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Barramundi aquaculture

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Barramundi (*Lates calcarifer*) farming is the second largest aquaculture activity in Queensland after marine prawn farming.

Barramundi are grown in a variety of culture systems across Australia. Queensland's climate permits pond-based production of plate-sized fish, while one sea cage operation produces larger fish. Southern states use recirculating tank-based systems.

Most of the product is marketed to domestic wholesalers and supermarket chains as whole fish or fillets, but export markets are becoming more important. The main market is for larger fish (2-3kg), with plate-sized fish (400-800g) still accounting for a large portion of sales. Plate-sized barramundi can be produced in the first year. Barramundi require a second growout season to reach weights of 2-3kg.

There is significant expansion proposed for the barramundi industry in Queensland, particularly in major pond-based operations. The industry continues to improve productivity and efficiency. Despite increasing formulated feed costs, production costs are decreasing. As with other aquaculture industries, economies of scale are important in reducing production costs.

This guide provides an overview of barramundi aquaculture in Queensland.

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Culture environment for barramundi

Barramundi can tolerate a wide range of salinities and can be grown in sea, brackish or fresh water. This allows farmers to cultivate barramundi in ponds, sea cages and recirculating systems.

In Queensland, most barramundi production comes from ponds. Both ponds and sea cages need to be located in areas that will provide the longest growing seasons.

Freshwater ponds

Barramundi production in [freshwater ponds](#) usually involves the use of floating cages for the first part of the growout period. Cages are accessed from walkways, with individual cages varying in size from 2m x 2m to 6m x 12m, and are 1.5-2m deep.

Most farmers choose to release the barramundi from the cages once they reach a size that makes them less vulnerable to predation (usually heavier than 300g) and then grow them free-range in the pond to a weight of 2-3kg.

Pond sizes range from 0.2ha to 1.5ha and are 2-3m deep. Ponds are normally aerated mechanically with paddle wheels and aspirators. Water exchanges are carried out to remove ammonia and control algal blooms.

Sea cages

Growout in [sea cages](#) occurs in floating cages, which are generally larger and more robust than the ones used in freshwater operations.

At present there is a single sea cage fish farm operating in Queensland, successfully growing barramundi near the Hinchinbrook Channel in North Queensland.

Recirculating aquaculture systems

Intensive heated indoor [recirculating aquaculture systems \(RAS\)](#) are established in the southern areas of Queensland. Most RAS farmers use a series of 5-10t production tanks connected to a solids removal device and a biological filter. RAS operations may be located close to markets and other infrastructure because of their compact nature and ability to control environmental parameters.

These systems require a higher level of management than the pond systems because of the water quality issues associated with high stocking densities and their complex mechanics. Most recirculating systems incorporate a biofilter, which removes toxic products (ammonia and nitrites) by a process called nitrification. There are many different designs of recirculating systems that can be used. Some are more suitable than others for barramundi.

Water temperature

Barramundi is a tropical species requiring water temperatures of 20-30°C. Commercial growth rates require temperatures above 25°C.

Seasonal variations in temperature cause growth rates of outdoor fish to decrease rapidly over the winter months, even in North Queensland. In southern Queensland, the lower year-round water temperatures makes these methods uneconomical. Death is reported to occur when water temperatures drop below 13°C, although stress-related mortalities and disease outbreaks become increasingly frequent as the water temperature drops below 20°C.

Related links

- Find out how to [get started in aquaculture](#).
 - You will need to discuss technical and licensing aspects of any proposed aquaculture venture with staff from [Fisheries Queensland](#) and the [Department of Environment and Heritage Protection](#) before proceeding with site selection, design and, where applicable, land purchase.
 - The [Australian Barramundi Farmers Association](#) has more information on barramundi production.
 - Find out how to [prevent, identify and manage disease in aquaculture farms](#).
 - Download the [latest report to farmers](#) for aquaculture industry statistics and production data.
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Breeding barramundi

[Hatcheries](#) are now able to spawn barramundi in captivity year-round with controlled lighting and temperature. Juveniles mature first at 3-4 years as males and change at 6-8 years to females; however, under aquaculture conditions maturation occurs in about half that time.

Egg production

Females are capable of multiple spawnings and generally produce 3-6 million eggs per season. The sexually mature broodstock can be induced to spawn by injection with an appropriate hormone. (Note that many chemicals used in aquaculture, such as hormones, require veterinary advice and prescriptions. Check before use.)

Fish spawn 24-36 hours after the injection. The eggs and larvae require salt water for successful fertilisation and survival. Larvae can be raised using tanks but are more often grown in extensive rearing ponds.

Fingerling production

The larvae metamorphose at 8-10mm and are then called fry. Weaning the fry onto artificial feeds starts at about 18mm. Once the fry are over 20mm (2-3 weeks of age) they are normally called fingerlings.

Cannibalism in fingerlings can cause massive losses unless they are regularly graded (every 7-10 days for smaller fingerlings). Grading normally starts at 30-50mm, or earlier if there is a large size variation in the batch, and continues until the fingerlings are at least 100mm long.

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Growing barramundi

Stocking rates

Commercial growout in ponds or recirculating systems starts once the fingerlings reach 30-100mm. Fingerlings are stocked at up to 15kg per cubic metre of water.

Feeding

The fingerlings are fed a semi-floating pellet 5-6 times a day when they are small. This decreases to 1-2 times a day as they grow. Pellet size increases as the fish size increases. Farmers feed their fish pellets until all feeding ceases.

The amount of feed required by a fish decreases rapidly with a decrease in water temperature. Maximum intakes occur at 27-29°C and decreases to almost zero at 20°C. Feed conversion ratios (total weight of fish produced per total dry weight of feed consumed) of 1.2:1 to 1.8:1 can be expected in well-managed operations at optimum temperatures.

Annual production from ponds can reach 30t per hectare but is more often 10-15t per hectare.

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