Inquiry into future water supplies for Australia's rural industries and communities

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Executive Summary

Water is vital for industry and for high value uses such as aquaculture and horticulture, to maintain employment in the Chinchilla district. Like most rural towns, Chinchilla is struggling against the trend where jobs are being exported from inland Australia to the call centres and shopping centres of the big cities.

More water is needed to cater for current demands, for future industry and to ensure the viability of the horticulture and aquaculture industries. Existing horticulture and aquaculture in the Chinchilla Shire are under threat because both industries need reliable water supplies and both need to expand to remain efficient in the competitive world of marketing to large supermarket chains both in Australia and overseas.

But small water users and small irrigation areas, such as Chinchilla are being overlooked in the large river basin plans. Broad policy objectives overlook the regional differences and lack of equity in water allocations.

Commonwealth 'competition policies' are having an undue influence on the water allocation program in Queensland. The effect is to unduly restrict irrigation water supplies based on generalisations about water use emanating from the southern portion of the Murray Darling Basin.

The Queensland situation is quite different and there is a need for quality research and information on the environmental impacts of water extraction to make informed decisions on allocations of irrigation water.

Two important differences between Queensland and southern regions which affect the sustainable use of water for irrigation are:

i. There is additional runoff from land developed since settlement which is contributing more water to the river system, compared to natural flows.
ii. There are such huge losses in the inland river systems, that small changes to irrigation water usage have very little effect on river flows in the Murray River.

There is potential for the waste water pipeline from Brisbane to provide more water for areas such as Chinchilla if there is substitution of water allocations further up the river which are supplied with water from the Brisbane waste water pipeline. Commonwealth government contributions are likely to be important to the development of this pipeline.

Submission to the Inquiry into future water supplies for Australia's rural industries and communities

Chinchilla is a rural town and shire with 6000 residents, around 300 kilometres west of Brisbane. It represents a typical rural community in Queensland where water supplies are of vital importance for quality of life and future development.

There are a number of issues relating to future water supplies in rural areas, which the people of the Chinchilla Shire would like to raise with the Parliamentary Committee of Inquiry.

1. Water is vital for industry and for high value uses such as aquaculture and horticulture, to maintain employment in the Chinchilla district.
2. More water allocation is needed to cater for present demand, future industry and to ensure viability of the horticulture and aquaculture industries at Chinchilla.
3. The efficiency of the Chinchilla irrigation scheme can be improved greatly by the allocation of more water and construction of an off-stream storage.
4. Small water users and small irrigation areas, are being overlooked in the large river basin plans.
5. Commonwealth 'competition policies' are having an undue influence on the water allocation program in Queensland and its effect on restricting irrigation water supplies.
6. There is a need for quality research and information on the environmental impacts of water extraction to make informed decisions on allocations of irrigation water.
7. There is potential for the waste water pipeline from Brisbane to help areas such as Chinchilla by way of water substitution.

Consideration of these issues suggests it is important for the local economy yet still viable on environmental grounds to provide more water at Chinchilla to cater for future industry and to ensure viability of the horticulture and aquaculture industries at Chinchilla.

There are current demands for more water from industry, intensive animal industry and horticulture. As well as meeting these, the town of Chinchilla needs to keep some water in reserve to attract more industry. A response is needed to the concerns of existing horticulture and aquaculture industries in the Chinchilla Shire that they cannot absorb any cutbacks and in fact need to expand to remain viable in the future.

Extra water allocation is needed in the Chinchilla district.
The Commonwealth Government competition policies are having the effect of stifling water availability for irrigation. These policies are based on incorrect assumptions and scientific opinion from southern Australia, which needs careful scrutiny.

1. *Water is vital for industry and for high value uses such as aquaculture and horticulture, to maintain employment in the Chinchilla district.*

Like most rural towns and shires, Chinchilla is struggling to maintain employment and population, in the face of a continued drain of services to larger towns and cities. Electronic services are taking over from people, and jobs are being exported from inland Australia to the call centres and shopping centres of the big cities.

Economic growth in rural areas is being restricted by a lack of water. It is difficult for industries to find a town with water available water in southern Queensland.

Yet there are major opportunities

1. Horticultural development
2. Aquaculture
3. Intensive animal industries
4. Industry based on the Surat basin coal and gas
5. Industries based on supplies of methane gas
6. Alternative energy industries which may compliment a power station

Chinchilla has an established horticultural industry and holds a *Melon Festival* every second year to celebrate the beneficial impact of horticulture on the district. However, the present horticulture in the Shire is under threat and expansion is restricted by a lack of water.

Horticulture and aquaculture are being described as *industry*, rather than *farming* in this submission, because of the substantial infrastructure and employment associated with them. They both require a large investment in cold storage, post harvest treatment and packaging which cannot be done efficiently on a small scale.

There is a much greater economic return from horticulture than broadacre crops, such as cotton. Rock melons and watermelons commonly grown at Chinchilla can produce net returns in excess of $10,000 per hectare using as little as 2 megalitres per hectare. This represents a return of around $5,000 per megalitre, which compares to return per megalitre from cotton in the major irrigation districts of less than $250/Ml.

The economic and employment benefits to Chinchilla and to Queensland from irrigated horticulture is 10 to 20 times that of cotton and other broadacre crops.

There is a significant demand for water from intensive animal industries with a piggery and feedlot in the region both seeking additional water supply to expand their operations. Without water these industries will stagnate at present levels.

There is current demand from industry for water. A major power station is planned for Kogan Creek, only 20 kilometres east of Chinchilla. This development has had to consider designs for more expensive air cooled systems because of a lack of water.

A coal mine which is to be developed close to Chinchilla is seeking water for a coal washing plant and may have to secure water supplies and pipe water from a considerable distance away. This adds to the cost which will drive away other potential industry from the region.

Chinchilla is in the middle of the Surat Basin oil and coal reserves and there has been significant amounts of methane coal seam gas discovered in the area in recent times.

The Queensland Government has recently endorsed the plan by Tarong Energy to build a railway line from Brigalow (20 kilometres east of Chinchilla) to Tarong to supply coal for the existing power station. It is possible this railway line may become part of a rail link between Melbourne, Goondiwindi and Gladstone in the future. An alternative route for a rail linkage between Melbourne and Gladstone may be through Miles (linked by rail, 30 kilometres to the west).

Chinchilla is close to the proposed Kogan Creek power station, which is likely to provide the cheapest electricity in Australia when it is developed. With natural gas on its doorstep, and being situated on a transport corridor to the rest of Australia, there is tremendous potential for future industry, if there is the water available to service it.

Other potential industries may involve alternative energy sources, such as ethanol and biodiesel. The feedstock may come from a variety of sources, including grain, cotton stalk and algae produced in salt water ponds (a by-product of salinity control measures), but both these fuels require significant energy to refine. Low grade steam, which is a by-product of electricity generation could provide much of this energy.

2. *More water is needed to cater for future industry and to ensure viability of the horticulture and aquaculture industries at Chinchilla.*

Water allocations need to be increased just to meet current demands, with more required in reserve for industrial purposes. When a new business is looking for potential sites, they do not want to wait for a year or more to prove the water supply. The town of Chinchilla needs to keep some water in reserve to attract industry.

The future of the existing horticulture and aquaculture in the Chinchilla Shire is under threat because both industries need reliable water supplies and they both need to expand to remain efficient in the competitive world of marketing to large supermarket chains both in Australia and overseas.

Contracts with supermarkets need to be large these days to supply Australia wide or export markets and they need to have reliable water. Farmers at Chinchilla have not been able to obtain enough water, with enough reliability to satisfactorily supply such markets and have in some cases moved elsewhere.

An extra 4,000 megalitres for horticulture in the Chinchilla shire could increase employment by 800. This is based on 400 jobs directly employed in horticulture and the total output multiplier for irrigation cropping to be in the vicinity of 2.

This multiplier figure is based on Smith (1992), who estimated an economic multiplier of 1.7 for irrigation on the Darling Dpwns and a study on irrigated cotton in the MacIntyre Catchment (Powell et al 1993) which found the total economic benefit in terms of income and employment to be 2.5 times the initial effect or income from the irrigated cotton.

This extra employment would be a tremendous boost to the Chinchilla district and create significant additional revenue for the Commonwealth Government, estimated to be $15 million per year in income tax alone.

3. *The efficiency of the Chinchilla irrigation scheme can be improved greatly by the allocation of more water and construction of an off-stream storage.*

Irrigation farmers in the Chinchilla district have improved the efficiency of their operations in recent years. There is on-going improvement in conjunction with the Queensland Government's Rural Water Use Efficiency Project.

Horticultural producers in the Chinchilla Shire use some of the most advanced technology in the world to maximise irrigation efficiency. To compliment their already efficient trickle irrigation, they are using radio linked soil moisture sensors and computer controlled watering systems.

By comparison the Chinchilla Weir irrigation scheme is quite antiquated and inefficient. The current rules for water use make it difficult to use the annual allocation of 2760 megalitres from a total storage capacity of 10,000 megalitres. Annual usage averages 20% of total weir capacity and 80% of water is wasted through evaporation and losses in sending water downstream to some irrigation farms.

A significant upgrade involving desilting and the construction of an off-stream storage would provide more water and enhance the reliability of water supplies in the Chinchilla district.

A small weir on the river at Nangram, around 30 kilometres downstream from Chinchilla would also improve the efficiency of water distribution from the Chinchilla weir. These improvements would require a small additional allocation of water, but would be of tremendous benefit to the Shire and greatly improve the efficiency of water use from the weir. The proposal is outlined further in Appendix 1.

4. *Small water users and small irrigation areas are being overlooked in the large river basin plans.*

The annual usage from the Chinchilla weir is around 2000 megalitres per year. Horticulture production on Charleys creek, a local tributary of the Condamine river uses another 2000 megalitres. Irrigators with water harvesting licences use another 2000 megalitres (approximately). This is less in total than many individual cotton farms on the Balonne river.

Small irrigation areas, such as Chinchilla are being overlooked in the Resource Allocation Plans for the Murray Darling Basin.

A detailed submission was provided to the Queensland Government in the formulation of the WAMP, but it would appear that it has been overlooked in the 'big picture' which is reportedly based on the decision that the river is overutilised.

Such views ignore the different levels of usage along the river and facts such as: "the Chinchilla district contributes more water to the river system via additional runoff from land developed since settlement, than it uses for irrigation."

According to the natural resources management strategy, the community in the Queensland portion of the Murray-Darling Basin has the following vision: *Equitable, efficient and sustainable use of the water, land and other environmental resources of the Queensland Murray-Darling Basin.*

There is not much equity in the allocations of water to date. In the same way that Queensland has argued on an equity basis that southern states were ahead of Queensland in water development, Chinchilla has an argument on equity grounds that more water should be allocated in its locality.

A small amount of additional water allocation in the Chinchilla area, would still only bring the total water use to around 10,000 megalitres. This amount is miniscule compared to the large allocations for irrigation, both upstream and below Chinchilla. Such an increase is ecologically sound because there is an *extra* 20,000 to 30,000 Ml of runoff water (above natural flow rates) added to the Chinchilla reach of the river from land which has been cultivated and levelled since settlement.

The reason Chinchilla farmers have not made a lot of use of water in the areas is because there are not large areas of suitable land adjacent to the Condamine river for the efficient development of furrow irrigation. Recent trends are for more efficient forms of irrigation, such as centre pivot and drip irrigation. These new methods open up the potential for more farmers to use water in the Chinchilla area.

There is also an area of land suitable for grapes, melons and other horticultural crops, which is mostly in the catchment area of Charleys creek, to the north of Chinchilla. Development options have been restricted to water holes and small weirs to this point in time.

These irrigators are also being overlooked because Charleys creek is a tributary, and not the main river. There does not appear to be any plans or mechanisms for transfer of water allocations from the main river to such tributaries.

The horticultural industry has been growing steadily and has now reached the stage where more irrigation water and more reliable water storage systems is a priority for further expansion.

Options to improve the supply and reliability include harvesting water into larger off-stream storages on Charleys creek and/or the transfer of some water by pipeline from an off-stream storage on the main river at Chinchilla weir. A program for such development is set out in appendix 1.

5. *Commonwealth 'competition policies' have an undue influence on water allocations in Queensland and are restricting irrigation water supplies.*

Money talks. The Queensland Government has indicated that one of the main reasons for needing to cutting back on water allocations is to meet criteria set down under the National Competition Policy (NCP) agreement with the Commonwealth Government.

It is suggested here that the decision making is being influenced greatly by water policies which are in turn influenced by water use in the southern part of the Murray Darling Basin, which is very much different to Queensland.

If the Commonwealth policies are to exert such influence on water allocation in Queensland, then these should be based on good scientific information relating to Queensland and not on theories extrapolated from the south.

These differences are outlined in the need for good information on water extraction and the river environment.

6. *There is a need for quality research and information on the environmental impacts of water extraction to make informed decisions on allocations of irrigation water.*

In presenting this submission relating to the Chinchilla district we acknowledge a need to consider wetlands and wildlife (such as the Narran Lakes) and environmental problems, such as blue green algae.

However, there are major assumptions relating to southern river systems which are not correct for Queensland and may be influencing commonwealth policies on water use.

These assumptions relate to the effects of reduced water flows on salinity, water quality and fish populations.

But there are also two other important aspects of water extraction which are not generally acknowledged. These are:

i. Additional runoff from land developed since settlement is contributing more water to the river system.
ii. There are such huge losses in the inland river systems, that small changes to irrigation water useage has very little effect on river flows at the Murray-Darling junction.

More water now runs off cultivated land

Land cleared for agriculture contributes more runoff than in a natural state of trees and grass. This effect is likely to be quite different in Queensland, compared to Victoria, because the rainfall is much more intense and the soils are mostly clay which has a slow rate of infiltration and more runoff.

But in the Chinchilla there is another important factor, whereby the land was covered with melon holes (natural depressions usually 1 to 2 metres deep) and timbered with brigalow. The natural depressions store water from falls of 50-80mm and almost eliminate runoff from the land in all but wet seasons.

To the east of Chinchilla a significant area of the flood plains was naturally treeless, and whilst these plains were not covered in large melon holes, there were natural undulations,10-15 centimetres deep. These small undulations would still have caused a dramatic reduction in runoff compared with large areas now levelled and cropped.

The increased runoff is around 20 to 30 mm per annum on some 100,000 hectares which has been levelled and cultivated in the Chinchilla area. This means an extra 20,000-30,000 megalitres now flows into the Chinchilla reach of the river each year, compared to the natural flow.

Evidence to support these calculations comes from runoff measurements in catchment studies conducted by the DPI and DNR. Research on the Darling Downs by Dr David Freebairn (1991) indicates annual runoff from cultivated land is 45mm more than pasture, or what would have been close to the natural runoff. In another study (Lawrence and Thorburn,1993) of a brigalow catchment at Theodore, with similar vegetation and rainfall to Chinchilla, average runoff (over 5 years) increased from 26mm for the brigalow forest to 55 mm for the cropped area.

If we consider the whole of the Condamine River catchment on the Darling Downs, emptying into the river above Chinchilla, there are some 800,000 hectares of cultivation which now contribute more runoff than in a natural state of with trees and grass. If we use a conservative estimate that the *increased* runoff is 15 mm per year, then the extra runoff compared to the natural flow of the river is 120,000 megalitres per year, which is around the same amount used for irrigation from surface water supplies.

Huge losses of water in the river systems

The Narran Lakes in north western NSW are the only wetlands of any consequence affected by extraction of irrigation water in the Queensland portion of the Murray Darling catchment. The increased runoff has been demonstrated to show irrigation diversions on the Darling Downs are not reducing water inflows into the Narran Lake, but there is another reason irrigation will have almost no impact, and this is because of the huge losses of water in the river system.

A feature of river flows in northern part of the Murray Darling is that a major portion of the river flow is during ephemeral flood flows. The river channels can not cope with flood flows and a large amount of water is lost as it spreads out from the river.

In wet periods, the effect of water diversion for irrigation is mainly to reduce the size of the flood peaks, while most of the water which would otherwise flow down the channels will still get there. In dry years, a flood in the river at Chinchilla can be completely swallowed up in the river system, wetting up dry riverbeds, before the water reaches the Narran Lakes.

If we were to cut out the entire irrigation industry on the Darling Downs, then it would still make very little difference to river flows in the Darling River.

This is because more than 50% of the water is lost before it gets to St George, another 50% on the flood plains between St George and the Queensland border. Less than 20% of the river flows at Chinchilla will reach Bourke on the Darling River.

Only a small fraction of the river flow at Bourke reaches the Murray River. We can see therefore, that if we put the whole Darling Downs irrigation water supply of 120,000 megalitres back in the river, it would result in less than 5000 megalitres reaching the Murray River. This is the amount used by one small rice farm!

Consider the impact of an additional diversion of 5,000 megalitres at Chinchilla. After allowing for considerable losses between Chinchilla and St George, it would result in around 1200 megalitres reaching the Queensland-NSW Border, with perhaps 200 megalitres in the Narran River. This amount pales into insignificance when compared with the diversion of more than 400,000 megalitres in the lower reaches of the Balonne river around St George and Dirranbandi.

Salinity

A major issue of concern in the Murray Darling Basin in southern states is an increase in salinity. This has not emerged as a problem, in northern areas, either along the river or in irrigation areas. Cotton and other crops have now been irrigated for more than 30 years around Narrabri and St George without development of salinity.

A recent study of soil and groundwater of the main irrigated cotton districts (unpublished study funded by the Cotton CRC) has found no evidence of problems.

The water flows in the Condamine-Balonne are low in salt. With common samplings of 200 µm/cm, they are well below the 800µm/cm target for the Murray River.

Some increase in salt levels has been found in tributaries such as Oakey Creek, where there is an effect from the outflow of the Toowoomba sewage works in dry seasons. The sewage outflows also have an effect on nutrient content of the water and local authorities are now moving to treat sewage to remove the nutrients before the water enters the streams.

Soil erosion

Water extraction has been blamed for poor water quality and adverse effects on fish and other aquatic wildlife. However, it is not irrigation but soil erosion which is the reason for poor water quality, both in terms of high nutrient levels and turbidity (or clay content).

The effects of soil erosion are of far greater importance to nutrient levels and river conditions which are suitable for growth of blue-green algae, than a reduction in water flow from irrigation. Evidence for this is contained in a report on *Land use in the Condamine-Balonne-Culgoa river system and implications for water quality*, prepared by Peter Wylie for the Condamine Balonne Water Committee in 1993.

Native fish populations

The effect of reduced water flow on native fish populations is another concern about irrigation. However, the Condamine river is naturally dry for long periods and it is common for fish to die naturally as waterholes dry up and oxygen is depleted.

A recent study by fisheries biologist (reported in NEWSflows March 1988), David Moffat, indicates a rapid recovery in fish populations several years after the major drought of 1992-95.

According to David Moffat, "In contrast to recent reports regarding the River Murray catchment, the rapid recovery of local fish populations from drought conditions suggests that, in ecological terms, our rivers are still in reasonable condition."

Wetlands

The effect of irrigation diversions on wetlands is another environmental concern. *An Environmental Scan of the Condamine-Balonne River System*, prepared by R. McCosker for the Department of Natural Resources in 1996, indicates there are no significant wetlands on the main river or its tributaries in Queensland.

The wetland systems identified in the Condamine basin in this report, are at Lake Broadwater near Dalby, the Gums Lagoon south or Tara, and the Bellvue Swamp and Pelican Lagoon in the Chinchilla district. All of these wetlands are on small local catchments, which are not affected by flows in the Condamine river or the creeks being considered for irrigation use in the Chinchilla district.

The main wetland and wildlife habitat downstream of Chinchilla is the Narran Lakes, on the Narran River, more than 600 kilometres downstream.

Beneficial flooding of grazing land

Although there is almost no effect of irrigation at Chinchilla on wetlands, there is concern about beneficial flooding of grazing lands. The main impact of water harvesting is to reduce the height of the flood flows for 50 to 100 kilometres downstream of Chinchilla.

This is where most of the water harvested for irrigation would otherwise have been lost. It would result in higher flood peaks close to Chinchilla which would have spread out further from the river. There will be little impact on flood heights further down the river.

But while flooding is regarded as beneficial on the flat plains below St George, it is not generally regarded as beneficial in the upper reaches of the Condamine, below Chinchilla. This is because the flood waters tend to be much deeper and more destructive than they are on the river plains below St George.

Land along the river downstream from Chinchilla includes some cultivation, on which flooding causes damage. In other parts it is heavily timbered with a limited amount of grass likely to respond to flooding. It is likely that in years when there are floods, there is enough rain to produce a surplus of feed and any extra feed would largely go to waste. The value of flooding to produce extra pasture for grazing is therefore quite small.

Flooding is much more beneficial below St George, where the floods spread out and cover large areas of pasture in gentle, non-destructive flows. The soil profile is filled with moisture and nutrients added from silt deposition to provide a boost in pasture production in the following season. But the water diversions at Chinchilla would have almost no effect on the height of beneficial flooding below St George.

Reviewing the River Environment

When we carefully examine all these environmental questions, a general conclusion is that more water for irrigation at Chinchilla will have little affect on a river system which is naturally dry more time than it is flowing. A reduction in river flows has not been demonstrated to be a causal effect of algal growth, and water quality is not affected by a small reduction in water flows.

Fish, birds and aquatic animals will have slightly less water, but of more importance than the amount of water is the existence of permanent water holes for refuge in dry seasons. The augmentation of the weir on the Condamine river and additional weirs on Charleys creeks will provide additional drought refuges for fish and birds.

6. *There is potential for the waste water pipeline from Brisbane to help areas such as Chinchilla by way of water substitution*

If Brisbane waste water can be brought to the Darling downs it may be possible for it to replace some of the river allocations further upstream, which can then be transferred to and purchased by Chinchilla farmers.

Commonwealth funding will be important for this project.

The way in which this might work is for Chinchilla farmers to purchase allocation of Brisbane waste water, which is then substituted for river allocation of existing irrigators in the area serviced by the pipeline. This river allocation then remains in the river, where it is picked up by irrigators at Chinchilla.

Consideration needs to be given to the increased value of the water which has a high reliability, compared to less reliability of river water supplies. It will be difficult but not impossible to arrive at methods of substitution of water allocations.

It may help the Brisbane pipeline project if there are horticultural producers at Chinchilla who can afford to pay more for water than cotton farmers.

It is the view of the Chinchilla shire residents that the Commonwealth Government should provide a substantial amount of financial support for the Brisbane pipeline project. It will not only help the regional economy of the Darling Downs, it will increase revenues of the Commonwealth Government.

In the first instance a substantial portion of the construction costs will be returned directly to the Commonwealth Government by way of additional income tax, less unemployment benefits, fuel taxes and GST. Over time there will be a substantial return to the Commonwealth Government in the form of income tax from an additional 1500 jobs which are likely to be created by the project.

There is also a significant environmental benefit from the project, where the water quality of Moreton Bay will be significantly enhanced by elimination of large amounts of phosphate and nitrogen which upset the ecology of these marine environments.

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Appendix 1

Augmentation of the Chinchilla weir and expansion of water supplies for industry and horticulture in the Chinchilla Shire.

Two proposals are developed in support of more water allocation in the Chinchilla Shire.

1. The first, presented here in Appendix 1 is a project involving the augmentation of the Chinchilla weir and expansion of water supplies for industry and horticulture in the Shire.

2. The second presented in Appendix 2 builds upon this first project allowing for an expansion of irrigation based on an equitable allocation where irrigation water supplies in the area are increased from around 6000 megalitres to 40,000 per annum.

Summary of Project 1 : Expansion of water supplies for industry and horticulture

- More water is needed for potential industry associated with coal, gas and power generation projects in the Chinchilla area.
- An extra 4,000 megalitres could increase employment by 800 with 400 jobs directly employed in horticulture and another 400 jobs in service industries.
- This extra water is needed to ensure future viability of horticulture in the Chinchilla shire.
- The future of the existing horticulture and aquaculture in the Chinchilla Shire is under threat because both industries need reliable water supplies and they both need to expand to remain efficient in the competitive world of marketing to large supermarket chains both in Australia and overseas.
- Farmers at Chinchilla have not been able to obtain enough water, with enough reliability to satisfactorily supply such markets and have in some cases moved elsewhere.
- There is a strong case for allocating more water for irrigation in the Chinchilla Shire on equity and economic grounds. Less than 6,000 megalitres is used each year for irrigation at present, compared to 400,000 megalitres allocated in the Lower Balonne.
- This amount of irrigation water is less than the *extra* runoff which is *additional* to natural flows. An *extra* 20,000-30,000 megalitres per year now flows into the Chinchilla reach of the river, compared to the *natural* flow.
- The Chinchilla Weir irrigation scheme needs a significant upgrade to improve the efficiency of water use. At present, the annual usage averages 20% of total capacity and 80% of water is wasted.
- Construction of an off-stream storage would provide more water and enhance the reliability of water supplies in the Chinchilla district.

Augmentation of the Chinchilla weir and expansion of water supplies for horticulture in the Chinchilla Shire.

The Chinchilla Weir irrigation scheme has an annual usage of 1900 megalitres per year, out of total capacity of 10,000 megalitres. The most economical way to improve the efficiency of this scheme is the construction of an off-stream storage. Some of the earthworks for the storage would come from de-silting the weir and would restore its depth and capacity and improve the yield of water from the weir itself.

An off stream storage adjacent to the weir, built to a depth of 8 metres,would provide more water with greater reliability, for future industry, town needs and horticulture in the Chinchilla district.

A 4000 megalitre storage and 500 megalitres of extra weir capacity, would make a big improvement to the size and the efficiency of the weir scheme. A major advantage of the storage is to provide reserve water supplies for the town of Chinchilla, while allowing the water supplies in the weir to be used for irrigation. At present irrigation water use ceases when the water level in the weir drops below 35%, so as to keep water in reserve for the town.

Initially a smaller storage of around 2,500 megalitres might be built with water allocation kept in reserve for industry. Should a new industry develop in town, then a further storage could be built to provide the extra water required.

In addition, the construction of a small weir at Nangram, downstream from Chinchilla will save water at Chinchilla by reducing the losses of water which occur when releases are made to provide small amounts of allocation water to downstream users. In this way an extra 1000 megalitres of water may become available which would allow increased allocations to new and existing irrigators on the river for both broadacre and horticultural crops.

There is a much greater economic return from horticulture than broadacre crops, such as cotton. Rock melons and watermelons commonly grown at Chinchilla can produce net returns in excess of $10,000 per hectare using as little as 2 megalitres per hectare. This represents a return of around $5,000 per megalitre, which compares to return per megalitre from cotton in the major irrigation districts of less than $250/Ml.

One possible feature of the proposed scheme is to link the off-stream storage at Chinchilla with another off-stream storage on Charleys creek. This could directly transfer water to some of the horticultural areas to the north of the town and improve the reliability of water supplies in this area.

Appendix 2

Irrigation Development in the Chinchilla Shire

A proposal was submitted to the Water Allocation and Management Plan for an increase in the total amount of water used for irrigation in the shire to around 40,000 megalitres per year, which is less than 7% of the water flows at Chinchilla.

A total of 1000 jobs will be created from irrigation farming and support industries, if an extra 34,000 megalitres of water could be allocated for irrigation of horticultural crops as well as grain and cotton in the Chinchilla shire.

Summary of the proposal

- Four separate projects to supply water to farms in the Chinchilla district show good returns on investment and can be largely funded by the irrigators through borrowings.
- There is a strong case for allocating more water for irrigation in the Chinchilla Shire on equity and economic grounds.
- A total amount of 40,000 megalitres in the Chinchilla area is around 25% of local runoff water. Less than 6,000 megalitres is used each year for irrigation at present.
- Most of the irrigation water being sought for use in the Shire is *extra* runoff which is *additional* to natural flows. Increased runoff from the cultivation and levelling of some 100,000 hectares of land between Dalby and Chinchilla means an *extra* 20,000-30,000 megalitres per year now flows into the Chinchilla reach of the river, compared to the *natural* flow.
- 40,000 megalitres is only 7% of the annual flow of water in the Condamine river at Chinchilla. This amount will not adversely affect the river environment, beneficial flooding of grazing land or the nearest wetlands at Narran Lakes in NSW.
- There are large losses in the river system. From a total of 40,000 megalitres, less than half is likely to reach St George, and only half of this would reach the NSW border. A very small amount would reach the Darling River.
- Water melons, rock melons and grapes are grown in the Chinchilla district. The expansion horticulture in the shire is now restricted by the lack of water for irrigation.

Rationale for increased water allocation

The Chinchilla shire has a large volume of runoff water with very little used for irrigation. The combined flow of the river and tributaries in the Chinchilla district, including Wambo, Charleys, Cooranga and Kogan creeks exceeds 600,000 megalitres per year, but less than 4000 megalitres per year is used for irrigation.

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As indicated in Appendix 1, there is a need for more water to meet current demand and to provide for future industry development.

The efficiency of the irrigation scheme operating on the Chinchilla weir can be greatly improved. The weir stores 10,000 megalitres, but the water use for irrigation averages less than 2,000 megalitres.

Table 1. Summary of water flows and planned diversions

Annual water flow at Chinchilla weir	500,000 megalitres (approximately)
Water from Charleys, Wieambilla and Wambo creeks below the weir	100,000 megalitres (approximately)
Total water flow: Chinchilla reach	600,000 Ml
Current allocations	2876 Ml irrigation Chinchilla weir 1160 Ml Chinchilla town water supply 2000 Ml existing water harvesting
Total water use proposed	40000 megalitres for the Chinchilla Shire
Percentage diversion of annual flow	7%

The Chinchilla weir irrigation scheme is quite small and some irrigators have allocations of only 150 megalitres per annum. These amounts are reduced at times by a lack of water. Such quantities are not enough to develop a viable area of irrigated cotton, while other broad acre crops are less profitable.

Although it is viable to irrigate horticultural crops with less water, most of the allocations from the weir are on land with heavy soils not suited to horticulture.

More water will allow an increase in water allocations for existing users of the Chinchilla weir scheme. A large off-stream storage of reasonable depth would improve the efficiency of the weir scheme and provide more water with more reliability for industrial purposes and for horticulture.

A small weir could be built at Nangram, downstream of Chinchilla. This weir will reduce the loss of water when it is supplied to downstream irrigators and collect extra water from downstream tributaries.

A survey by the Chinchilla and District Water Users Association resulted in a response from more than 50 farmers, that they were interested in additional irrigation water. The total water requirements indicated in these responses were in excess of 30,000 Ml. Since the survey, other landholders have been surprised at the potential to deliver water to areas away from the river and are now interested in irrigation, whereas they previously thought their farm could not be supplied with water.

Proposals have been developed with intending irrigators for three off-stream storages on the Condamine river, with a combined capacity of 12,500 Ml. One 5000 Ml storage would augment the water supply of the Chinchilla weir. Another 5,000 Ml storage would provide water to10 or more farms in the Hopelands district and one of 2500 Ml at Brigalow could supply water to farms on Chances Plain.

A. Augmentation of the Chinchilla weir

A storage adjacent to the weir, built to a depth of 8 metres, would have low evaporative losses compared to the weir itself. It may be possible to construct a storage by using the natural relief of the land adjacent to the river to form one or two sides of the dam, as well as to use material removed from the storage area of the Chinchilla weir. Using just a portion of the excavation for an off-stream storage could create 600 megalitres of additional storage in the weir with a yield of close to 100%, because there would only be small additional losses from evaporation.

The extra capacity of a 5000 megalitre storage and 600 megalitres of weir capacity, would make a big improvement to the size and the efficiency of the weir scheme. In addition, the construction of a small weir at Nangram, downstream from Chinchilla, will save water in the weir by reducing the losses of water which occur when releases are made to provide small amounts of allocation water to downstream users. These extra amounts of water would allow increased allocations to new and existing irrigators on the river for both broadacre and horticultural crops.

B. The Hopelands District

Preliminary investigations have suggested it is feasible to build a water supply storage on the river of 5000 Ml which would provide around 500 Ml of irrigation water per year each to 10 farms. Each of the10 farms would have an on-farm storage of around 500 Ml, which would provide additional water supply from tailwater return systems and some locally harvested water.

Such a project would use water harvesting pumps to divert water into the main 5000 Ml storage. The water would be distributed by pipeline over many months to the farms.

An investigation of the cost of such a scheme (in 1998) is that the water storage component would be in the vicinity of $4.8m., or $730 per Ml of irrigation water. An additional $720,000 would need to be spent on 10 farms preparing land for irrigation.

C. Chances Plain farmers

Detailed contour maps of the Brigalow flood plains show it is feasible to build a pipeline or water supply channel across the Chances Plain, to the north of the river and may even be possible to connect the water supplies of the Condamine river and Charleys creek.

A ring tank on the river at Brigalow, could supply water into a channel which could provide 800 Ml each for 10 farms with on-farm storages of 500 Ml.

The cost of the water storage component of such a scheme would be in the vicinity of $5.28m., or $704 per Ml of anticipated water availability. An additional $720,000 would need to be spent on 10 farms preparing land for irrigation.

D. Water storages on Charleys creek

There is interest by landholders in building larger water storages on Charleys creek or off-stream water storages. The supply of water from shallow water holes and weirs currently being used for irrigation is unreliable and would be improved with larger weirs and off-stream storages.

Some of these could be built privately, but there is scope for some co-operative schemes, whereby a weir and large off-stream storage could be shared by two or more farms. Larger storages are more efficient and have reduced losses and in some cases would be built to provide a water supply for more than one year, to improve the reliability of horticultural production.

The construction of weirs on Charleys creek, coupled with several shared or privately built off-stream storages might have a combined capacity of 4000 Ml and cost in the vicinity of $2.8m. With a yield of 3200 Ml (assuming the creek runs twice a year on average) the cost per Ml of available water is $875. This water is likely to be used mostly on horticulture and so a higher cost could be acceptable to landholders.

E. Other Private water harvesting schemes

If water allocation was available, several other private water harvesting projects would be established by landholders in the Chinchilla shire on the Condamine River, Charleys Creek and Wambo Creek. An equitable allocation of water harvesting permits in the area must consider these projects.

Allowing for 10,000 Ml of allocation for current water harvesting and to meet the demand for private water harvesting schemes in the Shire a total allocation of 40,000 megalitres is required for proposals indicated so far. This includes the 2876 Ml of allocation in the existing Chinchilla weir scheme.

Economic Benefits

The proposals for irrigation development in the Chinchilla shire are an attractive investment for landholders and government, and would have significant flow-on benefits to the town and community by way of job creation.

The economic returns shown below assume a profit of $450 per Ml from cotton and $900 per Ml from horticultural crops such as melons, grapes and pumpkins. Cotton growing is likely to use 5 Ml/ha, while horticultural crops using trickle irrigation average 3 Ml /ha.

The net benefit from irrigated crops, after allowing for the income forgone from dryland production and for depreciation and other costs of irrigation, is $340/Ml for water used on cotton and $800/Ml for water used on horticultural crops.

The total cost of the projects outlined above has been estimated (in 1998) at $26 million with $20 m. of this for the water storages and pumping equipment and approximately $6 m. for on-farm irrigation development of irrigation . The estimated net benefit of $12 million is an excellent return of 46% p.a. See table 2.

As well as private benefit to irrigators there is considerable benefit to the regional economy and employment prospects in the district. There are direct benefits to federal, state and local governments, by way of additional taxes from the employment of more than 500 people.

Table 2. Summary of economic benefits (assessed in 1998)

Development options	Total cost	ML	Net Benefit#	Rate of return	Net present value
A. Augmentation of Weir	$3.4m	3,200	$1.64m	39%	$12.5m
B. Hopelands channel	$5.5m	7,500	$2.55m	37%	$18.9m
C. Chances Plain	$6.0m	7,500	$2.55m	34%	$18.5m
D. Charleys Creek Scheme	$4.8m	3,200	$2.56m	43%	$19.7m
E. Private storages	$6.0m	8,400	$2.86m	37%	$21.3m
TOTAL	$26 m	29,800	$12.2m		

* Average annual water available

There is a mix of broadacre and horticulture for schemes A, D and E.

Internal Rate of Return and Net Present Value over 30 years, NPV at discount rate of 8%