

Dairy start up course

Grazing infrastructure

Grazing Infrastructure

- Paddock Layout
- Roadways
- Fencing
- Water System

How do I create an efficient paddock system?

- Get a map of farm with area for each field / paddock
- Decide on number of paddocks
- Keep paddocks as square as possible, ideally depth:width ratio no more than 2:1
- Determine suitable road layout to service each paddock
- Maximum depth from road to end of paddock; dry paddocks – 200m, wet paddocks – 100m
- Allow for multiple entrance points to each paddock
- Determine most appropriate water trough position in each paddock
- Farmers expanding should use flexible system until final number determined

Number of grazings per paddock

<i>Grazings per paddock</i>	<i>Pros</i>	<i>Cons</i>	<i>Recommendation</i>
1 grazing per paddock	Good grass utilisation Regrowth not affected Better in wet weather Easy to identify surplus/deficit	Cows could be underfed Heifers suffer More water troughs required	Least recommended
2 – 3 grazings per paddock	Regrowths protected Cows less restricted Easier for machinery	More difficult to manage in first/last rotation	Most recommended
4+ grazings per paddock	Fewer water troughs required Fewer paddocks required Allows for expansion	Regrowths affected More difficult to graze out Harder to get cows out	

Paddock Size

- 40 ha MB
- Heavy land 100m
- Shape of paddock
- On/off grazing
- Number of paddocks
- 12hr, 24hr, 36 hr grazing's

- 100 cows @ 17 kg grass= 1700kg per day
- Ideal pre grazing 1400 kg/dm/ha $1700/1400=1.2\text{ha}$

- Three grazing (1.5 days)
- $1700 \times 1.5 / 1400 = 1.8\text{ha}$

How do I set up an efficient road system?

- Get a map of farm and mark wet areas, dry areas, obstacles and milking parlour
- Allow access to every paddock
- Minimise bends, angles and corner to create good cow flow
- Source local material for roadway
- Construct roadway on southern side of hedgerows
- Avoid water troughs on roadways
- Good roadway network will use approx. 2% of land but improve grass utilisation by 20%

Key facts

Road width	50 cows – 3m, 100 cows – 4m, 200 cows – 5m. 1m wider close to yard
Good camber (slope)	1:25 one sided slope, 1:15 two sided slope
Construction	20 – 25cm hard core plus 7 – 10cm fine material
Cow walking speed	3 km per hour on good surface
Road slope	Max 3:1
Fencing	45cm from edge of road
Approx cost/metre	€15 - €25 per metre

Construction

<i>Roadway type</i>	<i>Options</i>
All topsoil removed	Build up with stone Consider if a lot of heavy machinery Most expensive option
No topsoil removed	Must be prepared during dry weather No heavy machinery Geotextile may be used Most suitable further from farmyard Less expensive

Roadway costing's

eaqasc
AGRICULTURE AND FOOD DEVELOPMENT AUTHORITY

Roadway 1

1:20 Cross fall

Surface blinding A

75 mm/3"
250 mm/10" **3" down trunking**
150 mm/6"
4 metre

Materials & Costs

- 3" down trunking:
 - €10/tonne
 - 2 tonne/metre run = €20.00/m
- Surface blinding A:
 - €10/tonne
 - 0.6 tonne/metre run = €6.00/m
- Installation cost: = €2.80/m

= €28.80/m



How do I set up an efficient water system?

- Get a map of farm showing each paddock and roadway
- Decide on main waterline loop
- Decide on location of water trough in paddocks, ideally centre of paddock
- Decide on pipe sizes and location

Key facts

Water intake	On average 65 litres / cow / day: up to 120 litres on warm sunny day
Drinking time	50% water intake within 2 hours of milking
Trough size	Allow 2 gallons per cow
Main waterline	38 – 42mm internal diameter for 150 cows
Connecting pipe	20 – 25mm internal diameter
Ballcock	Medium pressure
Main pipe layout	Loop system preferred

Key risks

Water pipe too small	Reduced water pressure at trough <ul style="list-style-type: none">• Doubling pipe size quadruples flow rate
Ballcock too small	Slow filling of water trough <ul style="list-style-type: none">• Low pressure – 42 litres/min• Medium pressure – 32 litres/min• High pressure – 8 litres/min
Trough too small	Inadequate reserve, bullying at drinking, drop in milk yield <ul style="list-style-type: none">• Allow 45cm space for 10% of herd

Case Study- water cost

2.2km of New Paddock system layout

- 40mm MDP piping(2.2km)
- 32mm MDP (40m)
- Mole Plough (2.24km) – 45mm deep
- Fittings, T pièces, risers etc.
- JCB (40 HOURS)
- 10 X 140 GAL water troughs
- **Total Cost (€9,560)**

How do I calculate water flow rate?

- Assuming peak demand of 120 litres per cow per day with 50% consumed 2 hours after morning and evening milking
- Flow rate required is 15 litres/cow/hour ($120 \times 50\% / 4\text{hrs}$) or 0.25 litres/cow/minute
- This equates to 25 litres/minute for 100 cow herd

To check flow rate on your farm

- Mark water level in trough
- Hold up ballcock and remove 20 litres
- Release ballcock, hold it down and measure time to fill to original mark
- Divide the 20 litres by the time taken to refill, if it takes 1 minute flow rate is 20 litres/minute but if it takes 2 minutes flow rate is only 10 litres/minute



Source: USGS

Source: NASA, NGA, USGS

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aero



Source: USGS

Source: NASA, NGA, USGS

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aero



Source: USGS

Source: NASA, NGA, USGS

be, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, sv

Y

L

T

H



Source: USGS
Source: NASA, NGA, USGS

, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGM



Source: USGS

Source: NASA, NGA, USGS

, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo,

Grazing Infrastructure Milking Platform

Item	Quantity/Ha	Unit Cost (€)	Total/Ha (€)
Lime	5	25	125
P&K Build Up	10	20	200
Reseeding	2.5	270	675
New Roads	25	20	500
Fencing	212	1.3	275
Water	2.5	100	250
Drainage	??		
Total/Ha			2,025

Grazing Infrastructure Outblock/Silage Ground

Item	Quantity/Ha	Unit Cost (€)	Total/Ha (€)
Lime	5	25	125
P&K Build Up	10	20	200
Reseeding	2.5	270	675
New Roads	-	-	-
Fencing	141	1.3	183
Water	2.5	50	125
Drainage	??		
Total/Ha			1,308