Submission by Netafim Australia Pty Ltd to the House Standing Committee on Agriculture and Water Resources inquiry on water use efficiency in Australian agriculture.

This submission is provided by Netafim Australia Pty Ltd (Netafim) to the House Standing Committee on Agriculture and Water Resources inquiry on water use efficiency in Australian agriculture.

On Thursday, 9 February 2017 the Minister for Agriculture, The Hon Barnaby Joyce MP, requested the Committee inquire into and report on water use efficiency in Australian agriculture. The inquiry will have particular regard to:

- adequacy and efficacy of current programs in achieving irrigation water use efficiencies
- how existing expenditure provides value for money for the Commonwealth
- possible improvements to programs, their administration and delivery
- other matters, including, but not limited to, maintaining or increasing agriculture production, consideration of environmental flows, and adoption of world's best practice.

This submission focuses on the final term of reference above relating to the matters concerning maintaining or increasing agriculture production, consideration of environmental flows, and adoption of world's best practice. However it will also address the question of technology choice by farmers in accessing current Government programs for on-farm irrigation development, which is related to the other terms of reference.

About Netafim

Netafim has been represented Australia since 1982 through distributors, in 1992 Netafim Australia Pty Ltd was established and in 1996 the local manufacturing plant was built in Laverton, VIC. The company has sales of approximately $60m, employs 110 people and has a presence in all major irrigation areas of Australia.

Netafim Australia is part of the worldwide Netafim International Group, which is the global leader in smart irrigation solutions for a sustainable future. With 28 subsidiaries, 17 manufacturing plants and 4,300 employees worldwide, Netafim delivers innovative solutions to growers of all sizes, from smallholders to large-scale agricultural producers, in over 110 countries. Founded in 1965, Netafim pioneered the drip revolution, creating a paradigm shift toward low-flow agricultural precision irrigation. Since its invention drip irrigation has enabled the world to “Grow More with Less.”

While helping growers to achieve commercial success, drip technology is able to sustain:

- ✓ Clean Air - Drip technology is reducing the emission of Nitrous Oxide and reduces the energy requirements compared to other pressurised irrigation systems.
- ✓ Clean Water – Drip technology is reducing ground and surface water contamination and furthermore, Drip technology can safely use recycled waste water and reduce the consumption of fresh water.
- ✓ Clean Soils – Drip is reducing soil contamination by applying water and fertilizers to the root zone where the plant can absorb it.

Today, Netafim provides diverse solutions – from state-of-the-art drippers to advanced automated systems – for agriculture, greenhouses, landscaping and mining, accompanied by expert agronomic, technical and operational support. Specializing in end-to-end solutions from the water source to the root zone, Netafim delivers turnkey irrigation and greenhouse projects, supported by engineering, project management and financing services.

Increasing agricultural production with less water – the role of drip irrigation

According to a report by the International Standards Association (ISO) [1] drip irrigation was invented in the mid-1960s by an Israeli water engineer who developed a method for delivering a small amount of water directly to where it is needed, i.e. the root zone. In drip irrigation, only a small portion of the soil that is needed for the plant's water supply is wetted while the rest of the soil remains dry. Major progress was made in drip irrigation products and know-how, including the introduction of better raw materials and new solutions for all crop types. The emitter discharge rate in drip irrigation systems has dropped over the years. While the first emitters had a flow rate of 8 l/h or more, today, agricultural irrigation emitters produced according to ISO 9261 specifications have flow rates of less than 1 l/h with a low probability of clogging. Flow rate reduction leads to less required energy for system operation, which means that a larger area can be irrigated simultaneously[2].

Most significantly, whilst drip irrigation initially has been used for intensive horticulture industries such as grape production, in more recent times it has increasingly been used for extensive or broad acre crops as the economic and broader sustainability benefits of using the technology have been recognized by farmers and governments alike.

As the ISO states, drip irrigation is a means of addressing major water use challenges globally. "Dwindling vital natural resources, such as land and water, and rising world population pose a constant threat that could develop into a future

[1] Understanding and applying drip irrigation for sustainable agriculture, Reference number IWA 20:2017(E), 2017

[2] Ibid., p. 6.

food and water crisis. Given the limited availability of water and land resources, the amount of food grown today needs to be increased to meet the demands of tomorrow. Reduction of available water for human consumption needs be addressed. As direct consumption of fresh water by populations cannot be decreased, the amount of water consumed by agricultural uses needs to be reduced and allocated for domestic or industrial use".

The benefits of using drip irrigation are numerous and varied:

"Drip irrigation addresses water scarcity and other environmental considerations. Its use can save large amounts of water (over 50 % of water can be saved for certain crop types), and can increase yields. Drip irrigation not only addresses the need to reduce water consumption and increase yield, but also requires less labour and energy for operation, leading to lower costs to farmers due to reduced usage of labour, fertilizers and other chemicals. Drip irrigation relates to sustainability agriculture issues, and can be used in dry areas, in saline soil with saline water, and in steep-sloped topographies, where other irrigation methods cannot be practiced. Drip irrigation is easy to handle and operate once installed. It is suited for automation and remote operation by computer or mobile phone. The system's simplicity makes it easy to install, operate, maintain and repair. Other than irrigation, the drip irrigation method is used as a delivery system for fertilizers and other agrochemicals. Drip's advantage as a delivery system is its ability to optimize fertilizer usage, and distribute it exactly where needed, in the root zone, while minimizing its release to the environment".[3]

Drip irrigation fundamentally makes better use of scarce water resources in agriculture. The following table indicates different water use efficiency rates for various irrigation technologies. Drip along with micro sprinklers has the highest overall efficacy rate.

Irrigation Method	Efficiency Range
Gravity/Flood	40-80%
Sprinkler – wheel-move	60-85%
Sprinkler - Gun	55-75%
Pivot/Lateral (sprinkler)	75-90%
Micro sprinkler	70-95%
Drip	70-95%

Source: Howell, T.A. 2003. Irrigation Efficiency, in Encyclopaedia of Water Science. Marcel Dekker, Inc. New York, New York. 1076 pp

[3] Ibid., p.v

In another recent report the international Sustainable Agriculture Initiative (SAI) states "Drip irrigation remains without any doubt the most efficient irrigation technique and most powerful solution towards improving water productivity and ensuring food security"[4].

Another report describes how "Use of subsurface drip irrigation has also progressed from being a novelty employed by researchers to an accepted method of irrigation of both annual and perennial crops. Analyses of the data for 15 years at Water Management Research Laboratory have demonstrated a significant yield and water use efficiency increase in a number of crops (tomato, cotton, alfalfa, and cantaloupe)"[5].

Drip irrigation in Australia

Australia is a country that is eminently suitable for drip irrigation. Australia is overall a dry country where agriculture is especially dependent on adequate rainfall for growing crops and raising livestock.

However only a relatively small proportion of irrigation in Australia uses drip irrigation. Only 9% of farmers use surface drip and 2% sub-surface drip irrigation. By far the biggest percentage of farmers (59%) uses surface irrigation[6].

A number of factors can help to explain this phenomenon. Firstly, annual rainfall is highly variable in Australia (reportedly the third most variable in the world). This affects water availability and the grower's decisions on permanent irrigation methods such as drip and sprinkler. This is especially the case since initial start-up costs for drip irrigation can be relatively higher than other technologies.

However as the ISO points out: "Flood irrigation costs are relatively low, since no parts are required. However, it involves high labour costs and time investments for irrigation-channel digging and irrigation operation, all the while using much more water and delivering lower yields.

In drip irrigation, farmers have a higher initial capital investment to purchase the system but since crop quality is better and yields are higher, the return on investment is very fast so that their income is rapidly increased compared to flood irrigation.

Furthermore, installation, maintenance and operation time are saved in drip irrigation"[7].

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[4] SAI Water Conservation Technical Briefs, TB 15 – Drip irrigation and water scarcity, June 2012, p.1.

[5] "Water use efficiency in agriculture: Measurement, current situation and trends", Bharat Sharma1, David Molden2 and Simon Cook, p.53

[6] ABS – Agricultural Water Use in Australia – 2013/2014

[7] ISO op.cit., p. 20

Another factor explaining the use of drip irrigation in Australia is the relatively poor level of awareness of farmers about the use and potential benefits of the technology.

Whilst it is well known amongst farmers that drip is a common method for irrigating intensive horticulture crops and has been used in such industries for decades, it is not well known that drip can be used for a wide range of crops. International experience verifies this. For example, reports show that drip irrigation has led to an increase in sugar cane yield of 133 % in India with a 50 % reduction in water usage compared to flooded plots. They also show an increase of 16 % in potato yield in China with a 33 % reduction in water usage compared to sprinkler irrigation. Results like these are due to improved water management by supplying the exact quantity of water at the right time and at the right place[8].

It should be noted that drip technology can be easily automated. In an era in which we wish to encourage and attract young and talented people to stay on the land we can do it by providing them with a technology that will enable them to practice precision agriculture which will be commercially sound, create value and enable them to keep a healthy balance of work and life style.

Drip irrigation of Maize and Lucerne with drip in Australia has shown dramatic increases in yield per ML over traditional flood irrigation (>100% increase). Cotton grown in Australia has also shown a decrease in water use and an increase in yield, with a 72% increase in bales per ML.[9]

Netafim submits that, notwithstanding the best efforts of our company in promoting the use of our products, the potential benefits from the use of drip irrigation in Australia are not well known to farmers. This is relevant in the context of the current Inquiry. Given that significant funds are provided to farmers by Governments for on-farm irrigation development, if farmers are not fully aware of the benefits of alterative irrigation technologies that might be applied to their properties using on-farm support funds, the economic and other outcomes of the use of the funds may not be optimal.

It is our view that farmers are commonly not aware of the potential application of drip in their farming circumstances, and if they are aware then they may not be aware of the cost/benefits of drip. Market research undertaken for Netafim indicated that a lack or limited knowledge about drip was the third biggest overall barrier to adoption of drip irrigation. The market research identified literature indicating that one of the key barriers to the adoption of innovative agricultural products generally was availability of pertinent information.

Netafim accordingly wishes to bring it to the attention of the inquiry that there could be justification for some form of education resourcing as part of the process

[8] Ibid., p. 6.

[9] Case study (Goondiwindi), Netafim

of providing on-farm funds that support decision-making by farmers on the alternative irrigation technologies that are available, and the most appropriate selection of technology for their on-farm irrigation development.

Netafim notes that Governments have provided support for farm decision-making in various areas in recent times. For example, the Australian Government is providing $20.2 million over four years help farmers with their decision making in managing farm risk. The Managing Farm Risk Programme provides rebates for advice and assessments to help farmers prepare and apply for a new insurance policy that assists with the management of drought and other production and market risks[10]. Perhaps Government could provide similar decision-making support for farmers in respect of the technologies they can use when accessing on-farm irrigation development funding. Netafim would be pleased to discuss this idea further with the Inquiry and the Government.

Netafim would also like to bring to the attention of the Inquiry that whilst the choice of irrigation technology is a matter for the individual farmer to make, the process entailed in deciding on grants by Government may have had the effect, albeit unwittingly, of discouraging farmers from using drip irrigation.

Based on anecdotal information, it is our understanding that in rounds of grants given to date around 50% of the support went to flood irrigation and 50% to what is referred to as "pressurised irrigation" (which includes sprinkler and drip technologies). Netafim is aware of at least one case where a farmer who applied for money for drip irrigation and was rejected until the term "pressurized system" was used in the application.

Moreover, it is apparent that the Government pays the same amount of $/ML regardless of the irrigation technology used system. The Government looks at $/ML in upfront capital infrastructure cost rather than what can be generated for the same $/ML. There is thus a tendency to support lower initial cost technologies such as flood systems which may generate lower water productivity than higher initial cost drip systems.

Netafim therefore respectfully submits that the Inquiry should investigate the choice of technology systems being supported and their relative productive efficiency, to maximise the benefits for farmers and meet the other criteria for the funding programs.

Finally it is Netafim's belief that , to quote Alfred Deakin from 1890, "It is not the quantity of water applied to a crop, it is the quantity of intelligence applied which determines the result – there is more due to intelligence than water in every case."

[10] See: http://www.agriculture.gov.au/ag-farm-food/drought/assistance/mfrp