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The Shepparton Irrigation Region Strategic Plan - The Next Five Years

Strategic Planning - the Second Five Years - a Practical Application of Resource Allocation During Implementation of the Shepparton Salinity Management Plan.

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ABSTRACT

The Shepparton Irrigation Region Land and Water Salinity Management Plan, after four years of intensive planning and review, commenced implementation in July, 1990. Now, after four and a half years of experience gained from dealing with the day to day policies and practices of implementing a complex Salinity Management Plan over an area of 500,000 hectares in Northern Victoria, a Strategic Plan for the next five years is being developed. It will accommodate the output of new research and the changing needs of the Farming Community and Government and includes a detailed re-evaluation of the economic priorities of each of the Plan's major implementation Programs, in a climate of limited and competitive funding resources.

Key Words: Salinity strategic planning; Resource allocation to salinity control; Re-evaluation of salinity control priorities.

Introduction

The Shepparton Irrigation Region Land and Water Salinity Management Plan (SIRLWSMP) commenced implementation in July, 1990. This followed its release for public and Government consideration in August 1989, after an intensive planning process that commenced in 1986. The August 1989 Draft Plan became the blueprint for implementation of a salinity management plan covering some 500,000 hectares of highly productive land in the Shepparton Irrigation Region of Northern Victoria. Approximately half the land is irrigated and forms the basis for the Region's pasture based dairy industry, beef and fat lamb enterprises and a pome and stone fruit orcharding industry. There is a relatively small area of irrigated cropping (cereals, oilseeds, maize, legumes) in the Region. Significantly for the Region, private enterprise has expressed confidence in the productivity of the Region by investing \$300 million in new food processing infrastructure over the last two to three years (including Rosella, Tatura Milk, Bonlac, Nestles, Kraft, Snow Brand, Campbell's Soups). This confidence has been supported by the knowledge that both the Government and Regional Community (urban and rural) continues to invest in the protection and enhancement of the Region's natural resource

The Shepparton Irrigation Region Strategic Plan - The Next Five Years

base by way of implementation of the salinity management plan, water quality improvement programs, as well as farm productivity improvement programs through the on-going development and implementation of new technology.

The August 1989 Draft Plan

The Draft Plan was developed under the Victorian Government's *Guidelines for the Preparation of Salinity Management Plans (Aug. 1988)*, as were all 23 salinity plans developed across Victoria. The *Guidelines* set the standards for economic and financial analysis of salinity management plans and included recommendations for evaluating the economic, environmental and social accounts for use in the decision to accept or reject potential salinity mitigation options.

The August 1989 Draft Plan outlined four major programs for the management of salinity in the Shepparton Region. The Farm, Surface Drainage, Sub-Surface Drainage and Environmental Programs each outlined strategies for controlling salinity by reducing or offsetting the movement of water to the groundwater, thus controlling and reducing the adverse impacts caused by a rising water table, i.e. as the water table rises to within two metres of the surface, the risk of productivity loss due to salinisation, increases.

Each of the four major programs was developed by evaluating its application across the entire Shepparton Irrigation Region. They were not developed with a budgetary constraint in mind.

The Surface Drainage Program identified all areas where surface drainage was needed and the costs and benefits of implementing the program for the entire area were determined.

Similarly, in the Sub-Surface Drainage Program, all areas were evaluated in terms of watertable levels and groundwater quality and the type and number of groundwater pumps or other forms of subsurface drainage was estimated for the Region. This enabled an estimation of the volume of groundwater (low salinity) that was available for mixing with irrigation water to supplement the supply. It also enabled an estimation of the volume of highly saline groundwater, unsuitable for irrigation, that required disposal to the Murray River or that needed to be evaporated locally to optimise the benefits from water table control.

The Farm Program identified farm and irrigation management practices that could be applied across the Region to maximise irrigation water-use efficiency and minimise accessions of water to groundwater (accessions is the percentage of applied water, irrigation or rainfall, that passes beyond the plant rootzone). The Program also identified areas where improved management of existing saline land would be necessary, leading to possible reclamation. The cost of the Farm Program was based on estimated areas of responsive soil types, irrigation layout standard, drainage status and water table status. The benefits were based water-use savings and productivity increases due to reduced salinisation.

The Environmental Program identified the Region's sensitive environmental issues: wetlands, river and stream banks; forests; farm trees; and the need to avoid unintended adverse impacts caused by the other Programs. The Program also identified the need for a higher proportion of trees on farms across the region, aimed at providing improved fauna habitats as well as providing an additional form of vegetation that may have some impact on the rising water table. It would be fair to say that the Environmental Program suffered initially because of a general inability to adequately express the "Benefits" in "\$"

The Shepparton Irrigation Region Strategic Plan - The Next Five Years

terms. This problem is being addressed by the development of improved methodology for assessing environmental values.

1995 - What's New?

The last five and a half years has seen the Government's Response (June 90) to the Draft Plan, with the associated budgetary commitment over that period. The experience gained in implementing the Plan since July 1990 has seen a focus on setting priorities for implementing each of the Programs. The Community-based Salinity Program Advisory Council (SPAC), through its Irrigation Committee, has the power to prioritise works and expenditure and has fully accepted the responsibility for implementing the Shepparton Irrigation Region Land and Water Salinity Management Plan.

With assistance from an inter-agency, multi-disciplinary technical support committee, lead by a full-time Plan Co-ordinator, SPAC has implemented a major works and supporting research and extension program. The Implementation Strategy has included each of the above four major programs with a co-ordinated, inter-agency budget of approximately \$12 million in 1994/95. It is funded by the Victorian State Salinity Program, the Murray Darling Basin Natural Resource Management Strategy, the MDBC Drainage Program and the Federal Water Resource Assistance Program. This year (1994/95), \$1.6 million of the \$12 million total budget has come from the Regional Development Initiative announced under the Prime Minister's "Working Nation" Statement. This enables an acceleration of the Region's arterial drainage program which facilitates subsequent investment by farmers in local community drainage schemes, thus bringing forward the economic benefits of the entire drainage program. An acceleration of the Surface Drainage Program also enables farm works to proceed that are dependent on having an adequate drainage outfall for each farm. Similarly, in some areas requiring groundwater pumping(sub-surface drainage), works cannot proceed until surface drains are in place to transport the groundwater requiring disposal.

In addition to the four major works programs described above, implementation has created the need for a Monitoring and a Program Support Program. The former is a program to monitor the effectiveness of the Plan's implementation, aimed at determining the success of the salinity mitigation works relative to the "Do-Nothing Scenario". The latter Program identifies and co-ordinates the involvement of the Community with the Agencies through SPAC, Irrigation Committee and various other ad hoc technical and specific policy issues Working Groups. Program Support also deals with on-going planning and policy development issues which arise as experience from implementation grows.

The August 1989 Draft Plan reflects the state of knowledge of the salinity problem at the time and includes some assumptions based on the theoretical knowledge at the time but limited practical experience.

Since then, the Salinity Program has benefited from continuing research, investigations and monitoring which has been able to focus on those issues where the original assumptions had a theoretical but not a locally applied basis and required some local validation. From an economic point-of-view, a better understanding has been gained of the time sequencing of projects, i.e. the distribution of costs and the flow of benefits over time of the various works programs.

The budget limitations have forced all non-economists to adopt a Benefit/Cost Analysis approach to prioritising the major works programs. A considerable investment



The Shepparton Irrigation Region Strategic Plan - The Next Five Years

has been made by the Murray-Darling Basin Commission and Goulburn-Murray Water (ex. Rural Water Corporation in Northern Victoria) in developing and using the MDBC Drainage Evaluation Spreadsheet Model (DESM - Jacob et al) to economically evaluate all surface and sub-surface drainage projects across the southern Murray-Darling Basin. These evaluations have become the basis for future funding priorities. Separate evaluations have been undertaken for 23 sub-catchments within the Shepparton Irrigation Region. The results of the evaluations have been taken to the Region's farming community as part of the consultation process for the Shepparton Region's Surface Drainage Strategy. The farming community has generally accepted the works program based on the analysis.

A significant difference between the original August 1989 Draft Plan economic analysis of the Surface Drainage Program and the newly developed Drainage Strategy is that the original Program had a B/C ratio of 0.7 and the new Strategy has a B/C ratio of 2.1.

Why the difference? The original Surface Drainage Program covered an area of 336,900 hectares with the majority of the service being provided by government-owned arterial drains. The estimated capital plus operating and maintenance cost was \$246 million. This compares with the new Strategy where the intention is to provide drainage to 267,990 ha, but with a variation in the standard of service, i.e. instead of an all arterial drain service, the arterial drains will proceed as far up a catchment as is necessary to enable outfall for a network of low cost community-owned drains (approximately 1/10 to 1/5 the cost per km of arterial drains). The estimated cost of the new Surface Drainage Strategy is approximately \$94 million (cf \$246 million). The improved Benefit/Cost ratio (using a 5% discount rate) of 2.1 reflects the lower capital cost of the program and the bringing forward, in time, of the benefits. The new Program can be achieved within current budget allocations and within the life of the original Draft Plan (2020).

The Value (Benefit) of Staff Training

Implementation experience has identified time spent in community consultation as one of the major potential factors that could slow the whole program down. SPAC has recognised the need for agency staff that are highly trained in group facilitation and negotiation. In particular, the Community Drainage Officers have played a vital role in negotiating agreed drainage routes with up to 60 farmers in single projects. The officers work closely with farmers, designers, local government and private contractors and play a vital role in achieving the final outcome. It is easy to imagine that within a group of 60, or even 10 landholders, one or more could be unco-operative for what ever reason, not the least of which is that they will be required to contribute 10% of the design feasibility cost and 50% of the construction cost. The skills of these agency staff has played a major role in minimising delays by negotiating acceptable compromises between neighbouring landholders or between designers and landholders. On rare occasions where agreement can't be achieved, the case can be taken to the Administrative Appeals Tribunal for resolution. This can cause lengthy delays to the construction of a drain, leading , in some cases, to the individual project falling off the priority list. The economic consequences to that drain's catchment may be high but the Drainage Program will pick up the lost benefit in a similar priority project, elsewhere in the Region.

The Shepparton Irrigation Region Strategic Plan - The Next Five Years

Environmental Costs

A major part of all the drainage feasibility studies is an environmental assessment to ensure the works don't adversely impact on sensitive areas. This may include outfall of nutrient-rich water to a sensitive wetland or erosion of a river bank at the point of outfall to the river. If significant issues are identified, the cost of avoiding the adverse impact must be included in the total project cost which will be shared between farmers and government.

This not only applies to the Surface Drainage Program but to the Sub-Surface Drainage and Farm Programs as well. Sub-surface drainage generates volumes of saline groundwater that has to be re-used on farms or disposed of in an acceptable manner and within the Murray-Darling Basin Salt Disposal Guidelines.

The major objective of the Farm Program is achieving increased irrigation water-use and irrigation efficiency, labour efficiency and enhanced farm-based drainage, without causing adverse on or off farm impacts. These objectives are facilitated by the development of a certified Whole Farm Plan for each farm, which details the specifications for more efficient irrigation layout following detailed survey and design. It now also requires review by an environmental specialist to ensure it meets guidelines developed by SPAC, in consultation with farmers and environmental specialists. The private design consultants have learned to ensure these guidelines are met in their designs.

The MDBC Algal Management Strategy - The Goulburn/Broken Nutrient Management Strategy.

Subsequent to the August 1989 Draft Plan's release, public awareness of the impact of nutrient loads in river systems has been heightened by a significant increase in major Blue Green Algae outbreaks along the rivers and streams and in lakes within the Murray-Darling Basin. Persistent drought in the Basin's catchments has aggravated the situation.

SPAC recognised the potential impact of enhanced drainage on transporting increased nutrient loads to the Murray River and has participated actively in the development of a Drainage Strategy that is compatible with the parallel development of a Nutrient Management Strategy for the Region. SPAC Policy on farm waste disposal is compatible with Environment Protection Authority Guidelines e.g. the disposal of dairy shed effluent into community drains is unacceptable and illegal. There is common membership on SPAC Irrigation Committee and the Nutrient Strategy Working Group. Similarly, there is common membership on research project steering committees that impact on the reduction of nutrient loads whilst providing an acceptable drainage service. The Shepparton Salinity Plan Co-ordinator has cross membership of many of these groups. SPAC is very conscious of the concerns of communities which are downstream of the Shepparton Irrigation Region, e.g. Echuca, NSW Murray Valley, Kerang and, eventually, all communities on the way to Adelaide.

Although there may be some additional cost associated with linking the Salinity and Nutrient Strategies, there will also be additional benefits that were not allowed for in the Draft Plan. The real test for SPAC and its technical support groups is to incorporate the major recommendations of the developing Nutrient Strategy into the existing Salinity Implementation program at no major additional cost.

The Shepparton Irrigation Region Strategic Plan - The Next Five Years

Sustainable Regional Development

The Prime Minister's "Working Nation - Policies and Programs" statement on 4th May, 1994 targeted the Shepparton Region as a Case Study for Regional Development initiatives. In due recognition of the high productivity of the Region and the large investment by food processors in recent years, the protection of the Region's natural resources used in food production was identified as a high priority. A local working group comprising of representatives from food processors, farming industries, SPAC, Local Government, small business and government agencies developed a portfolio of possible projects that would enhance regional development and employment options. The group identified the need to accelerate the Salinity Program's Arterial Drainage Program as it would enable a major increase in private investment in all the other major Programs, with associated bringing forward of the benefits, as discussed earlier. The "PM's Statement" allocated approximately \$2.0 million per year, for three years, to the Region, with \$1.6 million per year being allocated to accelerating the arterial drain construction program. The balance has been allocated to projects such as those which lead to improved water quality to the food processing industry, improved information technology to industry and associated planning requirements.

Natural Disasters

Events, such as the October 1993 flood, which seriously affected many farmers in the Region, serve to remind the Community of the importance of an effective surface drainage system in the relatively flat Riverine Plains environment. Following the floods, there were many farmers who would have voluntarily invested in private drainage schemes had there been an acceptable outfall for their drainage water. Lack of outfall and, hence, the need for an accelerated arterial drain construction program made allocation of the Regional Development funds an easy decision for the Region's Community.

The October flood also highlighted the need for the Salinity Program to have a high degree of in-built flexibility to enable the priorities to be adjusted as climatic or other conditions impact on the ability to implement the various programs. The flood prevented access to many farms for surveyors for Whole Farm Plans and Community Drains. Most of the Department of Agriculture's staff, who conducted the farmer consultation process in the Salinity Program, were co-opted to help in flood recovery operations, thus causing a delay in the whole implementation program.

Financial Management of the Program

Within the Salinity and Drainage Program there is a requirement for quarterly reporting of all projects against physical and financial targets. Early warning of an inability to meet targets can enable resources to be redirected to a high priority project within the total portfolio of some 90 projects associated with the Shepparton Plan. With a drought following the flood, field moisture conditions allowed arterial drain construction to continue up to and beyond June 30th, 1994. SPAC and Government have an agreed process for re-allocation of funds across the Plan which provides a high degree of flexibility in management and enables funds to be directed to projects which are capable of using the funds and provide the highest Benefit/Cost ratio.

The Shepparton Irrigation Region Strategic Plan - The Next Five Years

Where to Now - The Strategic Plan - The Next Five Years.

Although this paper has concentrated on the Surface Drainage Program of the Shepparton Land and Water Salinity Management Plan, the level of detail in that Program has been duplicated in the other Programs. Each of the six Programs have:

- a Program Goal;
- a series of Sub-Goals or Objectives;
- a list of Supporting Principles and Policies developed by SPAC which drive the Program;
- Targets and Actions to achieve the Goals;
- Linkages with other Programs (internal and external to the Plan);
- A Five Year Works program showing:
 - A Timetable with Priorities clearly stated
 - Resource Needs - Human, Material, Financial
 - A detailed Five Year Integrated Budget
 - Project and Program Management, Co-ordination and Reporting requirements
- A Summary of the Program's Economics - with major assumptions;
- A Cost Sharing Statement;
- Source of Funds.

All of the above takes into consideration all the experience gained since implementation commenced in July, 1990, as well as the linkages with other natural resource management programs being undertaken in the Region. A Policy Document and a series of detailed Operational Manuals have been published to guide the implementation of all the Programs.

The future success of the Salinity, Land and Water Program in the Shepparton Irrigation Region will depend on SPAC Irrigation Committee's ability to continue to demand a high standard of evaluation of the technical, economic, socio-political and environmental issues they face as implementation continues. The newly created Goulburn/Broken Catchment and Land Protection Board, which now oversees the Shepparton Salinity Plan, will benefit from and appreciate being offered a well directed and managed Salinity, Land and Water Plan which identifies its priorities clearly and makes supporting its needs in wider forums easier.

The Shepparton Irrigation Region Strategic Plan - The Next Five Years

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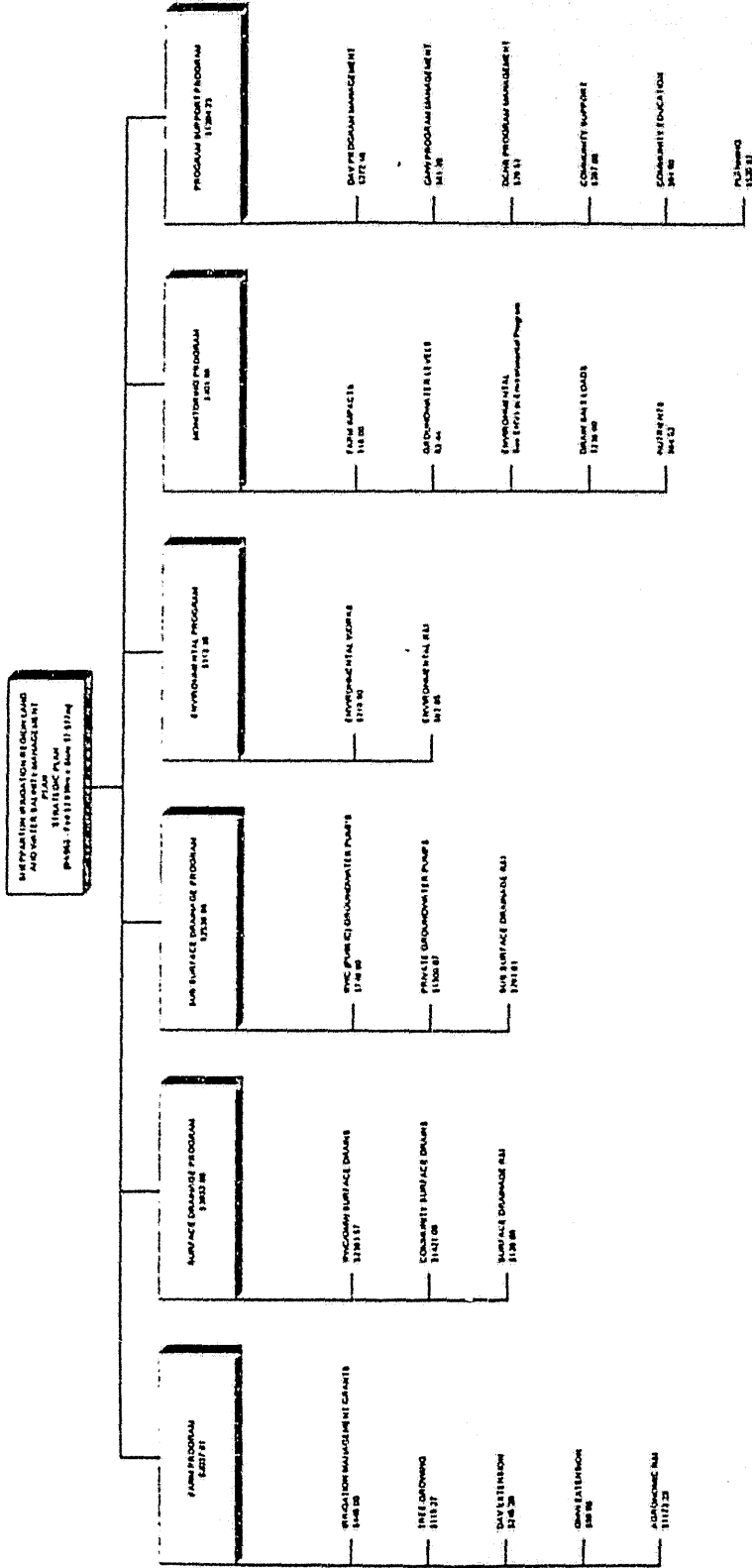
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MDBC, Evaluation of the Economics of Drainage Projects, Natural Resources Management Strategy Drainage program Technical Report No.2, October 1994.

SIRLWSMP STRATEGIC PLAN



1994/95 to 1998/99 (94/95 Budget shown \$ 000's)

| GOAL | Principle/Policy Documentation | Ref |
|------|--|--------------------|
| 2.1 | Community Surface Drainage (CSD) will only be constructed where there is suitable outfall. | 5 p 51. |
| 2.2 | CSD schemes are required to accept groundwater into their drains from Sub Surface drainage works where it is the most appropriate option. | 5 p 53. |
| 2.7 | In the long term RWC drains are to be limited in depth to minimise salt inflow due to groundwater seepage into the drainage system. New drains should not be deeper than 1.5m below the general depression grade line. | 2 p 57. 3 p 55. |
| 2.3 | Design standards of RWC drains in pasture and Soil cropping areas of 1:2 rainfall return period are recommended. Higher standards may be justified in Horticultural areas. | 4 p |
| 2.3 | RWC drains are to be constructed in areas where intensive irrigation takes place, high value crops are grown, outfall facilities are required (for community drains, groundwater pumps or tie drains), environmental sensitivity exists. | 2 p 54. |
| 2.4 | Proposed CSD schemes require an initial inspection by DCNR staff to determine whether an environmental assessment is required. | 5 p 52. |
| 2.4 | CSD incentives will not be available for the drainage of wetlands unless the works are part of a Govt supported SMP. | 5 p 53. |
| 2.4 | A planning permit is required from the local municipality where a CSD might disturb native vegetation. | 5 p 53. |
| 2.4 | RWC and DCPL approval is required prior to any construction of Community drainage schemes. | 2 p 84. |
| 2.4 | Wherever possible, Regional drainage works will be carried out such that Environmental values are maintained at least at current base level and further Environmental degradation prevented. | 2 p 59. |
| 2.4 | Wetlands rated as having high conservation value will not be degraded by drainage works unless a compelling public interest has been demonstrated. | 2 p 49. |
| 2.4 | Landholders are to be encouraged to include Flora and Fauna enhancement and protection as a component of farm works associated with drainage systems. | 2 p 49. |
| 2.4 | In protecting the environmental values of wetlands, tree plantations and Flora and Fauna habitat, the provision of regulation to manipulate the level of water in the wetlands may be assessed. | 2 p 49. |
| 2.4 | Where practical and economically justified, drains to low containing high levels of nutrients, salts or environmentally detrimental chemicals should be isolated from wetlands. | 2 p 93. |
| 2.5 | The Government will provide the Capital for initial construction of RWC drains, however the community is requested to pay operation, maintenance and current cost depreciation charges. | 1 p 26. |
| 2.5 | The Government will provide grants for 90% of the cost of survey and design, and 50% of construction costs for community drains. | 1 p 26. |
| 2.5 | CSD's funded by the Program must be carried out by suitably qualified experienced consultants to specified minimum design standards. | 5 p 51. |
| 2.5 | Funding for CSD's will not be given to unincorporated drainage groups. | 5 p 52. |
| 2.5 | To meet the costs of maintenance and management, landholders benefiting from the drainage works are charged at a rate according to their benefits. | 5 p 53. |
| 2.5 | The desirable maximum length of a community drainage line is 10 Km for each drain, as these drains rely on community expertise and good will. Longer community drains than 10Km should be considered. | 2 p 85. 1 p 26. |
| 2.5 | Economic evaluations are to be carried out on a catchment by catchment basis and consider all drains in a catchment as a package. Other things being equal, the Government will give preference to surface drainage packages with the best economic returns. | 1 p 26. 1 p 26. |
| 2.5 | The surface drainage program is based on community driven projects with the local community determining construction priorities and standards of service to be provided. | 2 p 47. |
| 2.5 | Community drains are to be designed to accommodate 1:2 rainfall events. | 2 p 85. |
| 2.5 | Community drains should bear a proportion of the operation, maintenance and depreciation costs of RWC drains in the same catchment. Each catchment will have it's own individually calculated RWC drainage tariff. | 1 p 26. |
| 2.5 | RWC drainage levies are to be imposed to cover the costs of landholders using RWC channels for drainage outfall. | 2 p 86. |

References:

- 1) Government response to Salinity management plans.
- 2) Draft SIRLWSMP 1989.
- 3) Draft surface drainage strategy (June 1989).
- 4) GHED review of RWC drainage standards.
- 5) SIRLWSMP Policies (1994)
- 6) Irrigation and Drainage Practices (RWC 1988).

A RWC POL

SIRLWSMP Strategic Plan: Surface Drainage Program.

SUMMARY OF PROPOSED WORKS BY DRAINAGE AREAS AND CATCHMENTS.

| CATCHMENT | AREA OF CATCHMENT (Ha) | AREA REQUIRING DRAINAGE (Ha) | RWC DRAIN REMODELLING LENGTH (Km) | RWC DRAIN NEW DRAINS LENGTH (Km) | COMMUNITY DRAINS LENGTH (Km) | DRAIN COURSE DECLARATIONS LENGTH (Km) |
|---------------------------------------|------------------------|------------------------------|-----------------------------------|----------------------------------|------------------------------|---------------------------------------|
| 1. LOCKINGTON | 20440 | 5400 | 4.2 | | 76.8 | 120.0 |
| 2. BAMAWM | 14920 | 1740 | | | 17.0 | |
| 3. WHARPARILLA | 9470 | 2830 | | | 24.7 | |
| 4. CAMPASPIE | 11180 | 7305 | | 2.3 | 58.6 | 20.0 |
| 5. STRATHALLAN | 9240 | 4360 | | | 25.0 | |
| ROCHESTER DRAINAGE AREA | 65250 | 21725 | 4.2 | 2.3 | 202.1 | 140.0 |
| 6. DEAKIN | 46230 | 20560 | 23.0 | 19.7 | 160.5 | |
| 7. COROP LAKES | 48620 | 38850 | | 41.0 | 135.0 | 143.0 |
| 8. TONGALA | 14930 | 2160 | | | 14.1 | |
| 9. MOSQUITO | 41990 | 29275 | | 66.3 | 326.2 | 20.0 |
| 10. COHAM | 7100 | 1660 | | | 19.1 | |
| 11. WYUNA | 22750 | 11070 | 9.5 | 2.9 | 150.3 | |
| 12. RODNEY | 17230 | 10650 | 20.5 | 10.7 | 110.0 | |
| 13. COOMBOONA | 15360 | 8900 | 1.0 | | 63.3 | 10.0 |
| 14. ARDMONA | 9420 | 3460 | | 0.5 | 40.6 | |
| 15. TOOLAMBA | 8750 | 4410 | | | 74.9 | |
| CENTRAL GOULBURN DRAINAGE AREA | 236370 | 133025 | 54.3 | 141.1 | 1994.6 | 173.0 |
| 16. KIALLA | 17110 | 5050 | | | 51.5 | 48.0 |
| SHEPP SOUTH DRAINAGE AREA | 17110 | 5050 | | | 51.5 | 48.0 |
| 17. SHEPPARTON | 9800 | 540 | | | 2.4 | |
| 18. TALLYGAROPNA | 37110 | 27500 | 120.0 | 43.0 | 199.4 | 82.4 |
| 19. INVERGORDON | 19180 | 5450 | | | 24.4 | |
| 20. KAARIMBA | 8900 | 5830 | | 2.4 | 48.0 | |
| SHEPP NORTH DRAINAGE AREA | 74990 | 39350 | 120.0 | 45.4 | 274.2 | 82.4 |
| 21. BARMJH/NATHALIA | 55200 | 27340 | 2.0 | 47.9 | 188.1 | 71.0 |
| 22. STRATHALLAN | 33630 | 8310 | | 9.0 | 72.5 | |
| 23. MUCKATAH | 40040 | 33190 | 120.0 | 64.0 | 105.6 | 120.0 |
| MURRAY VALLEY DRAINAGE AREA | 128870 | 68640 | 122.0 | 120.9 | 366.2 | 191.0 |
| REGION TOTALS | 522590 | 267990 | 300.5 | 309.7 | 1988.0 | 634.4 |
| | | | 51% | | | |

Table S.1 Summary of Results of Economic Evaluation on a Subcatchment Basis - 5% Discount Rate (\$ Million)

| Subcatchment | Present value of benefits | | | | | Total Benefits | Present value of costs | | | Total Cost | NPV | B/CR |
|----------------|---------------------------|---------------|----------|-------|-------|----------------|------------------------|------|-------------|------------|-------|------|
| | Salinity | Water-logging | Flooding | Reuse | Rowls | | Capital | O&M | Down-stream | | | |
| Lockington | 0.9 | 0.8 | 0.7 | 0.9 | 1.5 | 4.7 | 1.9 | 0.5 | 0.0 | 2.3 | 2.3 | 2.0 |
| Hamawin | 0.6 | 0.2 | 0.4 | 0.4 | 0.7 | 2.4 | 0.2 | 0.1 | 0.0 | 0.3 | 2.0 | 7.2 |
| Wharparilla | 0.6 | 0.8 | 0.9 | 1.1 | 2.7 | 6.1 | 0.8 | 0.3 | 0.0 | 1.2 | 5.0 | 5.3 |
| Campaspe | 0.8 | 0.6 | 0.9 | 1.1 | 1.9 | 5.3 | 1.3 | 0.3 | 0.0 | 1.6 | 3.7 | 3.4 |
| Strathallen | 0.1 | 0.4 | 0.4 | 0.4 | 0.6 | 1.8 | 0.4 | 0.1 | 0.0 | 0.5 | 1.4 | 3.8 |
| Deakin | 3.9 | 1.9 | 4.9 | 3.5 | 7.3 | 21.6 | 6.9 | 0.8 | 0.0 | 7.8 | 13.9 | 2.8 |
| Corop Lakes | 0.8 | 2.0 | 5.1 | 2.6 | 6.3 | 16.8 | 6.4 | 0.9 | 0.0 | 7.3 | 9.5 | 2.3 |
| Tongala | 0.1 | 0.2 | 0.2 | 0.2 | 0.3 | 0.9 | 0.3 | 0.1 | 0.0 | 0.3 | 0.6 | 2.7 |
| Mosquito | 6.1 | 2.0 | 8.0 | 5.5 | 9.7 | 31.3 | 16.3 | 1.8 | 0.2 | 18.3 | 13.0 | 1.7 |
| Coram | 0.6 | 0.2 | 0.4 | 0.4 | 0.5 | 2.1 | 0.4 | 0.1 | 0.0 | 0.4 | 1.6 | 4.6 |
| Wyuna | 1.5 | 0.8 | 1.5 | 2.1 | 4.1 | 10.0 | 4.4 | 0.8 | 0.0 | 5.2 | 4.8 | 1.9 |
| Rodney | 1.3 | 0.8 | 2.5 | 1.5 | 3.7 | 9.9 | 4.3 | 0.6 | 0.0 | 4.9 | 5.1 | 2.0 |
| Coomboona | 0.0 | 0.5 | 0.7 | 0.7 | 1.3 | 3.1 | 1.7 | 0.3 | 0.0 | 2.0 | 1.1 | 1.6 |
| Ardmona | 0.1 | 0.1 | 0.5 | 0.7 | 2.8 | 4.2 | 2.9 | 0.2 | 0.0 | 3.2 | 1.0 | 1.3 |
| Toolanba | 0.2 | 0.2 | 0.8 | 0.5 | 0.8 | 2.5 | 1.7 | 0.4 | 0.0 | 2.1 | 0.4 | 1.2 |
| Kialla | 0.0 | 0.4 | 0.4 | 0.7 | 1.7 | 3.2 | 1.7 | 0.4 | 0.0 | 2.1 | 1.2 | 1.6 |
| Shepparton | 0.0 | 0.0 | 0.1 | 0.1 | 0.3 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 11.6 |
| Tallygaroopna | 0.1 | 2.0 | 3.3 | 2.8 | 7.3 | 15.6 | 8.7 | 1.1 | 0.1 | 10.0 | 5.6 | 1.6 |
| Invergordon | 0.5 | 0.5 | 1.1 | 1.2 | 1.7 | 5.0 | 0.5 | 0.1 | 0.0 | 0.6 | 4.4 | 8.6 |
| Karimba | 0.0 | 0.1 | 0.5 | 0.6 | 1.0 | 2.2 | 1.2 | 0.3 | 0.0 | 1.4 | 0.8 | 1.5 |
| Barra/Nathalia | 1.8 | 1.4 | 3.7 | 2.3 | 7.4 | 16.6 | 8.9 | 1.1 | 0.0 | 10.0 | 6.6 | 1.7 |
| Strathmoreton | 1.9 | 1.0 | 1.9 | 0.9 | 2.6 | 7.3 | 2.2 | 0.4 | 0.0 | 2.6 | 4.7 | 2.8 |
| Muckatah | 0.7 | 1.8 | 5.6 | 2.3 | 10.9 | 21.2 | 9.2 | 0.9 | 0.0 | 10.1 | 11.1 | 2.1 |
| TOTAL | 21.6 | 19.0 | 44.3 | 32.6 | 76.9 | 194.4 | 82.1 | 11.6 | 0.3 | 94.1 | 100.3 | 2.1 |
| PERCENTAGES | 11% | 10% | 23% | 17% | 40% | 100% | 87% | 12% | 0% | | 100% | |

[Rounding errors may occur]

Source: MDBC Drainage Program
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