Infrastructure

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Module 4 – Infrastructure

What to do?

The overriding message on infrastructure is that it needs to be secure and practical.

The main infrastructure associated with a goat enterprise is:

- Fencing
- Water
- Yards
- Handling equipment
- Shelter

Think about the operations to be performed in your enterprise and set up accordingly.

How to do it?

In designing infrastructure that will be effective for the management of goats you need to carefully consider goat behaviour:

- Intelligent – goats quickly learn patterns of movement and respond well to routines. This is particularly important in designing and using yards, laneway systems and sheds.
- Inquisitive – goats will test fences and are quickly alert to irregularities, such as gaps, open gates or broken panels. Regular monitoring of power supply for electric fences and maintenance is important. Be particularly meticulous when fitting gates and fencing around gullies and eroded areas, where hollows and gaps could easily provide avenues for escape.
- Agile – goats have the ability to climb, crawl and jump.
    - o Domestic goats will rarely attempt to jump a fence from ground level unless under pressure. Consider adding extra height to fencing at pressure points in yards.
    - o They are more likely to go under rather than over a fence. The bottom third of a fence needs to be particularly secure.
    - o Their climbing nature means that they will readily use rocks, branches and angle stays as ramps to help them over a fence. Avoid the use of angle stays on the inside of goat fences and keep fencelines clear of objects that can be used as ramps. However, angled pipe stays are difficult to climb and may be suitable for a goat fence.

    - o Providing objects in the paddock that goats can climb on, away from fencelines, is an advantage because it provides mental stimulation for the animals.

    - Kids are particularly avid climbers.
    - Tight turning circle – goats can turn in a narrow space (narrower than for sheep), which has implications for setting the width of races.
- Attracted by light – goats will move toward light; they will baulk at and avoid dark corners in yards and races. Design and position yards to minimise shadowing, especially in the drafting area. Ensure that the exit point from a race is open and well lit.
- Nervous disposition – goats do not respond well to loud noises, sudden movements and excessive force. Quiet, calm handling techniques are essential.
- Reluctant to enter wet, muddy areas – goats will not usually enter water, unless pushed. If stock regularly need to be moved across a stream a dry crossing will be required. They will also avoid wet, muddy areas in yards, so pay attention to drainage.
- Wide angle vision – goats have very good peripheral vision and are very aware of movement around them. As such, they are prone to distraction and startling by activity that may be occurring off to the side of races and handling facilities. Closed sided races can reduce distractions.
- Move more quickly uphill than downhill – goats move slowly downhill, so to improve stock flow in hilly country it is advisable to minimise the slope of laneways.
- Following and circling behaviour – goats will readily follow a lead goat and, in a mob, show a natural instinct to move in circles. Therefore curved yards and races are sympathetic to the goats' natural movement instincts. Ensure that they can see the goats moving ahead of them. The use of well trained, quiet lead goats can be of assistance when moving stock toward and through yards, and in training goats to new routines.
- Crowding – goats will crowd and pack together much more readily than other livestock. There is a real risk of smothering if they are put under pressure in yards or on transport. Shorter races and smaller handling yards tend to reduce the risk of smothering. As a rule of thumb: a yard or truck that is one third full is full enough, especially with goats that are not regularly handled.
- Escaping – once a rogue, always a rogue. Some goats are more likely to escape than others, and may do so on a regular basis, taking others with them. Identify and cull persistent rogues.
- Territorial – once established in an area, goats become very territorial and don't like being moved to other areas. If planning to use a rotational grazing system, train animals to the system early in life. Goats will also tend to stay in family groups if they can.[30]

[30] The points presented in this section are a summary of information from the following sources:
Miller, J., Thompson Bros., Levinge, R., Waters, N., Squire-Wilson, L. and Browne, R.J. (2001). Handling goats. In: "Australian Goat Notes". B9, pp 42-45. Australian Cashmere Growers Association.
Mitchell, T. and Kearins, D. (2001). Fencing for goats. In: "Australian Goat Notes". B8, pp 37-41. Australian Cashmere Growers Association.
Scarlett, T. and May, T. (1993). Yard design for goats. Agfact A7.7.2, Agdex 470/720. New South Wales Agriculture.
Squire-Wilson, T. and Browne, J. (2001). Yard Designs for Goats. In: "Australian Goat Notes". B8, pp 37-41. Australian Cashmere Growers Association. Reference group and producer experience.

Fencing

Electric fencing:

Once they are trained to understand and respect it, electric fencing can be very effective in confining goats. Establishment costs are generally lower than conventional fencing and it is relatively quick and easy to erect. One of the major costs is the power source.

The keys to achieving an effective electric fence are:

- Ensure that the fence is tight, thus providing a good physical barrier.
- Maintain a good earth connection.
- Ensure that the energiser is sufficiently large to generate enough power to create an effective barrier.
- Keep the fenceline clean. Electrical shorts reduce the effectiveness of a fence. Shorts can be caused by branches falling on the fence, objects getting tangled in the wires and vegetation growing up through the wires. Therefore, electric fencing requires regular monitoring and maintenance.
- Use good quality insulators and wire. The type of insulator required will depend on the level of pressure being applied to the fence. Consider the strength, durability and level of fire resistance of the insulator.

In some circumstances, electric fencing has been found to be ineffective in containing unmanaged goats and keeping large predators out.[31]

Conventional fencing:

There is a range of different variations, but the basic structure is prefabricated fencing plus plain wires, with or without barbed wire. Prefabricated fencing has many names; some common terms used to describe this type of fencing material include: hinged joint, ringlock and griplock. The manufacturers of these products can provide information about fence design and construction techniques.

Fences of this type can be very effective in controlling goats. If correctly constructed, they provide a minimum of gaps through which a mature goat or kid could escape, and deter the entry of unwanted goats and many predators.

[31] Hacker, R., Clipperton, S. and Melville, G. (2005). West 2000 Plus – role of goat production as a range restoring alternative enterprise. Final Report. NSW Department of Primary Industries.

When selecting prefabricated fencing be sure that the spacing of vertical and horizontal wires is sufficient to deter an animal pushing through the fence.

The spacing must also be wide enough to allow a goat, having pushed its head through, to twist its head and get back out of the fence.

A 30cm spacing between vertical wires is sufficient to allow this to occur eg 8/90/30 or 6/70/30[32] – **15cm spacing is definitely not suitable for goat fencing**. Align your posts with the vertical wires. If you put your posts in between the vertical wires, this effectively creates narrow gaps in which goats could easily get trapped.

Electric wires can also be incorporated into this type of fencing for added security.

For specific design ideas suited to your particular type of enterprise, refer to *Module 4 - Infrastructure Toolkit 4 page 4*.

Water

Access to sufficient quantities of high quality, fresh water is critical.

Water requirements vary according to:

- Physiological state
- Production levels
- Activity levels
- Environmental conditions
- Diet
- Water quality
- Availability of shade and shelter

The following table provides some average estimates of water consumption:

Class of goat	Water consumption per head per day (assuming a dry feed diet)*
Weaners	4–6 litres
Adult dry goat	5–7 litres
Doe with kid	5–10 litres

Note:
** The above requirements for water consumption could double if the temperature exceeds 40ºC.*

For more information about water requirements refer to the Water section in *Module 7 – Nutrition*.

Water can be supplied via catchment dams, dams fed from bores, access to waterways and reticulated systems using tanks/dams and troughs.

Waterways

There are environmental issues to consider in the use of waterways as watering points:

- Physical damage to stream banks caused by hoof action and young goats playing on the banks. This can create erosion problems, which increase sediment and nutrient loads in streams.
- Dung and urine contamination of the water supply.
- Damage to streamside vegetation. Streamside vegetation is beneficial because of its ability to hold the bank together, filter nutrients out of run-off water, and provide habitat for wildlife and aquatic creatures.

From a production point of view, it should also be noted that waterways can also act as a vehicle for the spread of some diseases, eg Johne's disease, liver fluke.

[32] Mitchell, T. and Kearins, D. (2001). Fencing for goats. *In*: "Australian Goat Notes". B8, pp 37-41. Australian Cashmere Growers Association.

One way to preserve the waterway environment is to control stock access by fencing the stream and establishing off-stream watering points. Alternatively, stock access may be restricted to specific points on the waterway, rather than allowing uncontrolled access. These points should be chosen for consistency of water supply and natural stability. Some access points may require modification to create a stable and safe point for watering stock.

Dams

Catchment dams need to be carefully sited to maximise the potential to harvest run-off water or capture water produced by natural springs. They should be located on a soil type that will provide a good seal.

In rangeland areas, it is also important to consider location with respect to desired grazing range and relativity to other watering points. Goats will travel no further than an average radius of about 5km from a watering point.[33]

Evaporation losses are an issue with all dams. The size of the exposed water surface will influence the level of evaporation.

The management of areas surrounding dams should aim to minimise the movement of sediment and nutrients into the dam, as this can create water quality problems, silt up the dam and encourage algal growth. Grassed drainage lines and buffer strips will filter out a lot of nutrient and sediment.

Carefully consider the location of trees planted near a dam, you do not want to encourage stock camping above a dam – as the run-off from such areas will pollute the water supply. Be aware that goats also like to camp and play on bare ground, so they are often attracted to dam banks, which can result in erosion and nutrient contamination problems.

One issue of concern with dams is receding waterlines and muddy access, which presents a risk of goats getting stuck. If this becomes a problem, stock may need to be excluded and offered an alternative watering point, or frequent daily monitoring of the dam to remove trapped animals.[34] In such circumstances, "old fence posts laid around the water's edge will create solid footing for goats as they approach the water". *David Armstrong, Mitchell, Queensland.*

Reticulated water systems

The benefits of a well-designed reticulated system include reliability, reduction in evaporation losses, controlled water supply and improved water quality. The major costs are establishment, operation and system maintenance eg cleaning troughs, servicing pumps and mills, repairing broken pipes and monitoring float valves.

In designing an effective reticulated water-supply system you should seek the advice of a farm water-supply specialist. The information that you need to be able to give that person is the location of the water source, desired trough locations *Module 4 - Infrastructure Toolkit 4 page 6* and the quantity of water required in each paddock. They can then help you to make decisions about pump types and capacity, pipe sizes, storage capacity and locations, fittings and installations.

Goats will panic if the water system fails in hot weather, so regular monitoring is essential. It is also wise to have a back-up pump or alternative supply available.

When calculating the amount of water required in a particular paddock and determining desired flow rates, you need to be thinking peak demand. That is the largest mob of stock that is likely to be grazing a particular area in mid-summer. For

[33] Scott, W. (2005). Mt Magnet Rangeland Goat Pastoral Initiative. Pastoral Memo Southern Rangelands 11, No. 2, pp15-21.
[34] McGregor, B. (2003). Nutrition of goats during drought. Rural Industries Research and Development Corporation.

grazing livestock presume that they drink their daily consumption in 4 hours.[35]

For example: If the largest mob size a particular paddock will carry in summer is 400 dry does, whose average water intake is 7litres/head per day (assuming summer temperatures are not greater than 40°C), then the peak demand will be 400 x 7 = 2800 litres to be supplied in 4 hours (240 minutes). This equates to a required flow rate of 2800litres/240min = 11.7litres/min.

If using troughs, it is important to allow adequate trough space to accommodate the drinking habits of your animals. The requirement for space around a trough will vary with seasonal conditions, distance stock walk to water, physiological state of stock and other stock management issues.

Think about how your stock drink ie number of stock that might approach a water source at any one time. Also consider your mob sizes during peak demand times and the rate at which water will flow into the trough. The lower the flow rate supplied, the larger the storage capacity required in the trough.

In terms of determining an appropriate length of trough edge to allow sufficient access to water, there is an absence of data available for goats. A rough rule of thumb for sheep, which could be translated to goats, is to allow 1m of trough space per 130-250 animals.[36]

One important maintenance job with troughs is cleaning. If troughs are not regularly cleaned, water can become stagnant and salts build up through evaporative losses, resulting in deterioration of water quality and palatability. Algal blooms can also reduce the palatability of the water.

Caution: Water points present a safety risk to young kids. Options to reduce the risk include:

- Covering dams and wells.
- Selecting kidding paddocks that minimise the risk ie that have 'safe' watering points.
- Using shallow troughs which kids can stand in and easily climb out of.
- Placing rocks in troughs, so that if kids fall in they are more likely to be able to get out.
- Checking troughs regularly.
- Avoiding or fencing off boggy or heavily silted dams.

[35] Rural Industries Skill Training (2005). Farm Water Supplies in Western Victoria. Better Management of Water to Increase Productivity of Livestock (sheep, beef & dairy) in Western Victoria. Course notes.

[36] Hislop, D. (1998). Farm Water. NSW Agriculture Tocal, pp 79-80
Kondinin Group (1994). Livestock watering system – research report. Farming Ahead 154, pp 54-71

Yards

Yard design is primarily influenced by the type of activities that are going to be conducted and the type of stock using the yard. A yard that is to be used specifically for goats will be designed differently to that which is to be used for more than one type of animal, such as on mixed enterprise farms.

The following is a list of potential activities that may need to be accommodated in the design of a yard system:

- Trapping
- Drafting – shearing, culling, weaning, mating, mob separation
- Weighing
- Lice control
- Drenching
- Vaccination
- Vet check
- Foot trimming
- Foot bathing
- Classing
- Condition scoring
- Udder scoring
- Marking
- Ear tagging, ear marking and tattooing
- Loading on to transport
- Holding bucks during breeding season

Priority should be placed on efficiency of movement of goats through the yard, ease of operation and safety and comfort of goats and handlers.

Size of the yards should be sufficient to handle the largest mob on the property, bearing in mind any future plans for expansion.[37]

In some circumstances, it may be practical to have a set of portable yards in addition to, or instead of, permanent yards. Portable yards can be useful if you have a large property, where moving stock to a set of permanent yards is not always practical or an efficient use of your time. With some activities, such as marking, it may be more hygienic and less stressful on stock to carry out the procedure in a clean paddock using portable yards, rather than moving stock to permanent yards.

It is also important that yards have good vehicle access. Track width and turning circles should be of sufficient size to allow the large vehicles easy passage in and out of the property. Plan for the future – if you are considering significant stock increases in the future, you may anticipate that the size of stock trucks coming on to your property will also increase. Construct your yard with this in mind.

For specific design ideas refer to *Module 4 - Infrastructure Toolkit 4 page 7*. For information on feedlot design, refer to *Module 7 – Nutrition Toolkit 7 page 20*.

During the planning stages, it is important to go out and look at different types of yards and talk to other farmers about their experiences.

[37] Squire-Wilson, T. and Browne, J. (2001). Yard Designs for Goats. *In*: "Australian Goat Notes". B8, pp 37-41. Australian Cashmere Growers Association.
Reference group and producer experience.

Handling equipment

The type of handling equipment that may be required will depend on the type of activities that are likely to be performed in your enterprise. Some examples are given below:

- Weighing – weighing cradle and scales.
- Individual goat handling/restraint– options include: head bail, cradle, 'hold and lift' equipment.
- Transport – loading ramp.
- Foot bathing – foot bath.
- Trapping – entry/exit trap gates.
- Milking – dairy facilities.
- Shearing – shearing shed and associated equipment.
- Husbandry – 'goat handler', foot trimmers, dehorning equipment, elastic rings/bands, burdizzo, castrating knives, elastrators, marking cradle, drench gun, vaccination equipment, ear markers, tattooing equipment, ear-tagging pliers compatible with electronic tags, ear-tagging pliers that are suitable for standard identification tags.

Selecting and using handling equipment is an individual choice. Very basic handling facilities may be sufficient to get the job done. However, you should also consider your own health and safety and that of other people who may be working with your stock. It may be that a well-designed piece of handling equipment could make the job easier and safer.









MEAT & LIVESTOCK AUSTRALIA

TOOLKIT 4

Toolkit 4 – Infrastructure

Case studies

Tool 4.1

Finding further information

References

Wires and Pliers: the farm fencing manual. Casey, M.F. 1994. Kondinin Group, Belmont, Western Australia.

Yards 'n' Yakka: the sheep yard and handling systems manual. Casey, M.F. and Hamilton, G.R. 1994. Kondinin Group, Mt Lawley, Western Australia.

The Grazing of Goats in the Pastoral Areas of Western Australian. Best Management Practice – July 2005. Blood, D. and Williams, R. 2005.

This document contains fencing guidelines for Western Australian rangeland goat enterprises. Available for download from the Department of Planning and Infrastructure website: www.dpi.wa.gov.au/pastoral

Australian Goat Notes. 2001. Australian Cashmere Growers Association. This document contains a range of information notes on fencing and yard design.

Speedrite Fencing Manual. TRU-TEST. Electric fence design and construction.

Gallagher POWER FENCE™ Manual. Gallagher. Fence design and construction information.

Total Grazing Management Field Guide: self mustering systems for cattle, sheep and goats. Underwood, C. 2005. Department of Agriculture Western Australia and National Heritage Trust. Contains photos, designs and management options. Free download from Department of Agriculture Western Australia website: www.dpi.wa.gov.au

Total grazing management yards – a cornerstone for improved station profitability. White, K. 2003. Department of Agriculture Western Australia. Farmnote 22/03. Free download from Department of Agriculture Western Australia website: www.dpi.wa.gov.au

Websites

Refer to *Module 1 – Property planning Toolkit 1 page 5* for instructions on how to conduct an effective web search.

The following websites provide information on infrastructure design and construction:

Gallagher fencing
www.gallagher.com

Onesteel fencing
www.onesteel.com

Total Grazing Management – Department of Agriculture Western Australia
trap yards – design and materials
trap gates – design and materials general animal management
www.agric.wa.gov.au/tgm

Kondinin Group
fencing and yards
www.kondinin.com.au

NSW Department of Primary Industry
General information on infrastructure – look in publications section
www.dpi.nsw.gov.au

Department of Primary Industries, Victoria
General information on infrastructure – look in publications section
www.dpi.vic.gov.au

South Australia Research & Development Institute General information on infrastructure – look in publications section
www.sardi.sa.gov.au

Primary Industries and Resources South Australia General information on infrastructure – look in publications section
www.pir.sa.gov.au

Department of Primary Industries, Water & Environment, Tasmania
General information on infrastructure – look in publications section
www.dpiwe.tas.gov.au

Department of Agriculture Western Australia
General information on infrastructure – look in publications section
www.agric.wa.gov.au

Queensland Department of Primary Industry and Fisheries General information on infrastructure – look in publications section
www.dpi.qld.gov.au

Northern Territory Department of Business Industry and Resource Development
General information on infrastructure – look in publications section
www.dpi.nt.gov.au

Tool 4.2

Fence designs – producer experiences

Fencing is a critical part of any goat enterprise. There are many publications available that provide information on fence design, as outlined in the previous *Module 4 - Infrastructure Toolkit 4 page 2*. In the next few pages, we present some practical information from current goat producers about the types of fencing that they use on their properties.

Conventional fencing

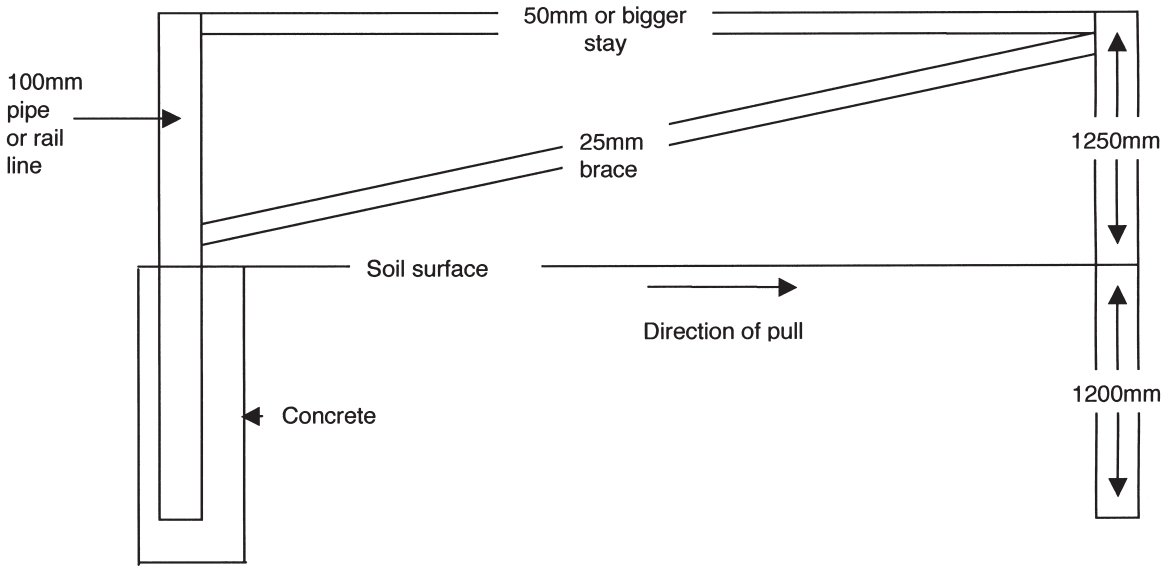
Greg Church from Wilcannia, NSW, shares with us the fencing designs that he uses on Bushley Station.

New fence

For a new fence, Greg favours prefabricated materials with box-end assembies. The basic design is as follows:

End assembly

- Box end assembly using 100mm pipes or rail lines – length 2450mm.
- 1200mm of the pipe or rail line secured in to the ground with cement.
- 3000mm stay in between end assembly posts. Stay diameter of at least 50mm diameter.
- Diagonal brace pipe 25mm diameter or greater.



Fence

Materials for fencing:

- 1650mm star droppers (steel posts) spaced at 9 metres.
- Top wire barbed.
- 7/90/30 hinge joint.
- 2 plain wires top and bottom.
- Hinge joint fixed with ring fasteners.

For 1km of fencing this equates to:

- 115 droppers (steel posts).
- 5 coils of netting 7/90/30.
- 2 coils of barbed wire.
- 1000m of plain wire.

Upgrading an existing boundary fence

Running netting on to an existing fence can be an easy way to upgrade a boundary fence to retain goats. Greg uses 6/70/30 netting; straining and stapling the netting to existing wires. Additional star droppers are added for extra support at pressure points.

Upgrading an existing internal fence

Upgrading a standard five-wire internal fence can be achieved by running extra plain wires into the fence. Greg adds six wires and extra spacers to existing fences. He finds that this method is cheap and effective.

Electric fencing

Tim Perrottet relies on electric fencing for his goat enterprise at Dirranbandi in Queensland.

Tim's basic fence design is a six-plain-wire fence, with three earth and three live wires.

As Tim's fences are being erected for the long-term, using high quality product is important. Tim cautions that many of the products on the market are for short-term fencing. If fencing is to be of a more permanent nature, he recommends taking the time and effort to source high-quality materials.

Tim uses 2.8 gauge extra galvanized wire, six-foot (180cm) posts and either porcelain cotton reel type or poly pin lock insulators.

For electric fencing to function effectively, Tim stresses the importance of having a clear fence line, with a wide clearance to minimise the risk of branches falling on fences.

Reflecting on his first experience with electric fencing, he explains "When we first hooked it up, we had heaps of shorts and thought we had made a big mistake, however after a few months the roos and the emus get used to it and leave it alone." Get the basics right and have patience.

In circumstances where there is an existing conventional fence in good condition, Tim uses electric outriggers on either side of the existing fence, attached near the base of the fence. He comments that "this works well with trained goats and is a lot cheaper than new fencing, at approximately $250/km."

Tool 4.3

Hints for siting troughs

- Stock prefer to graze within comfortable walking distance of water. Grazing improved pastures on flat country, stock tend to stay within 3km of water, and 0.8km in hilly country.[38] In rangeland environments, goats graze within a radius of about 5km of a watering point.[39]
- Think about grazing patterns within a paddock. Locating troughs nearer areas that tend to be less well utilised will encourage goats to change their grazing pattern.
- Locating troughs near laneways can make inspection easier.
- Locating troughs near fence lines can make cultivation easier. However, be aware that if there is insufficient trough edge available, bullies can dominate the space.
- The number of troughs required can be reduced by sharing one trough between two paddocks. With large mobs this may not be possible.
- Do not put troughs too close to a gateway as this could impede stock movement into and out of a paddock.
- Troughs need to be located on a solid, non-erodible base.
- Think about the class of stock that will be using a trough. If kids will be using the trough, you may need to create a slope up to the trough to ensure that they can access the water. If the slope up to the trough is made of dirt, the trough will require more regular cleaning as goats will push dirt into the water. Shallow troughs are preferable for kids as there is less likelihood of drowning if the kids happen to get into the trough.
- Think about the location of the source of water. Aim to minimise the length of pipe needed and maximise the gravitational advantage in supplying water to the trough.
- Shade is a consideration. Shading a trough will reduce water temperature and evaporation. However it can also encourage stock camping, and trees can drop leaves and branches into troughs.
- Cement troughs keep water cooler.

[38] State Electricity Commission Victoria (1991). Rural Stock and Domestic Water Supplies.
[39] Scott, W. (2005). Mt Magnet Rangeland Goat Pastoral Initiative. Pastoral Memo Southern Rangelands 11, No. 2, pp15-21.

Tool 4.4

Yard design

Hints from producers:

Trap and holding yards for extensive production systems – Will Scott, Mt Magnet, Western Australia

Will Scott writes about his experiences with trap and holding yards:

"The size of the yard or containment must be relative to the frequency of relocation of goats. The size must be increased if the removal of trapped goats is not frequent.

"Many people make their yards too small because they are trying to keep the costs down. Small yards are not as effective because the goats can see that others are trapped inside. The yards should be large enough for the goats to move freely. If you have about 500 goats on the watering point the yard should be about 120m in circumference.

"Small paddocks or yards must be de-stocked regularly to prevent stress on the goats. If not removed, they must be provided with supplementary feeding.

"Goats should not be in the trapping yard for more than 48 hours. They should be drafted and the sale goats removed to the main holding and feeding area.

"Larger paddocks with feed and shelter can be used for holding mobs, but the stocking rate should be monitored for both forage damage and goat stress.

"One of the biggest issues I have found is the overstocking of holding paddocks - dumping too many goats into a holding paddock and expecting them to survive at very high stocking rates for too long a period.

"I would recommend that they should have a holding yard no smaller than 1 hectare (100m by 100m) that has good shade and water and clean areas where hay and lupins can be fed on the ground, so that the goats can be given the required daily ration."

Handling yards – Tim Perrottet, Dirranbandi, Queensland

Tim has found that well layed out sheep yards can be adapted to make good goat yards. The main adjustment required is an increase in the height of fences and panels. In Tim's experience, the most effective draft is one with an adjustable width, V-design.

Handling yards – Bruce Foott, Mitchell, Queensland

When asked about the ideal height for panels and races in handling yards, Bruce suggests 1.2m – the height of the average farm gate. Mesh provides added security, and closed sides in races reduce the distraction of activities occurring off to the side.

Tool 4.5

Training goats to respect fences and yards

Goats run in extensive areas will require training and handling to familiarise them with management and husbandry.

The following is a list of tips for training goats to stay in fenced areas and reduce stress in yards:

- It is important to have a secure fence. Once goats have escaped they will continue to do so and train others in the mob to follow them. Poorly constructed fencing will encourage this behaviour.

"No fence is better than a bad fence." ***Gary Steele, Girilambone, New South Wales.***

- Identify and cull animals that escape.
- Select and breed for good temperament.
- Minimise stress and practices that provoke behaviour that puts pressure on fences.
- At weaning, make sure the weaners are contained in a well fenced area and provided with feed, water and shelter so that they will settle quickly. Avoid having does in an adjacent paddock to reduce pressure on fences.
- Remove large bucks from the herd, only run breeding bucks with the does.
- Control dogs at all times.
- Handle goats regularly and use quiet, controlled handling techniques.
- Build a secure fenced area within a bigger fenced paddock. This area can be used to condition goats to an electric fence. Even if animals escape they will not get free. Another alternative may be to electrify part of the yard system, say the holding yard, to act as a training area. Initially goats may be hard to keep within electric fences, but after 6-12 months exposure to electric fences, producers have found that goats are easier to keep in than sheep.[40]
- If using electric fences, make sure that they are solidly constructed, well earthed and that the current is maintained at a suitable level at all times. An adequate earth can be difficult to achieve in dry conditions. Be sure to adopt an electric-fence design that suits your particular environment.
- Design fences and yards for easy flow and movement of stock.
- If you are continually having problems, modify the design or construction.
- In confined areas, construct stays on the outside of the fence or use design or materials to prevent animals climbing out.
- Good gates are essential for goats. Poorly constructed or installed gates can present opportunities for escape.

"We buy gates to use as panels for portable, temporary yards for marking and tagging each year, then they get used around the farm over the next year." ***Bruce Foott, Mitchell, Queensland.***

[40] Martin, G. (2004). South Queensland Goatmeat Producers Group, Producer Initiated Research and Development Project G2001/Q14 Final Report. Meat & Livestock Australia.

- After assessing the biosecurity risk of any new goats brought on to your farm, mix them with a mob that is accustomed to your fencing. See more about biosecurity in *Module 3 – Industry obligations*.

See *Module 8 - Marketing Toolkit 8 page 6, Preparing goats for market and relocation* for some more tips on minimising stress.

A useful reference on this topic is the *Best Management Practice Guidelines for Goats in the Pastoral Areas of Western Australia.* David Blood and Rod Williams, Department of Agriculture. Western Australia Department of Agriculture and Pastoral Lands Board December 2003.

Case study

HANDLING EQUIPMENT

NAME:	Peggy, Dan and Marcus Jessen
PROPERTY NAME:	Cranley Park
PROPERTY LOCATION:	Clifton, Darling Downs, Queensland
PROPERTY SIZE:	260ha
NUMBER OF GOATS:	1,000
MAIN GOAT ENTERPRISE:	Dairy
TARGET MARKET:	Fresh milk sold to a processor for pasteurising and on-selling in to the supermarket trade
SECOND GOAT ENTERPRISE:	Meat
TARGET MARKET:	Cull does are sold to abattoirs through local auction
OTHER FARM ENTERPRISES:	Beef cattle

Being part of a dairy enterprise, the goats are well accustomed to handling. Regular handling begins at a very young age as most kids are hand-reared, so they grow up being comfortable with human contact and well trained to the handling routines. With such quiet animals, Peggy does not require much in the way of restraining facilities, such as crushes or head bails. The essential item is small handling yards.

Aside from milking, the main husbandry activities which require specialized equipment are hoof trimming, disbudding, tagging and vaccinating.

- Hoof trimming is a frequent practice on the property, so Peggy looks for high-quality, durable trimmers.
- All kids are tagged as babies. For this job, Peggy uses an Allflex Flexitag™ gun, which takes a roll of tags and allows for quick tagging.

- Kids are disbudded at 1-2 weeks of age, using a Deken® electric iron. This particular disbudding iron was designed for use on calves, but works equally well with kids.
- Routine vaccination is an integral part of the farm's animal health program. The use of an automatic vaccinator makes the process as quick and easy as possible.

Another essential piece of equipment on this property is the 'chariot'. This is a small trailer with a crate that is pulled behind a four-wheeled motorbike. Peggy uses it to transport does and their newborn kids from the paddock to the shed.

In this dairy enterprise, supplements are an important part of the feed ration, so reliable hay-making/handling equipment and grain mixing equipment, plus feed troughs are a necessity.

Case study

YARDS AND SHEDDING

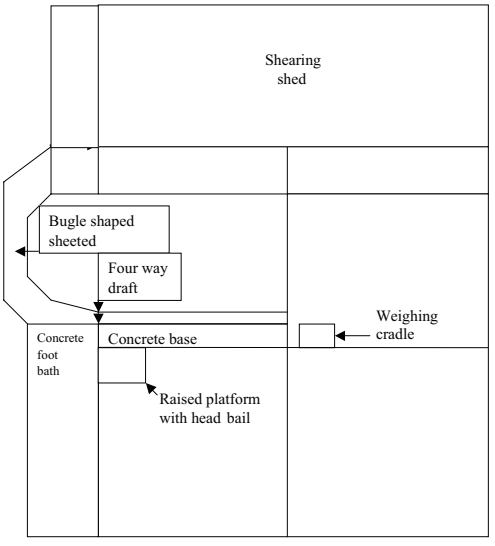
NAME:	Bryan and Judy Murphy
PROPERTY NAME:	Angip
PROPERTY LOCATION:	Horsham, Victoria
PROPERTY SIZE:	256ha
NUMBER OF GOATS:	1,500-1,800
MAIN GOAT ENTERPRISE:	Meat
TARGET MARKET:	Capretto – domestic market
SECOND GOAT ENTERPRISE:	Livestock sales – Boer goats
TARGET MARKET:	Export buyers – stud and commercial livestock
OTHER FARM ENTERPRISES:	Cropping and hay

Shedded yards:

This shed has the capacity to hold 1,000 animals. It doubles as a shearing shed and general handling facility. The main feature of this design is the inclusion of a race that can be used for drafting, drenching, inoculating and general husbandry. One of the best things about this shed is that it protects stock and handlers from the elements, allowing stock work to be undertaken in any type of weather.

Another feature is the adjustable out loading ramp. It is practical and effective, offering little chance of stock escape.

Also note on the yardplan the bugle-shaped, closed-sided (sheeted) yards leading into a double race which allows for a four-way draft. This design encourages the smooth flow of stock through the yards. The double race is concreted and a weighing cradle is fitted at one end. In a meat enterprise, having the ability to weigh stock is essential.



The outlet of the race leads into a raised platform and crush. This useful piece of equipment enables animals to be easily restrained allowing processes such as inoculation, tattooing and foot trimming to be carried out quickly, safely and with reduced physical effort (less bending).

Case study

LOW COST, EFFECTIVE AND PRACTICAL INFRASTRUCTURE

NAME:	Bruce and Joy Foott
PROPERTY NAME:	Barta Park
PROPERTY LOCATION:	Mitchell, Queensland
PROPERTY SIZE:	10,000ha
NUMBER OF GOATS:	4,000
MAIN GOAT ENTERPRISE:	Meat
TARGET MARKET:	Export – carcase and live trade
OTHER FARM ENTERPRISES:	Sheep (meat)

Infrastructure need not be highly engineered and flashy. Sometimes a simple design can be just as effective, and much cheaper. Bruce Foott showed us some his designs.

Portable yards:

This simple set of yards has all the features required to get the job done.

The yards are made from farm gates (1.2m height). This is a good height for goats (discouraging jumping) and the mesh provides a secure barrier.

The drafting race is short (one farm-gate length – 12ft or 3.66m) to prevent goats piling up on one another.

The crush is homemade and portable, with an adjustable panel at the front which can easily be moved to narrow the race width, thus reducing the rate of flow if the goats are moving through too quickly. The exit gate allows for a two-way draft.

Shade cloth over the work area makes life more comfortable for the workers and goats. Rubber matting creates a non-slip, cushioned surface in this area.

A simple head bail is used to restrain individual goats for tagging and marking. The bail consists of a centre pole with a lever attached which pushes the goat against the centre pole and restrains its head.

Entry to the yards is directed by a guiding wing on one side and a fenceline on the other. Near the entry gate, the existing fenceline is topped up with an extra panel of ringlock to discourage escape.

Feed troughs:

During drought, Bruce feeds cottonseed to his goats. He constructed feed troughs from shade cloth. The idea of the shade cloth is that it doesn't hold water and is lightweight making the troughs easy to clean out.

The trough is designed to fit between two trees or posts located about 20m apart. The shade cloth is fashioned into a trough, with a seam saddle-stitched in place along the top edge, allowing wire to be threaded through. The trough is suspended by attaching the wires to the end posts or trees. A few iron droppers placed at intervals along the trough help to support the structure. The lip of the trough is covered with poly pipe to protect the shade cloth from damage.

Trap gates:

Mustering is facilitated by the use of trap yards at water points. Access to the water is through a one-way trap gate. Bruce's trap gates are a simple mesh construction, which allows goats into the yard, but prevents them exiting.