Australian Government

Department of the Environment, Water, Heritage and the Arts

WATER for the FUTURE

Improving On-farm Irrigation Efficiency

March 2009

IMPROVING ON-FARM IRRIGATION EFFICIENCY

The Australian Government acknowledges farmers achievements in water conservation and the steps taken to adjust to climate change, but more must be done to ensure a sustainable future for irrigated agriculture, especially in the Murray-Darling Basin.

Water for the Future is the Australian Government's $12.9 billion plan to secure the long-term water supply for all Australians. *Water for the Future* focuses on four key priorities: taking action on climate change; using water wisely; securing water supplies; and supporting healthy rivers. Improving on-farm irrigation efficiency can make a significant contribution to these four priorities. The *On-farm Irrigation Efficiency (Pilot Projects) Program* is part of the $5.8 billion Sustainable Rural Water Use and Infrastructure component of *Water for the Future*.

The Australian Government is funding projects under the *On-farm Irrigation Efficiency (Pilot Projects) Program* to evaluate the effectiveness of delivery models in achieving improved irrigation efficiency, and generating water savings to enhance environmental flows within the Murray Darling Basin.

The experience gained through the assessment phase of the *On-farm Irrigation Efficiency (Pilot Projects) Program* and the implementation of a suite of pilot projects will provide important information relevant to future on-farm projects for which funding may be sought through the State Priority Projects and Private Irrigation Infrastructure Operators Projects.

Irrigation sprinklers (A Tatnell, DEWHA)

Crop under irrigation (T J Ierino & DEWHA)

Why is it important to improve on-farm irrigation efficiency?

Irrigated agriculture accounts for about 70 per cent of all water use in Australia. This water is not used as efficiently as it could be. For example, up to 20 per cent of water delivered to the farm gate may be lost in distribution channels on-farm and around 60 per cent of water used for irrigation on-farm is applied using high volume, gravity irrigation methods. Some 10-15 per cent of water applied to crops is lost through over watering. More can be done to better match water application to crop water requirements.

By improving on-farm irrigation efficiency, the return from crops can be enhanced due to the reduced inputs required, the environment and its natural resources better protected and the long-term sustainability of industries improved. Crop quality and yield may increase due to improved water application and reduced water logging.

How can on-farm irrigation efficiency be improved?

Methods used to improve on-farm irrigation efficiency vary widely by region and with the commodity under irrigation. The ways on-farm irrigation efficiency can be improved include:

- adopting technology that better matches irrigation water application to plant water requirements;
- reconfiguring irrigation layouts;
- installing infrastructure, such as recycling systems and piping, to improve on-farm storages and delivery systems; and
- installing new infrastructure, such as drip or spray systems, to improve in-field applications systems.

The On-farm Irrigation Efficiency (Pilot Projects) Program

Following a public invitation for Expressions of Interest in funding on-farm irrigation efficiency improvement projects issued in September 2007, the *Pilot Projects Program* will contract a number of organisations to manage pilot projects delivering on-farm irrigation infrastructure improvements on individual farms. This will test the effectiveness of funding and managing projects, potentially involving a large number of irrigators, through a delivery partner, rather than through direct funding to individual irrigators. Eligible delivery partners include catchment management authorities and irrigation water providers.

Improvements in on-farm irrigation efficiency are expected to generate considerable savings in water use for individual irrigators. An important feature of the *Pilot Projects Program* is that funding recipients must agree to transfer a proportion of the water savings they generate to the Commonwealth. These water entitlements will be managed by the Commonwealth Environmental Water Holder.

Development of the *Pilot Projects Program* has already yielded some important lessons:

1. Investment in improving on-farm irrigation must take place within the wider context of overall farm planning (for example, through application of water efficiency plans), as well as regional planning (such as catchment management strategies or wider irrigation area plans).

Proposals will generally be more effective and efficiently managed where projects focus on an individual catchment or irrigation scheme rather than being spread across unrelated schemes or catchments.

It is important to identify any linkages between on-farm projects and activities undertaken by delivery partners through access to other Government programs, particularly those aimed at improving the efficiency of irrigation water delivery infrastructure.

2. Improving the efficiency of low technology irrigation infrastructure may be as cost effective as funding a significant upgrade to more sophisticated irrigation technology.

The considerable variation across regions and between production types needs to be recognised in identifying the most appropriate and cost effective options for improving on-farm irrigation. In some cases, such as flood irrigation for dairy or rice production, efficiency improvements may be made through improvements in design and management of existing irrigation systems, without the need to implement high cost technology.

3. Due diligence on water entitlements and on technical aspects is a vital part of the project assessment process.

The transferability of any offered water entitlements must be established as part of the assessment of any proposal, to ensure the entitlements can be legally transferred without any encumbrances. Similarly, technical due diligence provides important information on the suitability and viability of particular projects in a regional context.

4. While project funding must realistically reflect the costs of new infrastructure, the transferred entitlements must also represent good value for money for Government relative to the prevailing market price.

The cost to Government of obtaining the proposed water savings from on-farm infrastructure improvements is likely to be greater than purchasing water entitlements in the market. Determination of what represents 'value for money' in these circumstances must take into account broader benefits of the project, in terms of enhancing an irrigation district's long-term ability to adapt to reduced water availability, and the potential offered by water savings to enhance environmental flows, particularly for key environmental assets.

5. It is important to establish agreed mechanisms for sharing project risks around the timing of the transfer of water entitlements as part of any program design.

Some projects may facilitate upfront transfer of water entitlements (which provides certainty for Government), while other projects may not be able to deliver entitlements until the project has been completed (because the irrigator needs on going access to the entitlements during the course of the project). The risk sharing arrangements must be determined up-front in order for individual irrigators to realistically assess the benefits of the program to them.

6. While individual projects will have direct benefits for irrigators, in terms of improving their on-farm infrastructure, there is also potential for broader benefits of providing demonstration projects as a basis for capacity building and training.

There are, potentially, considerable benefits for Governments and the irrigation industry in delivering on-farm programs through delivery partners. In addition to reducing the administrative burden of dealing with a large number of individual irrigators, this approach also facilitates communication of program outcomes to a wide audience and integration of best practice on-farm activities with other initiatives at regional levels.

IMPROVING ON-FARM IRRIGATION EFFICIENCY

Drip irrigation pipes under vines (J Baker & DEWHA)

Aerial view around Trangie, NSW (D Markovic, DEWHA)

Future approach

The projects funded under the *Pilot Projects Program* will be implemented over several years. The knowledge gained from the program will provide useful input to the Australian Government's approach to assessing on-farm irrigation efficiency initiatives within the Murray-Darling Basin, through initiatives such as State Priority Projects and Private Irrigation Infrastructure Operators Projects.

References

For other Australian Government programs under the *Sustainable Rural Water Use and Infrastructure* component of *Water for the Future* visit **http://www.environment.gov.au/water/programs/srwui/index.html**

Further information about irrigation systems in Australia may be found at **http://www.csiro.au/org/IrrigationResearch.html**

Australian Government Department of the Environment, Water, Heritage and the Arts, March 2009.