BLINDED BY PERCEPTION, DRIVEN BY EXPECTATION, MISLED BY OMISSION

Roger Doyle

Audax Enterprises Pty. Ltd., PO Box 395, Bunbury. Western Australia. 6231
Tel: 08 9731 2455 / Fax: 08 9731 2466 / email: audax@westnet.com.au

MAKING THE MOST OF THE WESTERN AUSTRALIA RAINFALL

There are two major water issues in Western Australia at present. The low rainfall areas are suffering from Dry Land Salinity (DLS) caused by too much water while the population that lives in the high rainfall areas are facing water shortages. These challenges present incongruous anomalies where perception, expectation and capacity do not provide the appropriate environment for sustainable development. Solutions to these water challenges will only be found when the unique scenarios (climate and rainfall patterns) that arise in Western Australia are addressed.

Can't find the water for the rain.

Contrary to popular perception, Perth is not a dry city, receiving on average 45% more annual rainfall than London, United Kingdom. The challenge is not so much how much annual rainfall there is but the extremes of climate and the intensity of rainfall events. The issue both in Perth and in the inland areas is how to better deal with the rainfall, maximise the benefits and minimise the negative effects. The challenges will not be solved in the world of averages and regional planning but in paying attention to the natural laws that dictate water movement from the moment rainfall hits the ground while taking into consideration all the effects of any proposed works.

During the 1980's the Department of Agriculture was advocating rapid discharge of surface water to reduce ponding while the Department of Rivers and Waters was advocating detention basins to reduce peak flows and increasing infiltration. Following two floods in Merredin in the early 1980's a system of contour banks was constructed to hold up the water and prevent a repeat of the flooding. A major issue now facing the town is rising groundwater and salinity.

Better drainage is the key.

The much referred to "Water Cycle" does not even identify the role of drainage, which is the key mechanism for adequately identifying and addressing these challenges. It is the development of appropriate drainage systems that determines whether the valuable water resource is conserved or polluted and wasted. All water management activities need to consider options for the preservation of this scarce resource.

Drainage is not just a dirty water disposal system, it has always been the natural, gravity driven mechanism by which water moves over or through the soil profile to a point of storage or discharge to the ocean. Drainage modifications do not only occur when deliberate drainage activities are undertaken but also result from many land development operations. The present DLS challenge is a result of the inadequate recognition of the effects that clearing and cropping have on drainage and the water balance in the region. Add to this the construction of roads, railway lines and other infrastructure which have also had an impact on natural drainage and the challenges grow. When these challenges are combined with the

high rainfall intensities experienced in the region, plus the effects of the long hot summers, the results could have been predicted if drainage issues had been considered. The recent move to direct drilling has been applauded by many for the improvement in soil structure and the reduction in runoff but if all the additional infiltration is not used by the crop, a further increase in the rate of salinisation will result.

Drainage developments are multi-generational.

The perception that the inland areas are dry is only upheld when using annual averages as the guideline. Monthly averages show that for two months a year the average monthly rainfall in Merredin is equivalent to the rainfall in London, a city where drainage infrastructure has been in place for centuries. Any drainage infrastructure must be able to cope with averages but the short-term intensity of rainfall events that occur within the catchment. In this respect Merredin faces the greater drainage challenge. A typical farmer in the region (with 325 mm rainfall), on a 1000 Ha block of land will frequently experience a rainfall event that provides 5 mm of runoff. The landowner is now left with the challenge of being responsible for the safe removal of this 50,000 tonnes of water from the surface of their land in settings there are no appropriate political, legal or technical frameworks for drainage development.

Under the present legislation, the Commissioner for Soil Conservation is empowered to impose a Soil Conservation Notice on any landholder who does not address an identified salinity problem on their property. Where a landholder takes remedial action and discharges saline water from the property, the Commissioner for Soil Conservation can impose a Soil Conservation Notice on the landholder to prevent the discharge. There is presently no process by which farmers can invest in salt remediation drainage work that may not be closed down at some future date due to changes in environmental perceptions and assessments.

Water challenges vary.

While the large-scale rural water management challenges are extreme, domestic supplies on rural properties are largely taken care of by rooftop catchments connected to tank storage with garden and stock supplies largely provided for by small catchment dams. Few farms have the luxury of being able to water the garden and provide clean water for spraying operations from valuable rooftop rainwater storages.

In Perth the situation is reversed, with drainage services to minimise the effects of flooding being well developed with Water Corporation drains discharging over 128 gigalitres of storm water into the Swan River each year. Meanwhile the Water Corporation is struggling to supply up to 300 Gigalitres of chlorinated and fluoridated water through the Integrated Water Supply System to be used for domestic and industrial use. Domestic consumption is 70% of this supply and, while all this water is chlorinated and fluoridated, 56% of domestic consumption is used outside the home with only 7% being used from a tap. (Water Corporation 2003)

Implementing what we know.

The removal of tree cover from farmlands has for many years been blamed for an increase in surface water discharge. A recently commenced trial in the Wungong Catchment is aimed at reducing the density of the regrowth in an attempt to increase the surface water discharging into the water supply dam. It will be interesting to see whether the principles of vegetation free roaded-catchments, which have been installed for many years in the inland areas, provide similar benefits in the higher rainfall areas.

Both rural and city regimes could beneficially adopt improved water management strategies, learning from each other how to better utilise and manage the rainfall that they do get. If considering pollutants (including storm water) as “resources in the wrong place” then the whole issue of drainage takes on a whole new meaning.

Our true resource.

Most extractive industries make an assessment of their available resources based on the known deposits and their extractive techniques. With water, the deposits appear to be assessed as existing dam capacities and known groundwater reserves, which is rather like assessing the total iron ore resource as that which has been mined and is presently in storage. If one was to assess total water deposits as rainfall, then it is likely that examining the “extractive” (drainage) techniques to show a small gain in catchment water management, major benefits could be realised.

The available water that is stored in identified groundwater reserves is only a fraction of the annual rainfall that is deposited on those same areas. Figures extracted from the Draft Natural Resource Management Strategy prepared by the Northern Agricultural Catchments Council show that less than 6% of the annual rain that falls on groundwater catchments is available from the stored groundwater. The Perth shires cover an area of over 4,083 square kilometres and receive average annual rainfall that provides in excess of 3,695 Gigalitres of water.

We need to become better at using what we already collect.

The Water Corporation, while struggling to supply 300 Gigalitres to the Integrated Water Supply System, discharges 128 Gigalitres of storm water into the Swan River each year. To pump this volume of water into a storage tank at an elevation of 100 metres up the scarp would require about 17 Megawatts of power, during the 123 days that it rains in Perth. The soon to be commissioned desalination plant will require 24 Megawatts of power (Water Corporation 2005) and will only supply up to 45 Gigalitres of water. Pumping 45 Gigalitres out of the 128 Gigalitres of storm water would require less than 6 Megawatts during the 123 rainy days.

Rooftop catchments could supplement the city’s water needs as they do in rural areas. House building approvals in Perth over the past 5 years have totalled 68,751 (ABS 2006) and if it is assumed the average roof size is 250 square metres, then 17.18 square kilometres of land has been developed as rainwater catchment. Assuming that there is an 80% recovery of an average 720mm annual rainfall, then this area could recover 10 gigalitres of quality water. To move this quantity of water into storage at an elevation of 100 metres would only require 1.3 Megawatts of power for the 123 rainy days.

Sustainable communities.

There are better options for the supply of water for Perth than to plunder resources from other parts of the state. We live in an age where “Sustainable Development” is the catch cry, yet the city residents have the support of the politicians to expand their boundaries and maintain their unsustainable lifestyles at the expense of the environment.

At the same time, rural landholders are being required to meet today’s environmental standards while fixing up the residual water management challenges that have been inherited from the unsustainable practices of the past. Landholders are largely expected to achieve this without the legal frameworks or political support that are necessary to provide long term security for their investment in long-term solutions.

CONCLUSION

Drainage systems can be developed to service many water related functions and meet any environmental standards but are difficult to alter once they are established. Internationally, drainage has been, and in many countries is still, a political issue that governments like to avoid. (Scheumann 2001) Unfortunately the natural forces that drive drainage water never cease and the problems generated by avoidance or ill-conceived “remedies” will always return to haunt society.

Solving the water problems of Western Australia will only be achieved when considering all the rainfall received as an asset. A greater appreciation of the importance of appropriate drainage systems for water harvesting as well as flood mitigation must be developed. The foundation for this will be the development of a public mind-set that values the appropriate usage of water assets. This will also require the development of the necessary political and legal frameworks to enable landholders to appropriately plan and implement long-term drainage based solutions to their water management challenges.

In the words of Shimon Peres: “I can see solutions the moment that the parties will agree to see nature as the overriding consideration – more than politics. Politics divides people, wastes energy, wastes money, wastes time. If communities will agree to handle water as it flows by nature, all of us will win, without exception.”

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