from the water pan; and pump drinking water for livestock from this shallow to the over head water tank and from there to the water troughs



17.2 Treating/purifying and Supply of oxygen to water

Supply of oxygen

- Supply of oxygen to water can be realized in the water if allowed to flow and more effectively if a small water fall can be created



18. Water storage

- Water storage also determines quality of water, if it is maintained or deteriorated
- Farms that harvest or store water from other sources should have a good storage facility
- Frequent cleaning of the water storage facilities should be done



Elevated plastic tanks



Tyres used for storage

18.1 Water storage Cont'd...

- Water should not stay for long in an enclosed storage since it may have bad odour
- Mending/sealing of holes should be done to avoid water losses
- Farms should plan to have sufficient storage of water for dry seasons



Excavated dam