Appendix F: Discussion on cost sharing

F1 Programs addressing irrigation salinity

F1.1 Irrigation Farm Planning

Currently, there are financial incentives offered to landowners to compile Irrigation Farm Plans in irrigated areas within the Macalister Irrigation District and surrounds. The current landowner rebate is 75% of the cost of a Farm Plan to a maximum of $82.50 per hectare plus GST. This rebate has increased from 50% in July 2001 to increase the uptake rate. The current rebate of 75% is higher than similar programs in the Shepparton Irrigation Area (50%) and lower than the Kerang area (85%).

The public benefits of Irrigation Farm Planning include the in-direct effects on:

- Land salinity;
- Surface water salinity including downstream wetlands;
- Nutrient levels in rivers and the Gippsland Lakes; and,
- Water savings.

Irrigation Farm Plans help to build the capacity of landowners to address the off-site impacts.

Since Irrigation Farm Planning is the overarching planning tool advocated in this salinity plan and the MID Nutrient Reduction Plan, a reasonably high level of rebate to landowners is justified. This plan recommends that the rebate for Irrigation Farm Plans be set based on a combination of the required uptake rates and the public benefits they achieve.

The current higher incentive for Whole Farm Plans relative to some parts of Northern Victoria is based on the following justifications:

- Irrigation Farm Plans are generally more expensive in the Macalister Irrigation District than in Northern Victoria due to the greater undulation and larger variety of soil types requiring different irrigation rates.
- Irrigation farm plans are an integral part of the reduction in nutrients to the Gippsland Lakes. The lakes are a major asset of the region and nutrient reduction is a major priority as stated in the West Gippland Regional Catchment Strategy (WGCMA, 2004). GHD (2004) conclude that the financial incentives provided for irrigation farm plans is creating and nuturing a culture of best management irrigation practices in the Macalister Irrigation District. This culture was generally absent prior to the introduction of the incentives scheme.
- Uptake rates were very low when the incentive was set at 50% but has increased dramatically once the incentive was increased to 75%. This suggests the threshold for farmers to take up the incentives is somewhere between 50% to 75% incentive.
- If the cost share were to be reduced, this would send a negative message to the community and undermine the momentum gained over the last few years.

Based on the above discussion, the salinity management plan makes the following recommendations:

- That the financial incentive for irrigation farm plans remain at their current level of 75% of the cost of an Irrigation Farm Plan to a maximum of $82.50 per hectare plus GST with the maximum cost adjusted for inflation on an annual basis;
- That the incentive for Irrigation Farm Plans be available in all areas where the implementation of irrigation farm plans will provide nutrient benefits to the Gippsland Lakes, salinity benefits and water savings. Without any one of these three public benefits, the justification of public investment is weakened. Such a policy would allow the incentives to be provided in all irrigated areas within the Gippsland Lakes Catchment which are vulnerable to salinity (all salinity management areas except Port Albert, Foster and Trafalgar);
- That a review be conducted into the barriers to the adoption of irrigation farm plans and spray irrigation be conducted in the first year of the plan; and
- That the cost share recommended in this plan be reviewed in the third year of plan implementation taking into account the uptake rates and any new information on the public benefits. It is important that the cost sharing and associated assumptions as well as the content of farm plans is reviewed to ensure they include all required components so as to ensure justification and cost shares remain accurate.

F1.2 Irrigation management program – conversion from flood to spray irrigation

The calculations in Section 6.4.3 demonstrate a clear economic case for the conversion from flood to spray irrigation on high permeability soils using either lateral or centre pivot irrigation. As discussed in Section 6.9.1, the cost share between Government and the landowner wishing to undertake the on-ground works should primarily be based on the split between public and private benefits with consideration also given to the economic viability of the action from the landowners perspective and uptake rates.

Public and private benefits

The key public and private benefits for the conversion of flood to spray irrigation are listed in Table 87.

- **Table 87: Benefits associated with flood to spray irrigation conversion**

Benefit	Quantified in economic calculations presented in Section 6.4.3?	Private or public
Production benefits achieved from growing more pasture on the same irrigated area	Yes	Private
Water savings benefits achieved from greater irrigation efficiency	Yes	Predominantly Private (see Note 1)
Nutrient benefits achieved by the reduction in nutrient rich runoff from irrigated pastures, the consequent reduction in nutrient loads to the lakes and the decrease in algal blooms in the lakes.	Yes	Public
Production benefits achieved through decreased down-gradient salinity resulting from decreased in-situ groundwater recharge.	Yes	Public (see Note 2)
Decreased pressures on families resulting from the reduced labour demands of centre pivot spray irrigation (less so with lateral spray irrigation);	No	Public (see Note 3) and Private
Decreased wetland salinity in areas down-gradient from irrigated areas (especially the RAMSAR listed Lake Wellington wetlands	No	Public
Increase in overall environmental amenity of the area including reduction in land salinity and algal blooms in the lakes. These are in addition to the economic benefits of reduced land salinity and algal blooms discussed above	No	Public

1. Saved water can either be used on farm (private benefit), traded (private benefit), or be used to increase security of supply (private benefit with some public benefit associated with increased river flow).
2. Production benefits occur on private land but generally on a different property to where the action is being implemented or the problem is being caused. The action is addressing a public problem of social inequity between the polluters (irrigators) and those being affected and is therefore, assigned as a public benefit.
3. Public benefit resulting from decreased pressures on public services such as the health and welfare system

Table 88 shows the public and private proportion of the overall benefits for the quantifiable benefits only using the information from the above table and the economic calculations in Table 22.

- **Table 88: Percentage of private and public quantifiable benefits of overall quantifiable benefit**

	Using a 4% discount rate		Using a 8% discount rate	
	Conversion to Lateral Spray	Conversion to Centre Pivot	Conversion to Lateral Spray	Conversion to Centre Pivot
Public salinity and nutrient benefits as % of total benefits	7%	7%	7%	6%
Private benefits as % of total benefits	93%	93%	93%	94%

NB: This analysis does not include the unquantifiable benefits listed in Table 87.

Economic viability from irrigators perspective

As suggested above, the economic viability of flood to spray irrigation from a landowners perspective needs to be taken into account when determining the appropriate cost share. Ideally, a full financial analysis should be undertaken including tax and depreciation factors. Such an analysis has not been conducted. However, there are several pointers to the viability of the conversion of flood to spray irrigation including:

- A study by Wood *et al*., (2002) which showed that flood irrigation on high permeability soils in the Macalister Irrigation District had a higher return on investment ($21,382/ha) than lateral spray irrigation ($19,876/ha) and centre pivot spray irrigation ($20,049/ha). This study did not take into account the potential increase in production achieved from spray irrigation (estimated between 0 and 25%) nor the current incentives offered to convert from flood to spray irrigation. Also, the study assumed that water is available in unlimited volumes at a price of $33/ML which is not the case any more nor is it likely to be the case in the future. Nonetheless, the study suggests that the returns on flood and spray irrigation are comparable; and
- The uptake rates of the current incentives program to convert farmers from flood to spray irrigation. To date, the uptake rates for spray irrigation through the current incentives program have been approximately 355ha/year which is below the target of 800ha/yr. GHD (2005) suggests that a 15% rebate may be too low to convince farmers to move away from flood systems given the other perceived or real barriers to adoption. The barriers to adoption of spray irrigation are not well understood and there is a strong need for additional investigation into the reasons for the current low adoption rate. There are potentially many reasons for the lower than expected uptake rate other than lack of financial viability including the substantial time taken for Irrigation Farm Plans to be developed before the incentives can be accessed and the current lack of landowner disposable income due to the current period of dry climatic conditions.

There is enough doubt in the evidence provided above about the economic viability of spray irrigation from a landowner's perspective (even with the current rebates available) to warrant further investigation.

Recommendation on cost share

The calculations above suggest approximately 7% of the **quantifiable** benefits are public. This assumes that all of the saved water is used on farm and is therefore, a private benefit. In reality, some of the saved water will be used to increase the security of supply and will only be used during dry years. Therefore, of the **quantifiable** benefits listed in Table 87, 7% public benefits is considered a minimum. If the **unquantifiable** benefits associated with salinity, nutrient and social impacts are included, the overall proportion of public to private benefit is likely to be in the range of 10% to 20% although it is impossible to accurately estimate.

This plan recommends that the current incentive for flood to spray conversion remain at 15% of the capital costs to a maximum of $410/ha (plus GST) indexed for inflation annually based on the following justifications:

- A rebate of 15% is consistent with the estimated proportion of public benefits associated with flood to spray irrigation conversion;

- The current rebate per hectare of spray irrigation conversion is approximately equivalent to the rebate offered for the installation of re-use systems per unit catchment area thus providing an element of consistency and fairness to the overall program. The water and nutrient savings per unit area of spray irrigation converted and per unit catchment area of re-use system installed are approximately equivalent; and
- Landowners are generally comfortable with the current rebate as demonstrated by views expressed at a meeting of invited community members on the 18th April, 2005.

Currently, there is no justification for an increase in the rebate based on uptake rates until a thorough analysis is conducted into the barriers to the adoption of spray irrigation.

This plan also recommends that the current incentives be available in all areas where the implementation of irrigation farm plans will provide nutrient benefits to the Gippsland Lakes, salinity benefits and water savings. Without any one of these three public benefits, the justification of public investment is weakened. Such a policy would allow the incentives to be provided in all irrigated areas within the Gippsland Lakes Catchment which are vulnerable to salinity (all salinity management areas except Port Albert, Foster and Trafalgar). All extension activities promoting the incentives program should target irrigators on the higher permeability soils where there are the greatest salinity, nutrient and water savings benefits achieved from the conversion of flood to spray irrigation.

To provide greater clarity on the appropriate cost share and financial viability of flood to spray irrigation conversion, this plan recommends the following:

- That the economic viability to the landowner of flood to spray irrigation conversion be investigated including a full financial analysis of tax and cash flow implications. This is important to ensure that Government is encouraging and investing in activities which provide a financial benefit to the landowner;
- That an analysis of the barriers to the adoption of spray irrigation be undertaken to determine the reasons for the currently low uptake rates; and
- That the cost share recommended in this plan be reviewed once the barriers to adoption have been investigated and the financial analysis is complete.

F1.3 Sub-surface drainage Program

Given the results of the economic analysis, it is likely that only high value land (or potentially other high value assets) would be warranted for public investment in the future. The owners of the protected land and assets would be the potential beneficiaries of a pumping scheme, and would be easily identifiable. However, from an equity perspective it is important to consider whether these landholders should be required to pay for salinity losses that may be partly a result of land management practices in areas outside of the pumping sites.

Public Groundwater Control Pumping Program

The investigation and installation costs for Groundwater Control Pumps has been State Government funded based on the public benefits of reduced salinity impacts on infrastructure, communities, wetlands, water quality etc. This plan does not recommend any changes to this arrangement.

The costs of operation and maintenance of public groundwater control pumps are currently shared between Local Government and irrigators. The irrigators are charged through a $0.40/ML charge on their water use. The costs covered by this arrangement include operating costs, monitoring, maintenance, capital replacement contributions, and a management fee for Southern Rural Water. The share of the contribution is based on the proportion of dryland and irrigated land protected, with a contribution of 80:20 for irrigated land protected, and 20:80 for dryland areas protected, paid by the irrigators and Local Government respectively. The actual percentage Local Government pays each quarter varies depending on which pumps have been operating, but is approximately 36 - 38 % of the total operation and maintenance cost (J. Wheaton, SRW, *pers. comm.,* 2004).

As the majority of salinity in the dryland areas around the Public Groundwater Control Pumps is irrigation-induced, from a 'polluter-pays' perspective there is a case for increasing the share of costs paid by irrigators for the protection of adjacent dryland areas. This approach can be referred to in economic terms as internalising the external costs of irrigation, or, in other words, encouraging an efficient level of irrigation by passing the off-site costs of irrigation to irrigated landholders. If this approach is accepted, and given that irrigation provides indirect benefits to all members of the local community, then instead of a 20:80 share for protection of dryland areas, this plan recommends a share of 80:20 irrigator to public funding for all areas protected including dryland. In practice, there would need to be justification that irrigation was contributing to the salinisation of the areas selected for pumping, and demonstration that the protection of dryland areas is justified from an economic perspective, in order to ensure the appropriate use of public and private funds. Where it can adequately be determined who is contributing to the problem the 'polluter-pays' approach should be used. However, where the salinity is being caused by diffuse actions, the 'beneficiary pays' approach is more justified.

Private Pump Program

For private pumping, the Targeted Exploratory Drilling Scheme (TEDS) subsidy currently covers all costs incurred in the exploratory drilling program, excluding a deposit of $825 paid by the landowner. If the drilling program is unsatisfactory, the landowner's deposit is returned. If successful, the landowner has two years to install a pumping system. If the system is not installed over this period, the landowner incurs an additional 25% of the total costs of the investigation, up to a maximum cost of $3,500.

Landowners who install a groundwater pumping scheme are eligible for financial incentives from government under the Capital Grants Scheme. Landowners receive a once-off payment equal to the lesser of:

- $200 per ML of groundwater that can safely be used on the property annually;
- 65% of the total cost of installation; or
- $15,000

Most landowners have received the maximum payment of $15,000 per property due to the high costs involved with setting up spear-point systems and connecting power (J. Wheaton, SRW, *pers. comm.*, 2004).

The costs and benefits of the private pumps from a landholder's perspective, based on preliminary assumptions regarding construction costs, are outlined in Table 89. Again, it should be noted that the information in this table does not consider financial aspects such as potential taxation benefits, and is only a split of those economic costs and benefits attributed to a landholder plus the incentive payment. As such the figures should be considered as indicative only. As shown, the subsidy is sufficient to encourage private use of pumps, but does not appear to be too excessive from a public viewpoint. The analysis assumes that no direct on-farm productivity benefits (due to reduced land salinisation) are expected for the landholder operating the pump.

Table 89: Estimated Costs and Benefits of the Private Pump Program from a Landholder Perspective

Item	Present Value* of Private costs per pump installed
Costs	
Investigation	$ 825
Installation	$ 48,000
Operation and Maintenance	$ 28,000
Benefits	
Water use	$ 67,000
Current subsidy (maximum)	$ 15,000
Net Present Value**	$ 6,000

*30 year analysis period, 8% discount rate.

** Analysis is based on components of economic assessment attributed to a private landholder, plus subsidy payment, however does not consider financial aspects such as taxation. Excludes potential on-farm production benefits.

Based on the above preliminary assessment of private groundwater pumps, it is recommended that the current cost-sharing arrangements continue, provided there is economic justification in terms of the value of assets protected.

F1.4 Surface drainage program

Although community drainage schemes provide some public benefits through decreased land salinity in the region, most of the benefits for these local drainage schemes are expected to be private. Therefore, most of the costs associated with these drains should theoretically be borne by landowners. However, there is scope for public investment in aiding landowners plan and implement drainage schemes. Also, if the schemes avoid the implementation of a public groundwater control pump, then there may be justification for public investment in the capital cost of new drainage schemes. This may apply in areas where drainage problems may have been exacerbated by nearby irrigation and there may be strong social reasons for community assistance to construct surface drains if this is deemed to be the best course of remediation for that site.

F1.5 Living with Salt

The planting of salt tolerant crops and pastures to rehabilitate saline land has little or no off-site benefit. Therefore, if this strategy is used on agricultural land, the benefit is primarily private and should be privately funded. However, there is justification for public investment in extension advice as part of the Government's role in supporting the agricultural industry.

The economics of alternative uses of saline land and water such as aquaculture have yet to be investigated. However, there may be opportunities to further share the costs of public groundwater control pump operation with private enterprise such as aquaculture that utilise the pumped saline water.

F2 Programs addressing dryland salinity

Of the five recommended programs to address dryland salinity, the cost sharing arrangements are discussed only for the tree program. The other options need to have detailed economic and cost sharing analyses undertaken as part of the research and investigation phase of the proposed projects. There is not enough information currently available to allow a detailed cost sharing approach to be determined, so the generalised cost sharing approach detailed in Section 6.9.1 should be used.

F2.1 Tree Program

Inevitably, growing trees for profit will often conflict with planting trees for maximum environmental benefit. There is a need to encourage farmers through financial incentives and rewards to forgo economic returns to enhance environmental benefits. Public investment in such schemes can be justified based on the public environmental benefit achieved through strategic tree planting. A thorough economic study is required to identify the potential public and private benefits achieved through commercial tree growing and appropriate cost sharing arrangements. Such a study is currently being planned by Gippsland Private Forestry Inc.

There are existing programs established to provide landowners with financial incentives to protect existing native vegetation and revegetate environmentally significant areas (eg Bush Tender program). This plan recommends the continuation of the current cost sharing arrangements for the encouragement of tree planting for environmental purposes and the protection of native vegetation. For instance, Greening Australia currently receives $25,000 per year from the State Government for on-ground revegetation works. Corporate sponsorship from Mission Energy provides an additional $100,000 of which $35,000 goes towards on-ground works with the remainder going towards project management. The $60,000 for on-ground works is used to provide incentives of 50% towards the cost of revegetation works on private land. This includes tube stock, seed, labour and site preparation. $1.50 per metre is also provided for all fencing.

F3 Programs addressing ocean induced salinity

No cost sharing analysis has been undertaken for the ocean induced salinity management options. A detailed economic analysis and cost sharing approach will need to be undertaken as part of the recommended feasibility study into these options. The generalised cost sharing approach detailed in Section 6.9.1 should be used.