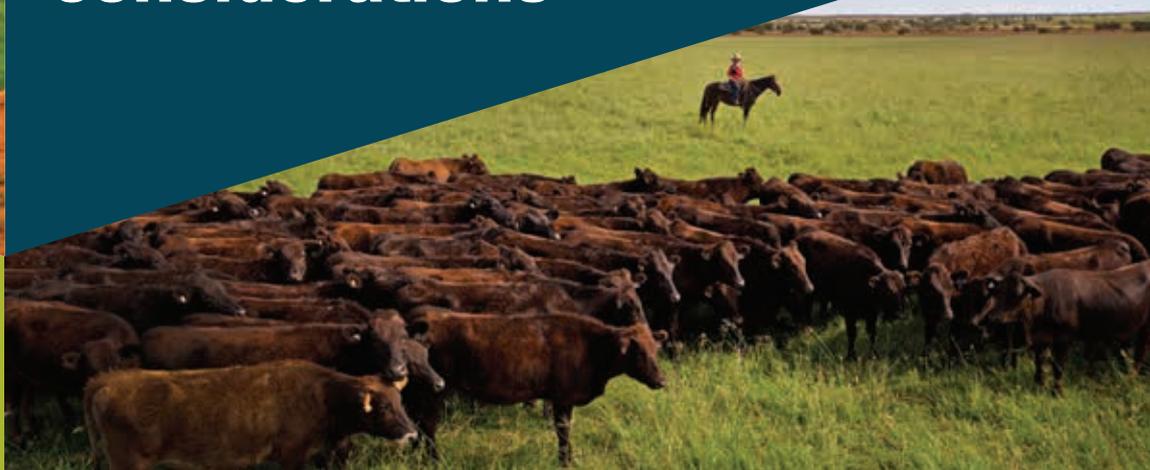




Developing and operating an irrigated fodder enterprise in the Pilbara — financial considerations



At a glance

- Viability of irrigated fodder enterprises is strongly influenced by depth to water, efficient use of equipment, and fodder yield and quality
- High quality fodder is essential to achieve rapid cattle live weight gains
- Calculate how the availability of irrigated fodder could add the most value to your beef enterprise

Production systems in the Pilbara continue to be optimised as irrigators gain experience in trialling new crops, systems and technologies. Irrigation has the potential to improve productivity and provide some risk mitigation in pastoral beef enterprises of the Pilbara.

Establishing an irrigation development is likely to require new skills that aren't available in the pastoral business nor can be procured easily within the region. This document is targeted towards pastoral beef producers that are considering irrigation developments to support their business. It outlines considerations and key factors that influence the likelihood of success of an irrigation development.

Why produce irrigated fodder in the Pilbara?

There are a number of reasons why pastoralists have considered investing in irrigation projects to support their cattle enterprises.

Yard feed import replacement

Irrigation enables the production of fodder that can be used for pastoral operations such as mustering and yard work or for feeding stock while held in preparation for transport. In these situations quality of this fodder has not been a major consideration as the intended use is to maintain stock in their existing condition. Self-supply of this fodder avoids the purchase of fodder from elsewhere in the region or the south-west. Freight adds a considerable component to what is a relatively low value but essential input to the pastoral enterprise. Hay costing \$200 per tonne (T) in the southern agricultural area could be landed in the Pilbara for about \$350/T assuming a 1000km journey and a freight charge of 15c/km.

Weight gain strategies

Using irrigation to produce good quality pasture and fodder enables pastoralists to turn off cattle at a higher live weight to achieve greater price per kilogram and price per head in the market. The flexibility of being able to feed cattle to a market requirements and at specific times could create an opportunity for forward selling contracts.

Improving condition of breeding stock

Quality pastures also provide the opportunity to improve the condition of the breeding herd. Firstly there is an opportunity to grow heifers to a weight suitable for mating, accelerating the breeding process. Secondly pastures can be used to improve the condition of cows that are to be mated for the second time, as these cows typically take a longer time to regain condition after their first calf and this often results in low conception rates. Improved cow condition and conception rates will drive overall herd fertility, a key factor of enterprise profitability.

Better control over genetic improvement

Confining a selection of the breeding herd to irrigated pastures provides an opportunity to command greater control over genetic improvement. Introducing new genetics to animals in improved physical condition and in a controlled environment increases the likelihood of success in introducing improved traits.



Conservation of core breeding herd during dry seasons

Irrigated pasture or conserved fodder enables pastoral producers to minimise the impact of dry seasons. Irrigated fodder gives the ability to maintain more stock on the property during these times. Good feed budgeting means pastoralists are less pressurised to sell cattle when market prices are low, and conversely don't have to purchase stock when prices tend to increase post-drought. Maintaining stock on property provides the option to enable a faster recovery of stock numbers.

Irrigation can be used as a tool in any combination of these strategies and pastoralists should evaluate the feasibility of each option according to their circumstances.



Factors affecting profitability

Variable production costs are very sensitive to inefficiencies in the production system. The key factors impacting on the profitability of the irrigation will be total dynamic head of water – a function of depth to water and pumping pressures, enterprise scale relative to capital equipment purchased, fodder yield and fodder quality. Fodder quality correlates to animal productivity as better quality fodder should translate to improved feed conversion and faster weight gain.

Pastoralists considering irrigation developments to support their beef production enterprise should work through the production system and use scenarios outlined above to determine which option provides the greatest value to the business.

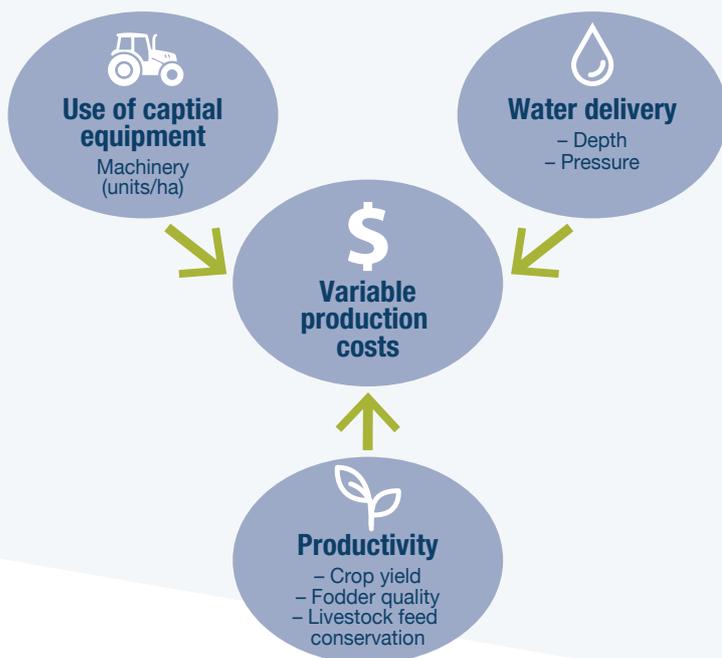


Figure 1. Key factors affecting profitability

Opportunity costs

Pastoralists considering irrigated fodder production should consider the opportunity costs involved. These include the use of the water for extending water points and associated fencing for better pasture utilisation, and growing other crops. Alternative strategies could also be considered to preserve breeding herds and genetic improvement, such as off property agistment.

Pilbara irrigation development:

A CASE STUDY

Economic modelling was used to understand the costs of building and operating an irrigation site in the Pilbara. The model was based on a four pivot 190 hectare (ha) development site with an artesian water supply.

Capital costs

An artesian supply is pressurised which implies reduced (or no) pumping costs compared to a pressurised supply (Figure 1). The total cost of the 190ha development was estimated at \$4.1M or \$21 700 per hectare (Table 1).

The capital costs of developing an irrigation project are significant, particularly when contracted services are required for the development of water resources, land clearing and site works. Individual circumstances of geographic location, resource availability and equipment on hand can considerably influence the viability of the development. The development costs estimates below are intended to be used as a guide only.

Table 1. Capital cost components of an irrigated fodder development in the Pilbara

Item	Cost per 190 hectare development (\$ total)	Cost (\$/ha)
Land and water development	1400 000	7300
Irrigation equipment	1350 000	7100
Plant and machinery	100 000	5400
Livestock yards and grazing management	350 000	1800

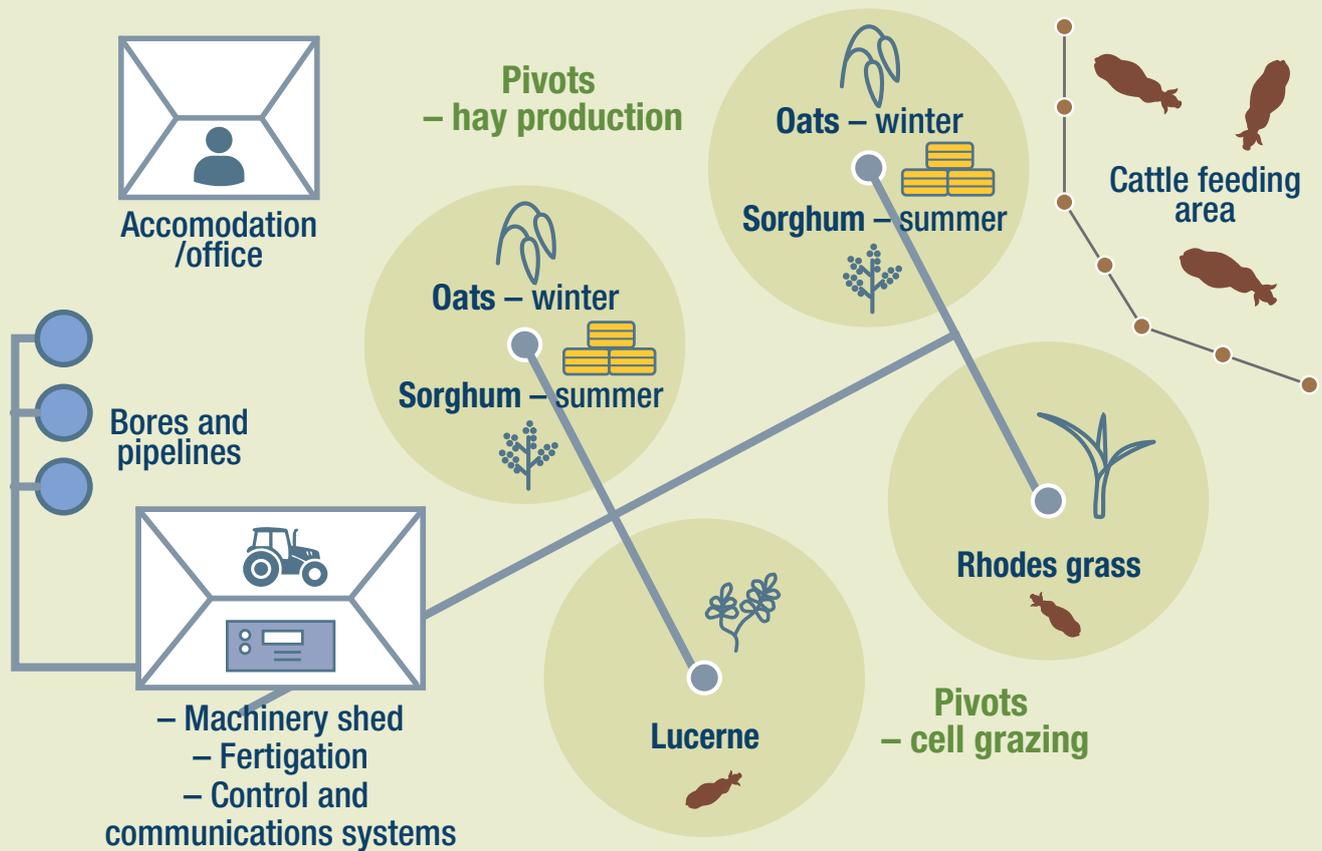


Figure 2. Model irrigation enterprise

Land and water resource development

Development of the water source infrastructure is usually the most expensive component of an irrigation development. These costs include site selection, consultants, production and monitoring bores, pipelines, clearing, fencing, roads and site accommodation. Land development costs can be minimised by good site selection and ensuring suitable soils are close to the water resource. The nature of the water resource and how it is developed will impact on capital development and long-term operating costs.

Irrigation equipment

Pilbara irrigation water resources are most suitable for sprinkler irrigation systems as water has to be pumped to the irrigation site. Centre pivot irrigators can travel over undulating terrain and don't require expensive soil levelling that flood irrigation would require. On sandy loam to clay loam soils of the Pilbara centre pivot irrigation is an efficient means of irrigating field crops and pastures. Irrigation equipment costs in Table 1 include installation

of four centre pivots with a solar-diesel hybrid power supply, shed, fertigation system and communications and control system.

Plant and machinery

A suite of cropping and hay-making machinery would be fully utilised across a four pivot, 190 hectare (ha) development (3 x 47.5ha harvested fodder crops + 1 x 47.5ha stand and graze). This would include a tractor, cultivator, harrow, seeder, fertiliser spreader, mower, boom spray, hay rake, baler, bale wrapper, telehandler and shed. All equipment would need to be in good condition as service support may not always be readily available when needed.

Livestock management

Livestock handling yards, feeding facility, cell grazing fencing for the stand and graze pivot areas and perimeter fencing is required.



Variable costs

The variable cost of operating the 190 hectare fodder production irrigation area is estimated at \$0.62M per annum. This development would be capable of producing about 5000 tonnes of fodder annually and enable weight gain in 4475 young cattle grown from 235 kilograms (kg) to 350kg at a feed conversion ratio of 8:1.

The variable cost components (Table 2) are calculated on the basis of a pressurised artesian water supply, \$9.70/ML cost of solar / diesel generator energy to drive the pivots and power the machinery shed, and accommodation camp. If irrigation water has to be pumped, using diesel generators, at a total dynamic head of 20 metres (m) the total cost (diesel, depreciation and

maintenance) increases to around \$46/ML. The variable cost of feeding cattle in the stand and graze areas and confined feeding area combined are calculated at \$0.36M per annum.

If the capital components of the development are financed and then costed on an annualised basis, the total annualised costs of running the irrigated fodder and cattle feeding enterprise = Annualised capital cost + variable costs of fodder production + variable cost of livestock feeding.

This is estimated at \$1.4M per annum for the 190 hectare operation and a live weight production cost of \$2.80/kg. If water were to be pumped at an all in cost of around \$46/ML (20m/head) using diesel, then the estimated live weight production cost rises to \$3.18 kg.

Table 2. Crop production parameters and variable costs for production of several fodder types

Crop type	Yield (t/ha)*	Variable cost (\$/ha)	Pilbara market price (\$/t)	Water use (ML/ha)*	Fertiliser (\$/ha)	Seed (\$/ha)	Fodder conservation costs (\$/ha)	Labour (\$/ha)
Sorghum hay	27	3300	225	15	2000	160	480	390
Oaten hay	7	1060	255	5	560	120	60	180
Lucerne hay	18	2650	280	18	1040	NA	700	490
Rhodes grass pasture**	19	1890	NA	15	1050	NA	NA	420

* Crop yield and water use per hectare depends strongly on the combination of climatic conditions, crop type, length of fallow periods and intensity of production required from the installed irrigation system. These will become better defined as production systems are developed and refined. The values listed in Table 2 are the input values for the economic model.

** Based on 55% pasture utilisation of a 35t/ha gross yield.



Find out more

Please visit the Department of Primary Industries and Regional Development website for more information on irrigated fodder enterprises in the Pilbara or to download a copy of the report *Growing the Pilbara*.

📍 Visit: www.dpird.wa.gov.au

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