

Pause to think about why farmers dam water. Usually, it is to store intermittent or seasonally variable rain until the optimal growing season of the crop when water becomes limiting.

When it is most needed, the rainfall deficit coincides with a deficit going into the dam. When raining and the dam is filling, the local need is low. At high rainfall events, storages are filled to overflowing when the local demand is lowest, so most of the water goes over the spillway.

Conveyance of water via long aqueducts provides water from sources that are far away. Either the source is less correlated with the sink, or the supply and demand are in sync, such that the water is most in demand when it is the most available, and least in demand when least available.

Long Conveyance of water in the Bradfield Scheme not just about the supply of water from less correlated regions. It is about transfer between climates with reliably different rainfall patterns. Large local dams need to store water over from the winter period in order to water during summer, losing considerable amounts due to evaporation. Conveyance of monsoonal water during the summer period would minimize the storage and associated evaporative losses.

In a summer crop such as cotton, water may be limited in the hot dry growing season. Therefore the transfer of water from a monsoon climate in Northern Queensland to climates with uniform rainfall such as southern Queensland and Northern NSW makes sense.

Annual average rainfall varies from more than 1800 mm along the coast with peak rainfall in summer (Jan to April). Southern districts receive average rain in the hot summer, making agriculture particularly reliant on rainfall during the winter growing season - unless water was conveyed from the reliable monsoon falls of the north.

As an example, cotton is a perennial plant grown commercially as an annual, summer crop. It prefers hot summers with low humidity and a maximum amount of sunshine. Cottonseed is planted in the spring as soon as the soil is warm enough to be sure of satisfactory seed germination and crop establishment. On irrigated cotton farms the initial irrigation (watering) is usually followed by a further four to five irrigations, at two to three-week intervals, from mid-December to late-February.

Thus the northern wet season is long enough for the fourth months of growth needed from germination to when the cotton bolls to ripen and split open. When mature, timing is critical in cotton. The controlled watering ensures dry conditions on the heavy soils that are needed for mechanical harvesting, placing into large modules, and transferring to cotton gins for

processing and shipping to overseas markets.