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Study Tour Report

United Kingdom and Israel
November 2012

Andrew Gregson
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Executive Summary

It can be very simple to be seduced by the remote nature of Australia. We can become focused on our own problems, caught up in our own issues and quickly become ignorant of where we sit and what our role is in a larger picture. Agriculture is perhaps an ideal example of that phenomena. We view ourselves as distant from the rest of the world and focus primarily on policy and management issues within our borders.

Beyond our borders lie not only our markets, given how much of our product is exported, but our competitors as well. Both require our attention and both have the capacity to affect our domestic issues. Our competitors may use policy to their advantage, limiting us from market access or shielding themselves from the economic imperatives with which we must deal through tariff or subsidy. Similarly, large scale market players for the commodities that we produce are more likely than not to be based far from Australia and influenced by policy, politics and consumers far from our realm.

This study tour to the United Kingdom and Israel was designed to see, feel and understand views from afar. It set out to interact with policy makers, influencers of policy, representative organisations and irrigators directly. It aimed to uncover both similarities and differences. It was about learning lessons and bringing them back to those whom we seek to represent.

By far the key outtake was an appreciation for the economic efficiency burden with which Australian farmers - particularly irrigators - must face on a daily basis. We face significantly lower capital investment from government (subsidy), practically zero operational subsidy, virtually no payment for ecosystem services (but with high regulatory requirements), remote markets requiring high transport costs and a wage regime that proves challenging against our competitors.

In short, Australian irrigators are driven by an economic efficiency imperative that our competitors are not. We are efficient in water use not because we are short of it, but because we have allocated a price to it - and price, margin and profit are at the centre of every Australian irrigators operations.

We are efficient by necessity. This is not a common scenario globally.

Whilst undoubtedly a leader in the development of water efficient technology, irrigated agriculture in Israel is not an efficient sector. Enormous government subsidy, both capital and operational, has been necessary to develop the sector. It is not sustainable in the long term either financially or environmentally.

In both a contrast and a similarity, farming in the United Kingdom is based on an economic principle which largely defies logic. Whilst the operations which we inspected were impressively productive, land values are such that profitability appears not to be a driving force.

It would be unfair to conclude that Australia's irrigation sector is world leading, for our irrigation businesses simply operate in largely different environment; both physical and regulatory. It would, however, be fair to assert that our irrigators are driven by a motive which is sustainable if external regulatory burdens do not become overwhelming.

Introduction

In July 2012, the NSWIC Board considered a Briefing Note (attached) proposing a study tour to the United Kingdom and Israel. The proposal involved engagement with academia, government, irrigated agriculture representative groups and irrigators.

The Board approved the proposal and the tour was subsequently organised.

Tour Participants

An expression of interest for participation (attached) was advertised to Members and stakeholders of NSWIC through regular email updates, social media and publication in our Journal, *Productive Water*.

Three delegates joined the NSWIC CEO (Andrew Gregson); Hayden Cudmore as a representative of the Rice Growers Association, Dan Bloomer from the Board of Irrigation New Zealand and Andrew Curtis as the CEO of Irrigation New Zealand. Two other potential participants withdrew leaving a small but easily manageable party.

Participant biographies the were distributed to parties with whom the delegation met are attached.

Itinerary

The tour commenced in London where discussions with both government officials (DEFRA) and academics from Kings College were held. This was followed by a sessional presentation from Andrew Gregson and Andrew Curtis to a cross-London colleges seminar. Academics and researchers from Kings College, Queens College, University College, Oxford and Cambridge were in attendance. The session was followed by a panel with all tour participants invited to engage.

The following two days were spent in Cambridgeshire and East Anglia. We were kindly assisted by the East Anglia Branch of the National Farmers Union who organised a round-table at their offices attended by a range of irrigators which was followed by farm visits and inspection of water infrastructure in the region.

A full day meeting with the UK Irrigation Association and the Head of Water Science at Cranfield University rounded out the UK section of the tour.

In Israel, our itinerary design was generously assisted by Netafim. We inspected their head office facilities and operations near Be'er Sheva before journeying to the Arava Valley via Yatir winery to inspect a range of operations and meet with irrigators. On return to Tel Aviv, we met with a range of senior Netafim officers, senior government water policy managers and irrigators. Our final day was in northern Israel inspection irrigation operations.

Specific Recognition

In planning and executing this Study Tour, extraordinary assistance was provided by a number of individuals whom NSWIC would like to specifically record its thank to;

- Professor Tony Allan and PhD Candidate Michael Gilmont of Kings College who not only assisted with arrangements in London, but provided invaluable advice and contacts in respect of the Israeli portion of the tour;

- Mr Paul Hammet of the National Farmers Union in Newmarket who went well beyond the call of duty to ensure that we met with and had access to irrigation farmers and government water managers in East Anglia and beyond;

- Dr Jerry Knox from Cranfield University and Mr Melvyn Kay of the UKIA who were extremely generous with their time to provide a full understanding of scenarios both in the UK and across Europe; and

- Mr Levy Schnieder, the Managing Director of Netafim Australia and Mr Roni Rott of Netafim at Kibbutz Hatzerim who were generous not only with their time but with their extraordinary knowledge and contacts to arrange an itinerary which gave us an insight into the complex world of irrigation in Israel.

Balance of This Report

The balance of this report provides detail of the individual meetings and inspections that were undertaken.

Subsequent to the meeting detail appears the Trip Journal recorded by Andrew Gregson. It is a personal Journal that is not - and should not be considered - a formal document of NSWIC. The views in it are not necessarily endorsed by NSWIC. It is provided primarily to ensure a context of views put formally is available for consideration.

Meetings, Sessions and Inspections

United Kingdom
5 November 2012

Henry Leveson-Gower; Department for Environment, Food and Rural Affairs

Henry Leveson-Gower heads the Future Water Resource Management project within DEFRA.

44% of extractions (abstraction) is for public water utility (human consumption), 33% for energy (that not returned but lost in evaporation), 11% for other industry and only 1% for agriculture. That is, agriculture is mainly rain fed.

The key reform driver in the UK is climate change and population growth. They're looking at a 20% reduction in summer water use for irrigated agriculture, not necessarily visited in the form of drought (although they expect incidences of drought to increase) but as a change in availability of water resources.

Trading is currently possible, but there is very little demand for it with around 50 trades having been recorded since 2003. Short term trade is difficult to achieve as the regulatory approval process is lengthy. There was some short term trading during a recent drought.

It appears that significantly greater use of groundwater is made than surface water. In the key irrigation district of East Anglia, around 50% of water used is groundwater sourced. Like Australia, they understand that the sources are linked but have no detailed understanding of that linkage. We noted that Australia and New Zealand both have assumed linkage in policy and management. The UK does not.

Licenses in the UK are issued with a maximum annual and a maximum daily volume. Many also have flow regime requirements (a "no pump" in low flow conditions) which is colloquially known as "hands off". Licenses differ based on when they were issued. Those issued earliest have the fewest conditions (e.g. 1963 licenses were perpetual and faced no "hands off" restriction).

They're moving to a 15 to 20% abstraction rate based on science with the balance to be an environmental flow requirements. Between 15 and 20% of their water bodies are currently above this. The scientific bases for sustainable extractions limites stems from a European Union Directive. They are, however, using a triple bottom line approach so, for example, human benefits of Thames extractions for the use of London have the capacity to override environmental benefit. As they climate changes, Henry notes, their ability to meet environmental standards will reduce. They are, however, on the verge or recognising formally that flow is but a proxy for environmental health. They are moving toward catchment scale management (the CMA model) on the back of this.

I asked if non-EU exporters (e.g. Australian and NZ) will be expected to comply with EU standards. Andrew Curtis noted that NZ already had to in order to supply UK supermarket chain Tesco's. Henry says that Spain and Greece are not dissimilar to Australia in respect of water availability and management and must comply with EU directives, although he notes they are less "consistent" standards.

Professor Mike Young has been advising DEFRA on water markets for the past 6 months or so. Henry is clearly a convert to Professor Young's methodology. DEFRA is considering how to change all licenses to a single system ahead of introducing a high security/general security regime entirely consistent with that in NSW. I suggested that greater similarity would be found in Tasmania and NZ for *timing* control of allocations, as this was not necessarily what HS/GS is designed to address.

DEFRA is looking favourably at creating a perpetual share with an annual allocation, again mirroring the NSW system. In recognition of this aim, they've now unbundled water from land.

It became clear in discussion that the advice they'd received was based on regulated systems, which there's are largely not. I suggested that they consider unregulated systems in NSW, noting that there is essentially no unregulated system in South Australia. They will ask Professor Young to further consider this.

The key, we conclude, is private storage. Andrew notes that a removal of sovereign risk (through the creation of a property right) may lead to a spike in private investment in storage. Henry agrees to the extent that they're looking to develop trade with release from private storage.

Professor Tony Allan; School of Geography, Kings College London

Professor Allan commenced his rise to academic prowess wondering how it was that the "water wars" contemplated in the 1960's did not proceed. From here he developed the theory of embedded (or "virtual" water) to explain the matter away logically. Countries such as Australia, which were relatively abundant in water compared to population, were able to export water embedded in food and fibre to offset the demands of less endowed regions, particularly the Middle East.

The asymmetry of food production capacity is actually significantly greater than the asymmetry of oil production. Australia is the highest per captia exporter of embedded water on the planet. In context, France is the only country in the European Union who is a net exporter of food. At the other end of the spectrum, Israel is currently desalinating that entire volume of water that they use for irrigated agriculture.

90% of the water needed by humans comes in the form of food. It is therefore Professor Allans view that 90% of the worlds water both is *and must* be managed by farmers. They should be assisted in that task rather than hindered.

We enjoyed a long discussion on the concept of water stewardship. There is significant European funding for "pillar 2" Common Agriculture Policy environmental measures which may see stewardship gain momentum. Note that CAP measures essentially see farmers being paid to delivery environmental services.

6 November 2012

Round Table with East Anglia Branch, National Farmers Union

Some 13 farmers and NFU officials met with us at the East Anglia Branch headquarters in Newmarket.

This is perhaps the driest area of the United Kingdom, ideally suited to growing fruit and vegetables. Most of the farmers present were growing a mixture including potatoes, onions, vegetables, stone fruit and sugar beet. They note that they're "at the pointy end of climate change".

Food security has again become a debate in the UK. Their policy approach is "sustainable intensification". It is highly likely that the UK will need to import food. The NFU are working to link food security with water security in a political and policy sense.

The earliest entitlements were issued in perpetuity. Since that time, newer licenses have been issued with a shorter time limit, either 20, 10 or 5 years. There is a "presumption of renewal", but no guarantee that it will occur - which is a clear risk to owners. With each renewal, the applicant has to provide further evidence of the sustainability of their extractions. They must demonstrate need, efficiency and provide environmental impact information.

Most regions are now fully allocated. In East Anglia, there is no summer surface water or groundwater left available for allocation. There may be some winter surface water available.

The UK has enough water - what they do not have is enough storage.

Water is not tied to land, but it is closely linked to extraction points. Farmers have moved around the formal trade process (and its lengthy delays) by leasing land with water entitlements in situ. That is, farmers will rent a block with water on it ready to grow.

There issue now is first in time frist in right and how to deal with overallocation. They're right at the start of that process, but wary of what DEFRA and Professor Young propose. I provided a presentation on water management in Australia from an irrigators perspective, noting that they key was not trade itself but the development of an underlying property right to remove sovereignty issues.

Elveden Farms; Andrew Francis, Farm Manager

Elveden Estate is a very large property with multiple business interests including irrigation. Some 22,500 acres produces around 90,000 tonnes of produce including onions, carrots, parsnips, potatoes, combinable crops, sheep and beef. Their water is primarily drawn from the two aquifers underlying the Estate. They are licensed to extract 2,500 megalitres and have 2 450 megalitre on farm storages. The property features 130 miles of underground permanent main. In season, they'll employ between 10 and 12 staff to run irrigation operations.

Their water is lifted between 30 and 80 metres with pumps driven by electricity. Energy prices did not seem to be a major concern.

They produce 6% of the UK onion crop. We inspected their state-of-the-art drying and storage facility driven by gas-heated air.

The records on rainfall an aquifer impacts that are held by the farm sector are far superior to those held as public record. There is a reluctance at government level to use private data. It can be used to argue the requirements for reissue of an entitlement, but is considered "tainted".

Andrew discussed with us some of the details of the Common Agricultural Policy payments that they receive. Payment arrives from the EU in order to manage the heathlands around the property.

7 November 2012

College Farms; Andrew Nottage, Manager

Nottage Farms produces potatoes, onions and sugar beet across 2,500 acres, 450 of which are organic. They're finding that methods developed in organic operations are being used to reduce costs in traditional operations, but that the margin on organic production is decreasing.

Irrigation is increasing the disease risk that they face in organic productions. That has resulted in the exercise of additional caution and therefore decreased yield.

College Farms is part of the LEAF charity - promoting Integrated Farm Management. They have used the association to leverage a premium price in the past, but that has now largely disappeared but access to certain markets remains.

They have some 1,125 megalitres of entitlement which is delivered through around 20 kilometres of underground mains. They're using the licenses of surrounding farms as well as their own. Surrounding farmers are content with this arrangement as it sees their license utilised and hence add value to their own farm holding. College Farms pays the associated license fees.

We inspected a significant new reservoir development being privately funding by College Farms adjacent to the river. It is designed to access winter high flows and distribute in summer. It is being internally financed, but housing development adjacent to the storage together with operation of a quarry in the construction phase are clearly a significant offset.

Denver Sluice Complex

The drainage scheme of which the Denver Sluice is the heart was designed by Vermoyden around 350 years ago.
The complex is run by the Environment Agency. Our meetings were also attended by managers from the Drainage Boards in the area. The job of the latter in winter is to ensure adequate drainage of the peat-based surrounds (the Fens), but also to hold up water for summer delivery.

Abstraction licenses are required where take is to exceed 20 cubic metres per day.

The Environment Agency has the power to fine, remove a license or demand that all pumping be ceased. They operate an informal system of agreement in times of shortage rather than use those power. Irrigators all agree to restrict their take to a nominal percentage.

In terms of reduction in take, they're contemplating a compensation model based on a study in conjunction with Cambridge University as to what an irrigated crop is worth against dryland use of the same asset. As a rule of thumb, they're looking at around two thousand pounds per megalitre.

Private water companies, who deliver to urban residential use, set their own prices. I suggested that this was an inbuilt mechanism to inefficiency. They use 40% of water in the UK but have an incentive to ensure that their customers use as much as possible.

Of particularly note in this meeting was the positive attitude and understanding of agriculture shown by the Environment Agency. When questioned as to whether this was driven by existing personnel, all present agreed that this was a significant part, but it was a relationship borne out across several decades.

8 November 2012

Meetings at Cranfield University with Melvyn Kay and Dr Knox were held simultaneously over several hours. As such, discussions involved both.

UK Irrigation Association; Melvyn Kay

The UKIA has around 350 members. Their income is generated by a member fee of around 40 pounds and an annual conference. They maintain an interest in the ICID and were interested if we would seek membership and status if IAL chose not to continue.

Melvyn is an engineer who was based at Cranfield for some time. He set out from there as an independent consultant and now has UKIA as a client. He also does some work for the UN Food and agriculture Agency (UKFAO).

Irrigation in the UK covers around 150,000 hectares.

Cranfield University; Dr Jerry Knox

Dr Jerry Knox has been at Cranfield for around 20 years. This is an applied university that works directly with industry. It is an entirely graduate university - that is, there are no undergraduate courses. Of the 3,000 or so students enrolled across sciences and engineering, more than 10% of PhD's in the UK will come from here. They earn more in research dollars than Oxford and Cambridge combined.

Jerry is the leader of water for food production in the Water Science Institute. His primary works is looking at water use against crop yields and quality. The risks associated with climate change to agriculture form part of his work.

He spent his early life in Tanzania and Kenya where his family ran a coffee plantation. He worked in Griffith at CSIRO with Shabaz Kahn in the early part of this century.

In a presentation to our group, Jerry argued that there's no incentive in invest without security of water - a proposal with which we readily agreed.

Up to a third of irrigated crops in the UK are left (chopped in) because they don't meet supermarket quality or appearance standards.

They're currently working on precision irrigation where sprinklers can turn on and off across a run. As Jerry put it, "we've spent 20 years trying to make irrigation uniform and new we're trying to reverse that uniformity". They keys are establishing a decision tree to understand if precision irrigation is worth the added resource demand. In short, is the soil variability sufficient to make a difference?

They're heavily involved in water "benchmarking" work. I posed that this has the same problem for us as "stewardship", where requirements are based on highly reliable European water systems. The potential exists for our highly variable systems to be unable to meet overseas benchmarks which become a trade barrier by another name. Jerry noted that they also get higher rainfall support and less evapo-transpiration which further separates the benchmarks from our experience. They note that the benchmarks are to drive water use efficiency, to which I noted we use a market.

Jerry shared some climate change prediction data which suggested a 20% reduction in summer rainfall with a corresponding increase in winter. Whilst the net impact is zero, the timing is obviously a problem for irrigation. The predictability of falls is also going to be far more difficult, with probability bands dramatically broadened. We agreed that this was all evidence in support of further storage capacity.

Presentation from Dr Gonzalez

Dr Gonzalez works under Dr Knox. He's completing a research project on irrigation scheduling and is developing a management system through trials across Europe.

Farmers in Europe are over irrigating as they're worried about damage from under watering. Using in situ soil moisture monitors (three per node each at variable depth), Dr Gonzales' "Water Bee" system connects via the mobile phone system.

He's aiming to reduce water use, but also to reduce nitrogen loss due to overwatering and to increase yield. The system will cost around 1,000 Euros including 3 nodes each with 3 sensors. About half the cost is the probes themselves, so to add more probes to double the system capacity is about half the full price.

General Discussions

The figures of "only 1% of water is used for irrigated agriculture in the UK" is misleading. It is used on the driest parts of the country at the driest times. ON a peak summer day in the peak 12 week season, agriculture actually abstracts more than all the water companies combined.

Melvyn believes that agriculture in the UK is market driven. I asked how this was the case if a return on investment given land prices simply wasn't possible. Jerry believes that irrigated agriculture is operating profitably, but other agriculture is likely not. Many of the large farms are underpinned by pension funds. They both believe that productivity is such that profitability at an operational level assists, but concede the 80 pounds an acres CAP payment likely assists in that.

Israel
11 November 2012

Netafim; Kibbutz Hatzerim.

Netafim had been invaluable in planning this tour, so we were pleased to hold our first meeting in Israel at their headquarters at Kibbutz Hatzerim outside Be'er Sheba. In attendance were Levy Schneider, the Managing Director of Netafim for Australia and New Zealand, Roni Rot, the Managing Director for the Middle East and Africa and Naty Barack, the Chief Sustainability Officer for Netafim based at Hatzerim.

Netafim started on this Kibbutz in 1965. From here, they commercialised the drip irrigation that they developed from the sheer necessity of farming in the Negev desert. Permira - a European venture capital operation - is now the majority owner, but the kibbutz retains a significant portion and manages the operation. They have a presence in over 100 countries.

Water is a key component in all agricultural production. It is little reaslised that there are 4.1 metric tonnes of water in a pair of blue jeans. Agriculture globally uses 70% of available water, meaning a saving of only 15% will double domestic availability.

17% of agricultural production is irrigated - but that represents 40% of the global food supply.

A change from flood irrigation (of which there is none in Israel) to subsurface not only has water saving implications, but can reduce greenhouse gas emissions. A reduction in nitrous oxide is the biggest impact change, as it is some 300 times more greenhouse potent than carbon dioxide.

A cotton farm in Arizona, USA, has been using the same Netafim sub-surface drip system for 20 years. A system on sugar in South Africa designed to last 8 years has now been operating for 15 with no issue. A large scale project in India in which Netafim was involved saw 187,000 farmers upgrade to drip systems. There was a significant efficiency gain in water use, but the yield increase was not commensurate. We agreed that education in the use of technology was vital to their success.

The Arava Valley region - which we will be visiting - is classified as a desert, yet it provides 65% of Israeli vegetable exports due to the irrigation techniques employed. It receives rainfall of less than 15mm.

Some 60% of water used in agriculture is recycled. In Israel, effluent reuse sits at around 75% and is growing. Australia ranks high globally on effluent reuse, but still only at 13%.

Yatir Winery; Eran Goldwasser (Winemaker)

Yatir is owned by the Carmel operation, but is run independently. They were started as a cooperative by the growers themselves. Wine has been made in this region for around 4,000 years

The key point of difference for Yatir is their entirely Kosher operation and the niche market that they have created. The entire process can only be handled by a practicing Jew. A Rabbi was called in to accompany our inspection.

They produce around 150,000 bottles per annum from single vineyard systems, the majority of which were planted around 1996. The vines are between 600 and 900 metres above sea level which means although they're in a desert they have very cold winters. Harvest time sees hot days with cool nights.

What little rainfall they receive is solely in winter. They are entirely reliant on 200mm in season from irrigation. From that, they're aiming at 7 tonnes per hectare. There plantings are east/west, with plucking occurring on the northern side whilst the south is left alone to provide some sun protection.

They must deal with powdery mildew (but not downy) which they mitigate with chemical spray, which they must also undertake for moths. They're looking at between 4 and 5 sprays per year.

The wines they produce - Petit Verdot, Sauvignon Blanc, Viognier, Merlot/Shiraz/Cab, Cab Sav and Shiraz - are primarily (80%) for domestic consumption. They simply can't compete on price internationally, although at $25 a bottle (considered expensive on the local market) the quality was certainly present to complete.

12 November 2012

Arava Valley Farms

A series of farms covering some 25 hectares of the desert of the Arava Valley (just south of the Dead Sea - some 150 metres below sea level) was our first stop for the day. Hosted again by Netafim, the individual farmer involved (name not obtained) was very forthcoming with information.

The water used to irrigate here is 750mg saline. All of the soil in which the plants grow has been trucked in. They plant in the last third of summer to take advantage of the off season in European markets. They're also exporting to the US.

They're drawing from two aquifers; one at 200 metres and the other at 700 metres. The upper aquifer is being too heavily drawn resulting in saline intrusion. At present, they're using between 50 and 60 cubic metres per hectare per day. This is about twice the need of the plant, with the balance used to wash salt away from the root zone. They are currently experimenting with salt tolerant plants.

This farm was focusing on tomatoes and capsicum, as are many in the area. They're achieving yields of around 80 tonnes per hectare in capsicum and around 200 in tomatoes. Agricultural labour provides challenges given their location, but they need around 1 employee per hectare in capsicum and 3 in tomatoes.

Across the Arava, farms are required to be fallow for 1.5 months. That is, all plants must be removed for six weeks to deal with pests and insects. Much of the production is organic, which is achieving a premium of around 20%.

Water is only available at times dictated by the supply company, who in turn receive water from government delivery entities. The pressure of that supply can vary, so farmers consider it necessary to invest in tank storage. Government funding of up to 100% of capital investment is provided, with around 30% of operating costs also covered.

Not far from the farms, the Hatzeva Reservoir has been developed with international donations (primarily religious institutions). The Reservoir is designed to capture the extremely rare rain events that occur. The farmer guiding us believes it has been a failed project as it requires too much upkeep to justify and - interestingly - the plants have developed an expectation of saline water. Fresh water now has a mildly toxic effect.

Moshav Hazeva

This Moshav (village) comprises around 130 families who operate farms right up to the Jordanian border. We met with the water delivery company and discussed metering and telemetry at length.

Their farmer/customers are provided with access to the telemetred data, but few use it. They are required to achieve plus or minus 2% accuracy on metres under laboratory conditions, but there is no in situ accuracy standard.

The Arava is not connected to the national water grid. They access groundwater via the state owned delivery company who provides it to the local delivery companies. It appears that they are assuming connection to the national grid in the next few years and we got an understanding that this will be necessary if they continue drawing down aquifers at the current rate.

The national delivery company provide the local service entity with two types of water (based on salt load) which they then mix based on seasonal issues and farmer demand.

Arava Valley Research Station; Rivka Offenbach

The Arava Valley is bounded on the north by the Dead Sea and on the south by the Red Sea. The area receives an average of 1 - 2 inches of rain per annum.

There's around 3,500 hectares of desert under cultivation.

A significant program is underway to eliminate "medfly" (similar to fruit fly) with aerial spraying across both sides of the Israel/Jordan border. The program is sanctioned by the United Nations.

The water used is generally between 265 and 350 EC units and drawn from between 100 and 1,500 metres.

The Research Station is operating to both increase the salt tolerance (and hence water efficiency) of crops in the region and also to find new crops for farmers to grow. In respect of the latter, they're working on both ornamental fish aquaculture (several farmers are commercially providing Clown Fish) and rice on drip. The station itself retains around 25 people in its research program.

Of interest was the solar powered desalination unit. It was using standard photovoltaic panels (15 panels to create 5 cubic metres a day of water), but was powering nanofiltration rather than reverse osmosis. In this fashion, the level of salinity post process can be "dialled in" and hence the plant fed water only just as fresh as it needs to be. Using the output, they were achieving 15 kilograms per square metre of capsicum.

Next to this plant was a plastic greenhouse where hanging strawberries were cultivated in plastic bags of soil suspended at around 1.5 metres. Air conditioners are required in summer.

Date Palm Plantation; Hatzeva

Our final stop for the day was a date palm plantation using virtually raw effluent from the nearby township. The irrigation system employed microspray rather than drip due to the solids and the near-brine nature of the water delivered. Each palm was surrounded by a berm of earth around 40 centimetres high that was crusted with salt and held a black, brackish pool of water.

13 November 2012

Professor Uri Shani

Professor Shani was head of the Israeli Water Authority for five years. He was instrumental in implementing the current policy approach in the country.

He commenced his career as a researcher, including some time in the southern Arava Valley. He was a key part of the commercialisation of drip irrigation. Through that research, they experienced a doubling of yield in the first year. The broader scientific community did not believe the results. Journals in the United States made accusations of bias.

Subsequent to that work, he became a specialist in drip irrigation with brackish water and later taught soil physics and drip at the Hebrew University.

Three weeks subsequent to his appointment to the Water Commission it was changed to an Authority with far more autonomy. He was head of the Authority during the five year drought of record which stretched the countries resources to near breaking point. This drove significant change to the extent that, in his contention, Israel no longer has a water problem - with the exception of price.

At base level, all water belongs to the government - including post use. Priorities for use are not dissimilar to Australia - domestic, industry then agriculture.

Irrigation farmers are issued with a permit to access water. They believe it is a right, but this matter will eventually come to court and will likely settle "in the middle". Every year, the government will decide on an allocation against permits. At the commencement of this regime, trade was not officially allowed but it did occur within water districts.

Twenty years ago, there was consumer resistance to the use of recycled water, but this has largely dissipated as time has worn on.

There has been a largely similar use of water in agriculture from the early 90's until now at around 1.1 billion cubic metres. At present, around .8 goes directly to agriculture with the balance to urban use. The shortfall now comes from recycled water. That is, the use of recycled water has replaced the increased urban demand to ensure agriculture retained its volume over decades. For each unit of fresh water released by agriculture for urban use, they receive 1.2 units in recycled water permits. This water is also more secure as urban water is rarely cut back. Recycled water is also cheaper at farm gate.

Recycled water is largely privatised. If a farmer takes the effluent from an urban settlement, they'll receive a subsidy of up to 70% of the capital costs of the treatment plant. They won't find the full 30% on the other side as they will achieve "capital works efficiencies" to mitigate the full funding. There's no operating subsidy, but the inflow is free and hence the cost of the treated water is limited to the treatment cost. There's an issue in the near future when the first schemes reach a level where capital renewal is required.

More than 85% of Israel's urban water is now recycled. Internationally, the next best score on that front is Spain at 17%. Australia sits in the top 10 at 9%.

Parties across Israel have signed a tariff agreement on water with a glide path to full cost recovery, but the trade off was capital works subsidies.

I asked if recycling created a reverse incentive against urban water use efficiency. Professor Shari noted that he had been "particularly tough" in setting those rules. There are both Israeli and World Health Organisation requirements to treat water to certain standards before it is used for agriculture and therein lies the incentive. To release to a farmer requires less treatment than releasing to a river hence there's an inbuilt incentive to work with farmers. The total demand incentive to efficiency is within the tariff design - it's volumetric to a limit after which significant penalties apply for excess use.

The urban tariff is flat across the country to customers, but the city owned companies pay different bulk rates to cover the varying capital costs of operating the entire system. The flat tariff is an inbuilt smoothing mechanism, but is also politically driven as Arabs tend to live in remote areas.

The country has around 1.2 billion cubic metres of fresh water and around 500 of recycled water available to use. They target 7% losses in the urban supply (but currently experience around 9%). A further 600 is available from desalination. That is, "manufactured" water roughly equates to the natural supply level. Water tariffs have escalated to pay for this -

the domestic tariff is around $1.50 per cubic metre for the first 3.5 cubic metres per person per month. Excess use is at $3.75. The tariff is similar across Europe.

I asked about energy costs and means of production in respect of desalination. Professor Shani responded that their desalination costs are around one third of those in Australia. Whilst the environmental constraints in Israel are "huge", they are "far more" in Australia. He describes himself as an environmentalist and says that any environmental requirement that is tougher than Israel is "too tough". He believes the cost differential in desalination stems from capital works costs. The works in Israel are privately owned. Desalinated water is now about the same cost as natural water primarily due to the fact that it doesn't have to be moved as far. He notes that energy is cheaper in Israel as it doesn't have to move as far as it does in Australia, but that moving energy is far cheaper than moving water.

He favours trade and enabled it in his time as head of the Authority. All formal trade needed to be approved at Authority level. Prices were set by markets. Trade was in temporary allocation only, not permanent entitlement. This was primarily a means to address drought - and he's unsure if it continues. Permits are issued in perpetuity and largely achieve a 100% allocation. At the peak of the drought, this dropped to 50%. Allocations are made a year in advance, but sometimes are made with a "minimum available" caveat. Allocations do not exceed 100%, but the system is not set up for such flexibility in any event. For the past 20 years, allocations have been 100%.

In conclusion, Professor Shani left us with a simply though:

"If water has no price, there is no efficiency. This is true worldwide."

Shimon Tal; Former Water Commissioner

Shimon Tal was Commissioner between 2000 and 2006 - immediately prior to Professor Shani. Much of the implementation work completed by Uri was on the basis of policies set in place by Shimon.

Shimon was instrumental in the push from Commission to Authority. He believed there were too many functions that were shared with other Ministries that made water management inefficient. He wanted a clear line between policy and management (including pricing) to sideline politics from the process.

All water resources in the country are controlled by the government. That includes water discharged from various uses. The government acts as a trustee of the public who ultimately own the resource.

As Commissioner, Shimon was required to consult on decisions with a 39 member advisory council that was largely dominated by stakeholder farmers. This was abolished when the Authority was established, but Shimon believes this was a mistake - evidenced by the fact that it is now in the process of being reconvened. Israel also has a special Court for Water in which claims are settled. The bench comprises a judge plus two public representatives.

The development of agriculture in Israel was as much a national interest issue as it was an economic issue. Around 180,000 hectares of irrigated agriculture was the set aim.

Agriculture now provides a contribution of less than 2% to GDP but is still considered important politically and strategically. When land is not occupied in Israel, it becomes a target for illegal occupation - particularly by Bedouin. This enhances the national interest in agricultural occupation. In neighbouring Jordan, farmers remain a very strong political power.

Israel cannot manage water resources without taking into account its neighbours. Almost 40% of its water comes from outside the "green lines" (borders). On that same measure, it's 30% for Jordon and up to 60% for Syria (most of which comes from Turkey). The whole area has no more than 150 cubic metres per capita per year in renewable water. In context, 500 cubic metres per year per capita is the UN set "red line" below which shortage is considered to have occurred. In 15 to 20 years time, the area will drop to around 100 as population increases and the resource deteriorates.

To put this in a global context, average consumption is around 1,080 cubic metres per capita per year. In the region, the requirement is around 1,500 resulting in a large importation of water embedded in food (mainly grain). Within 30 - 40 years, the region will not survive without new sources of water.

They're now toward full implementation of a plan commenced in the early 2000's to create additional water.

The Water Authority fixes prices based on "real cost", which includes the value of water in natural resources. The real price is therefore the marginal cost of whatever was the most expensive source (which is generally desalination). Prices also include a contribution to the renewal of delivery infrastructure. The Government gets involved in providing subsidies for various use based on political considerations - for example, water is delivered to Palestinians at a lower rate.

Farmers claim that they are unable to pay the full price set by the government. Shimon contends that much energy is "wasted" on arguments for subsidies. He notes very simply:

We cannot have agriculture in this country without having subsidies to allow farmers to do their work.

Isral has a national water grid. It was built to allow movement of water from the north (where rainfall occurs) to the south, although it doesn't currently extend to the Arava Valley. Reconfiguration of the system is having to occur as "manufactured" water is injected into it from points not originally contemplated.

The environment in Israel suffers "simply because people have to live here." The Dead Sea is suffering from a significant reduction in levels as inflow are dramatically reduced. In order to maintain its level, an additional 1 billion cubic metres would be required. Environmental groups are campaigning for this, and are having limited success. That said, some 90% of the flow of the Jordan River is extracted with the remaining 10% reaching the Dead Sea being "unhealthy" (a significant understatement).

"At the beginning we pumped whatever we could. Every water source has a red line, but it is not enough." Israel provides some assistance to streamflow health by lowering levies on extraction the further downstream they occur.

Shimon reflected a widespread attitude in saying "we are losing water to the sea". Some 70% of the nations precipitation occurs in the "red months". Winter sees four or five significant storms and that's it for the year. The result is severe flow with suspended solids between 7 and 10% that is then very expensive to use. They have two major reservoirs to capture this and to allow sediment to settle.

There is no permanent trade of water entitlements. It's a simply "use it or lose it" system where non-use results in government resumption and reallocation. There is a consideration in the annual allocation system toward permanent plantings in the event of shortage. Shortages are met with compensation ("yes, of course") which was a primary driver toward desalination - the Minister took the attitude to "pay to produce water rather than compensate for the lack of it."

Netafim President and Chief Executive Officer; Igal Aisenberg

We were not scheduled to meet with Igal, but were delighted that he found time to see us.

We discussed the opportunity for growth of drip in Australia and New Zealand, focusing on barriers thereto. Cost was the main barrier in both setup and operation. Igal was surprised at installation costs, noting that their experience in Kansas shows a 25% only differential between drip and pivot.

They're now expecting a minimum of 15 years on underground drip equipment lifespan.

We noted the opportunity for drip in new irrigation areas that remove the necessity to level ground.

Gershon Vilan; Kibbutz Negba

Kibbutz Negba uses recycled water from the urban area of Tel Aviv and the settlement of Ashkelon to the south. They're using around 2,500 megatlires on 1,200 hectares.

They're growing drying wheat and hay as well as watermelons. They're also trying some cotton, using gypsum to overcome the salinity of their water supply. They have a range of other operations, including a dairy.

Everything grown is for export, primarily to Europe and Russia. First quality production goes overseas with the balance retained for domestic consumption.

Much of their water supply is moved over 20 kilometres and then dropped into an aquifer for up to 2 years to purify to the extent of being able to use for agriculture.

14 November 2012

Kibbutz Magal; Yigal Mazor

Yigal is the Commercial Manager at Kibbutz Magal. He set up Netafim in Australia between 1992 and 1999. During his time here, he worked with cotton between Moree,

Narromine and Goondiwindi before spending some time working on sub surface drip with the Tandou operation.

Kibbutz Magal is a part owner of Netafim, who licensed them when growth was too high for Hatzerim alone. Their manufacturing plant here, which we later inspected, makes thinwall dripline for single season use. Each of their machines can produce 300 metres per minute.

Israel at one point had up to 30% of its gross exports originate in agriculture. They're now facing huge competition from Spain, Turkey and Morocco due primarily to wages. A number of Israeli farmers have set up operations in Morocco to take advantage of both cheap labour and simpler access to European markets. What was previously a strong Israeli farm lobby is now substantially weaker and fighting a losing battle against imports. They're currently dealing with this issue in the milk sector where the governing is contemplating reducing or removing tariffs. Yigal says that this will kill many small milk producers in Israel.

Eli Vered

Eli spent some time working in Australia trying to introduce drip to sugar cane in Bundaberg. he is now in research for new crops to be grown with drip. He's currently working on 7,000 hectares in Peru where no more than 20mm of rainfall occurs.

he provided a presentation on an "environmentally friendly method of growing rice". Their target it to grow rice at no more than 700mm of water application. They note the greenhouse benefits associated as well as the water use efficiency factors if successful.

AS he noted, 80% of global rice productions comes from small farmers - who are rapidly aging. At the same time, rice is a staple in the most populous countries of the planet at half a kilo per family per day. More than 75% of the global rice supply comes from around 79 million hectares of irrigated paddy rice.

Methane emissions from rice are 300 times more powerful per unit than carbon dioxide as a greenhouse agent.

The aim of their project is to achieve higher yield from less water, use less fertiliser and less energy. Early results from projects in Texas suggest 50% less water use for comparable yield with a cost/benefit analysis ratio between .88 (not worthwhile) and 4.78 (highly worthwhile).

Further field experiments in China have seen massive methane emission reductions. They're drilling (rather than aerial sowing) using a wheat machine. They're running 1.1m beds with four rows across each with a single drip line. They claim a yield increase with an achievement of 8 tonnes / hectare.

Banana Plantation

Bananas are planted under shade cloth both for sun protection and protection against hail. The micro-climate created also provides benefits. Banana's are grown for winter crop income.

The land on which the plantation is based is rented from the local village. The rental price to be paid is determined by the crop planted, with banana's requiring a higher rent - hence the local village dictated the crop to be planted.

They water using drip every second day. It's saline recycled water and hence they're using more than strictly necessary to wash salt below the root zone.

A large portion of the crop goes to the Palestinian territories. The grower described the banana as "the potato of the Arab world". Trucks to those territories get through under all conditions - even when borders are closed.

It costs them around 1.2 New Israeli Shekels per kilo to produce and they're getting between 60 and 80 tonnes per hectare. This would drop to around 50 in the absence of the shade net.

They face a major problem with fruit fly. The programs employed in the Arava Valley are not extended here.

ENDS

Personal Travel Journal of Andrew Gregson

A Water Study Tour to England and Israel

3 November 2012 - Just Out of Sydney Airport

The NSW Irrigators Council has been pretty good to me. I've enjoyed some experiences that you wouldn't have the chance to do in your average political strategy and advocacy role. To many, claiming Bourke, Broken Hill, Wee Waa and Wentworth on your "been there" list might seem a touch pedestrian - but they're the sort of places that you wouldn't see without a reason. They're the heart of the outback and all that, populated by the salt of the earth folk that Australian's like to think we all are.

I've also enjoyed a few more exotic destinations with thanks to all that is water. I've been to all States and Territories of Australia and have seen the San Joaquin Valley of California a couple of times. A few years ago, after my first trip to California, I continued on to the World Water Week conference in Stockholm, Sweden. On the first night there I was a little surprised to look through the list of delegates (something like fifteen hundred) to find that I was Robinson Crusoe as a representative of agriculture.

That's shocking, when you think about it. Along with sunshine and dirt, water is the key ingredient in agriculture. Agriculture has an intrinsic interest in the subject, yet its sole representative at the preeminent global conference is a political hack with a slim understanding of horticulture. Hell, the last thing I grew would result in a dim view from the authorities (although now fortunately well past the Statute of Limitations on such things - and anyway, I never exhaled).

Things reached a peak when I attended a session on "virtual water" headed by Professor Tony Allan of Kings College in London. Frankly, I can't recall why - but I was incensed. How dare this archetypal academic claim to challenge Australia by suggestion we exported a very large number of cubic kilometres of water and hence actually weren't all that efficient. "These are my people, pal," thought I, "and I won't be having any of this!" So I fronted Professor Alan with his tweed jacket, arm patches and briar pipe (well, that's how I choose to remember it anyway) and told him it was about time he saw all of this through the eyes of we colonial practical realists!

He introduced me to his PhD research student, Michael Gilmont, who was in the early stages of planning a trip to Australia. His research involved a comparative analysis of water policy management in Australia, Israel and California. From London. Sigh. Academia - so incredibly clever whilst so incredibly silly...

A few months later, Michael landed in Sydney and we told him the way it was in a Board Room in Sydney before boarding a light aircraft half full of irrigators headed out on a tour of Basin States to share some knowledge in a series of town hall sessions. Fresh faced, terribly English and wide-eyed, I have to say that Michael was pretty well informed and clearly very keen.

Until our first night. We sat down to dinner in at the pub in Goondiwindi where you can order steak or, well, not. As the waitress went around the table, I saw Michael studying the menu as though the meal would be his last. A look of concern crossed his studious face as he realised that the waitress was standing over him.

"Do you have anything Kosher"

Goondiwindi.

It was going to be a long week for Michael.

But now it's my turn. The catalyst for this trip was an invitation to speak at a cross-London seminar hosted by Kings College. This is the heart of academia. If thought had a home, it's bedroom would be here. These people are clever 'n stuff - and Michael is amongst his own? Will a lad from Launceston get away with it?

4 November
London

Walt Disney was clearly a member of first class airline lounges. They are but the only thing that makes it a small world, after all.

We travelled to London via Singapore, as all Qantas flights do until early next year when they divert to that democratic stronghold of Dubai, but then via Frankfurt rather than direct. It involves one more stop in reaching Blighty, but it's considerably cheaper - and gives you an arrival time around 8.30 in the morning rather than 6.00. In other words, you arrive at a respectable time rather than something just short of silly.

There's now a "Heathrow Express" train to get from the western suburb into the centre of London - but for a town so sprawling as London, what exactly does "centre" mean? The Express goes to Paddington, which is then two separate tube rides from Russell Square, which is to be home for the next couple of nights. We opted instead for the Piccadilly Line tube which some 60 minutes later deposited us well below street level in this part of central London.

There was a huge queue for the two lifts that worked at the pace of a valium addled snail. Instead we opted for the circular staircase. That was wet. And had a warning sign telling us there were 173 steps. We had suitcases. And had spent the past 24 hours on an aircraft. Spot the error?

And so it was the we arrived at the delightfully named Imperial Hotel. We'd been upgraded from single rooms to twin rooms. Rather than just the one single bed in the tiny room, there were two. Thank the God's of upgrades that it was the Imperial rather than the airline who had offered us the very heights of luxury...

Avoiding jetlag is all about aligning immediately to local time. Whilst knackered, it was not yet midday. Hayden and I set out for a wander of the streets of London.

I haven't been to South America, large parts of Western Africa or Eastern Europe. There are islands dotted all over the place that I've not set foot on. in every country to which I've journeyed, there are unexplored bits. A while ago, I had what seemed a sound theory - why go back to somewhere you've been when there are so many places that you haven't? Is it an element of comfort? Is it familiarity that makes it simpler? Is it just that there's a limited number of places where English is a first language and I'm too lazy to learn another?

Wandering streets that I've wandered before made me realise it was none of this. Other than the odd cosmetic bit here and there, London hasn't changed. I was looking at the same stuff. I was surrounded by the same atmosphere. No, it wasn't London that had changed - it was me.

I was looking for something different through a different set of eyes. on my first trip here, London had been about beer served in really big portions and many, many members of the fairer sex whom hadn't been subjected to my cheesy lines yet. On my last visit, it had been about seeing London through the eyes of my history-riveted wife - standing on the grounds where Henry had knocked off (in some many senses) the wives with whom Dina seems to share an understanding of pre-Elizabethan intrigue.

This time, though, I wasn't going anywhere, I wasn't seeking anything and I wasn't expecting anything. I was just trying to stay awake - and the wonderment of London did an extraordinary job of it. We simply got lost

and soaked up the atmosphere of a city inhabited and alive for hundreds of years before Australia was even a thought in the realm of European settlement.

Hayden took off to see some family friends in the suburbs. I met up with Julia, our dear friend who has lived here for the past 8 years, and David, a mate of only a couple of years but one who shares my twisted view on life. We wandered the streets again. Even after 8 years here, Julia assures me it remains a favourite past time. We found ourselves at Camden Market in the old buildings amongst stalls and shops. We grabbed a table at a wine bar for some bangers and mash (what else) and the strains of a string quintet.

I sighed deeply and contentedly. What a fabulous city.

Or maybe the effects of jet lag are just manifesting into faux content?

5 November
London

I've never really been your academic type. My tertiary academic career started with an aim to achieve High Distinction, rapidly moved to settle for Distinction and subsequently evolved to "anything more than a pass was effort that could have been suitably used elsewhere."

That said, I've been utterly chuffed tonight. I'm just back from having delivered a lecture at Kings College London to a cross-London seminar series. That meant that in attendance was not only research students and academics from Kings, but from all of the other London Colleges including London School of Economics. But wait, there's more - Oxford was also in attendance, as were a handful of visiting Professors from across Europe and North America.

So why am I so chuffed? Is it the fact that it was an old world academic institution? Was I impressed by the surroundings and the people?

Actually, neither.

It's more that I've never really been considered an expert in anything - and tonight, I was. That's really quite gratifying. Yep, irrigators have been good to me.

The day started with sleeping in and adjusting to time zones. Our NZ travelling companions assured us that we'd awake at 3am and be ready to go. Perhaps they simply underestimated my capacity to sleep. Awake I did at 3, but straight back to sleep I went.

At 8.30, it was downstairs for the full English breakfast, which fortunately now appears to no longer include black pudding. Thank all that is good.

From there, it was a walk through the streets of London and St James Park (with the requisite view of Buckingham Palace) to the Government building of Ergon House where the Department of Environment, Food (etc) was located...

We met with a fellow called Henry Leveson-Gower. He's in charge of "future water" projects with the Department and is one of the more earnest fellows you'll ever meet. He's utterly enthralled with Australia's management of its water resources and is keen for the UK to follow suit. He rather seems to have missed the point that our water resources come in large scale, connected systems in the Murray-Darling Basin and theirs, well, don't. He's been taking advice from a Professor in South Australia whose opinions are far from universally welcome in his own country.

Why is it that things must be better if they're advanced by somebody from "away"? Why would Henry not simply be talking to farmers here to design a system? With those two hypothetical's, I suppose I could equally ask "what are we doing here?" Moving rapidly along...

We walked along the Thames to Westminster which remains utterly fabulous and awe-inspiring. Requisite photographs arranged, it was a stroll and lunch along South Bank before proceeding back across the Thames to the Strand and through the imposing doors of Kings College. OK, perhaps not imposing in the large door that's thousands of years old through which Kings have walked - but a modern revolving door used by thousands of students daily. Still, Desmond Tutu studied here so that's surely something?

A couple of very pleasant hours were spent with Professor Tony Allan and two of his postgraduate students (one of whom was Michael of Goondiwindi fame). Tony is your very typical English academic type - mid 70's, tweed jacket, grey hair and the works. At the same time, he is both affable, likeable and immensely knowledgeable.

Following introductions, I asked him the obvious questions - why did he end up a global thought leader in the use of water and where did this theory of "virtual water" come from. Like all good stories, it was both wonderfully entertaining and entirely unexpected. Tony started out his academic career in the 1960's - a time when "water wars" were first predicted. It was Mark Twain who wrote "whiskey is for drinking and water is for fighting over". The world was predicting that the wars of the next millennium would be fought over water. So why, Tony asked, wasn't it happening?

The research that resulted from this hypothetical question gave birth to the theory of virtual water. Tony sorted out that water wars weren't happening because those areas of the globe that were water short were able to import it - not in the form of water itself, but in the form of the food that it could produce. Hence they were importing *virtual* water. Interestingly he didn't use the term "virtual" to start with - the theory commenced as "embedded" water (which makes far more sense), but after banging away at that term for decades, he changed it to "virtual" and the concept took off.

As it turned out, around 160 of the current 200 (or so) countries globally have become net importers of food - and hence net importers of virtual water. There are only a handful of exporters of virtual water - and they are the large food producing countries (including Australia) that have, in essence, been able to feed the globe and have averted the water wars that were predicted.

Believe it or not, the asymmetry of food production between countries is significantly greater than the asymmetry of oil availability. Australia has become the highest per capita exporter of embedded (or virtual) water in the world. Even though we're not endowed with enormous volumes of the stuff, there simply aren't many of us - hence we are able to convert it to food (and fibre) and export it. Furthering Tony's theory, Australia therefore stands to be the oil baron of the next millennium. Perhaps we should start buying gold plated Mercedes now?

In short, Tony is a global though leader on water - and he likes farmers. It's very hard to find someone outside agriculture that has such a positive view of agriculture. He's incredibly well thought of globally and amongst his peers. it was a pleasure to be in his company - let alone for two and a half hours of far reaching discussion.

What happened next was nothing sort of immensely gratifying. Tony had asked me to speak that evening to a group of people at a cross-London seminar series that he's a part of. I expected a handful of undergraduate students turning up in the vain hope of some additional consideration come exam time. What I got was a room full of Professors and post-graduate students from Kings, Imperial College, University College, Oxford, Cambridge and the London School of Economics. There were around 30 in all - and they clearly knew their stuff. Fortunately, I also knew mine - so it was a wonderful 40 minutes or so

providing a presentation that was followed by a panel session with my travelling companions. The questions were hard, far reaching, extremely challenging and immensely gratifying.

Look, this is far from modest - but it's the only way to describe it; it really is a pleasure to be recognised as an expert at something - and to be recognised as such by global thought leaders was actually very humbling.

With that success in the bag, it was off to the pub with a handful of attendees. Tony shouted us all fish and chips along with a few pints of Hobgoblin real ale (what else?) After a few pleasant hours, a stroll through the cold streets of London settled an almost perfect day.

Sigh...

6 November
Newmarket

On a visit to London many moons ago (the same visit on which I met Dina), we had a Datsun Sunny that had set us back the grand total of one hundred and fifty pounds. It had been driven to the far south west coast, the far north of Scotland and to just about everywhere in between. London was just another destination in the Sunny.

So why was I nervous about collecting a hire vehicle this morning to head north east to the irrigation district of East Anglia? It was a rental vehicle, properly registered, largely safer than a Sunny and likely a lot more visible than a Japanese hatchback with buggered suspension. In the same way that London was different this time around, the answer lay not with the city or the car - but with me. It's quite extraordinary how you can be ten foot tall and bulletproof in one decade and far less confident the next. I really should have done everything back when I knew everything!

The ordered GPS navigation system wasn't available according to the clerk at Hertz who pretended quite admirably to give a shit. Fortunately my NZ travelling companion had an iPhone with a local SIM card that would act - to some extent - as a navigation device. We successfully proceeded north, successfully negotiated the traffic (that was largely travelling in the other direction) and successfully made our way to the East Anglia head office of the National Farmers Union in Newmarket.

It was here that we were met by the outstandingly helpful and truly delightful Paul Hammett, a long time servant of the NFU but recently appointed national head of water resources. National roles have been confined by policy within the NFU to being located at the national office in Warwickshire. They've made an exception for Paul, who is now a local of East Anglia. That exception was sensibly made for a number of reasons - East Anglia is the main irrigation district of the UK, it has a high concentration of agriculture and Paul. The third reason is the main one - this bloke knows his stuff intimately, knows the farmers intimately and (if our experience is anything to go on) is prepared to move heaven and earth to make things happen but then deny that it was difficult!

We spent two very pleasant hours in a round table discussion with around a dozen farmers from all around East Anglia. They provided us with an understanding of their systems, how they operate, how they've dealt with a recent drought and what they're facing in terms of water access policy change. They're concerned at the noises coming from London - and with some good reason.

In response, we provided presentations on what irrigators in Australia and New Zealand do, why the do it and some of the political work that we have done. They were interested in water markets, attentive to my suggestions that markets weren't the key (but permanent and indefeasible title was) but were extremely responsive to our concepts of political engagement. In fact, a round of applause stemmed from the

provision of details on the research we'd done to engage agricultural issues with voters in urban centres. I suppose it proves that what I do is likely just advanced common sense that is applicable to any relevant country. There's perhaps something in that...

After the international farmers lunch (sandwiches with odd fillings, lukewarm sausage rolls, scones with jam and cream), we headed out for the first farm inspection of the tour - this one to Elveden Farms.

We were in for something of a shock. Elveden may be called a farm, but it's actually an Estate and a remarkable one at that. The Lord of the manor (yes, there's both a manor and a Lord) is of the Guiness family (yes, the one that owns the brewery). They bought the place in the late 1800's. It had previously been owned by the last ruler of the Sikh nation who had been granted it by the British Monarch subsequent to the occupation of the Punjab. I can't claim to have extensively explored the Punjab, but I suspect matey got a pretty good deal in the swap (although I can't imagine the same can be said for those that he apparently led).

It's magnificent. It's out of books and films of a previous era. It's a Jane Austen novel - only bigger. During our drive about the place, I remarked on the grandeur of the house spotted next to the ornamental lake down a long, ash-lined drive. "That's where the Lord of the Manor lives, I trust?" questioned I. Nope. That'd be the managers cottage. Cottage. With all 12 bedrooms. Of course.

There are around 300 people employed on the estate. Only about 30 of them work on the farm business. The rest run the various business in the local village. The village is part of and owned by the estate. There are a couple of pubs, accommodation for visitors, a school with sports facilities, shops and the works - all of which is owned by the estate. I knew all of this used to exist but I don't mind saying that somehow my mind hadn't connected that it all still exists.

We started our inspection tour at the onion drying facility. The farm operations here produce around 90,000 tonnes of produce annually - everything from potatoes to onions to root vegetables and cereal crops. The estate totals 22,000 acres. About half of that is forest with the rest arable. About half of the other half is conservation land set aside for wildlife including - wait for it - rabbits. There are pheasants everywhere and 3 type of deer to ensure plenty for those that can afford it to shoot something (several thousand pound to shoot a deer and keep only its head).

The government is in the process of banging a four lane motorway through the middle of the estate, which does seem rather a shame. Part of the compensation deal included sealing all of the internal roads, which are numerous and now entirely comfortable. The balance of the compensation deal was likely rather sweet as well - we later discovered that the price of land here is somewhere between ten and twenty thousand pounds an acre.

We examined one of their two large on farm water storage reservoirs which is connected to an extensive underground mains network. It was all mightily picturesque - but bloody cold. So from here it was back to the village and the offices of the estate to get an overview from the affable farm operations manager, Andrew Francis, of the whole shebang.

The numbers weren't stacking up. With land worth that much and that many employees - even with the massive productivity of 90,000 tonnes of produce - we simply couldn't work out how it was profitable. With some questioning, we worked out that not insignificant sums were involved in transfer payments from the government to landowners for conservation measures such as those being undertaken here - but it still wasn't enough. Is farming here simply a hobby for extremely wealthy gentry landowners? The business operations themselves were clearly profitable, but the return on investment in land simply isn't there. Hmmm...

Our host had been very generous with time and it had been a wonderful experience to receive a guided tour of this historic estate and its modern operations, but we needed to bolt for Cambridge - our overnight destination and site of an organised dinner. Finding our thoroughly modern Crowne Plaza right amidst the historic architecture in the middle of this ancient university town, it was a rapid check in before navigating our way on foot to Robinson College.

Michael Gilmont was back at home. If Goondiwindi hadn't been his thing, Cambridge certainly was. He'd arranged dinner for our party at the college of which he is a graduate, inviting along several notable academics including our new best mate Tony Allan. It was Cambridge. They wore gowns. It was tradition. The wine choices involved an Australian chardonnay or a New Zealand Pinot. That seemed odd.

A satisfyingly passable dinner was had before we retired to the bar and pretended to be undergraduates. The undergraduates seemed to know better. The rest of the evening? Well, if you can remember it then you likely weren't there...

7 November
East Anglia

The morning started with another farm visit, this time with Andrew Nottage at Russel Smith Farms. This was clearly more a commercial operation than a large estate, but the numbers were equally perplexing. We started the visit in Andrew's office discussing their operations. Again, potatoes, onions, sugar beet and cereal crops were the mainstay of the operation (which probably explains why *every* meal in the United Kingdom necessarily involves chips).

Russel Smith farms are pretty serious about their program of integrated farm management. it's all about high quality produce, soil and water management and achieving market access from additional responsibility. it seems to have worked for them and Andrew was clearly committed to the process. Part of what they were trying to achieve was organic production, which has always struck me as something with limited potential. Like most people, I can see the value of using organic methods and limiting the use of pesticide. But also like most people, I'm just not prepared to pay a premium for it. Andrew reported that he has been achieving a premium, but that it's dropping. Perhaps organic has had its peak and now it's all about price? I remember hearing at one stage not too long ago that there is more organic cotton sold globally than is actually grown. Perhaps that's it - those incurring the additional expense of organic production (both direct expense and reduced yields) are simply being undercut by those just calling it organic.

Interestingly, Andrew reported that the use of irrigation in organic production is actually increasing the risk of disease. That results in even more caution and even lower yields. This farming caper isn't all that simple.

it was during our discussions of numbers that we came across the "single farm payment" arrangement that has replaced the range of subsidies that used to be paid to farmers. The SFP is a European payment that stems from the Common Agricultural Policy. It provides eighty pounds per acre of farm holding for land management. Or, as we would call it, a subsidy. The sort of subsidy that makes life difficult for Antipodean farmers who must compete on a world market in the absence of such subsidy. Still, even this payment doesn't really make the numbers stack up - how on earth is anyone achieving a return on capital investment? Maybe they're not? But if they're not, where's the incentive to efficient agriculture? Where's the incentive to use water efficiently?

Perplexed at the apparent contradictions of farming in England (and, indeed, Europe), we continued on to the Denver Sluice complex. Now this is a truly fascinating arrangement. Run by the Environment Agency, the complex is at the heart of the rivers and channels that make their way to Kings Lynn and out to the Channel from the River Ouse. It was first put together by a Dutchman, Vermoyden, around 350 years ago.

It's a network of sluice gates that move water through passages to get it out to sea in an orderly fashion without flooding the surrounding low lying areas. Flooding was common place prior to Vermoyden. It was his understanding and tenacity that put together the system to drain the Fenns (as they call the marshes here) and allow the farmers to become the most productive in England.

From the Sluices, we moved upstream to the Welney Washes. Part of the Fenns drainage complex, the Washes are essentially the floodplain between two main channels (one of which is the River Ouse) where the winter floods can be stored. The storage serves the join purpose of both avoiding flooding and allowing water to be stored for irrigation (in other parts of the system) over the summer.

The Washes are handled by the Environment Agency, who gave us a fantastic presentation on how the whole system works. The floodplain itself, like every other floodplain on the planet, is extremely productive agricultural land when it isn't underwater. Rather than leave it fallow - and chance having to deal with weeds - the Agency invites farmers in the surrounding areas to agist cattle over the summer. It creates an income for the Agency, an opportunity for the farmers and a relationship between the two that results in positive outcomes across a whole range of issues.

I couldn't help but wonder, though, if the hard hooves of the cattle were actually creating environmental damage. That's been a big issues in Australia, particularly with the Macquarie marshes on the similarly named river. It was half way through asking the question that I realised the answer - cattle are an indigenous species here. This is a landscape that is actually assisted by their presence. Cutting up the ground allows access to oxygen, making the grass grow better. It also allows local birdlife access to the subterranean buffet of insects that keeps them well fed and keen to breed.

It was winter, of course, so the cattle weren't present during our visit. The several mile long washes were full of water - which itself is an attraction for wildlife which in turn attracts around forty thousand tourists a year. Forty thousand is a big number - but it is small compared to the number of swans that travel here from Iceland, Russia and everywhere in between to enjoy the relative bounty and comfort that's offered. At night, the Agency provides tourists the opportunity to view the thousands upon thousands of graceful creatures that roost on the calm waters from the comfort of a massive hide. It's plate glass windows hover over the water which is turn is hovered over by swans. Early in the evening, they provide a feeding service which concentrates numbers for the benefit of onlookers. We were on a private inspection which didn't involve feeding, but did result in quite solitude amongst what is perhaps natures most grateful creature.

Well done that Dutchman 350 years ago. Nice work.

8 November
Cranfield

Leaving behind the heritage, tradition, bicycles and motorist-averse delights of Cambridge, it was time to head west. Our next stop, about an hour over the rolling hills and picturesqueness that is rural England is the university town of Cranfield. If you weren't coming to the university or, perhaps, the airfield, you probably wouldn't be coming at all. Fortunately, the airfield and the university are one and the same place.

Cranfield is what they call and "applied" University in that it works directly with industry in scientific and engineering fields. There are no undergraduate students here; it's all for postgraduate work and study for the 3,000 that are enrolled. That's a pretty big number when you think it's only people after higher degrees. In fact, more than 10% of the engineering and science PhD's earned in the United Kingdom come from here. The revenue that Cranfield earns from research is higher than Oxford and Cambride combined.

Most of the day was spent in meeting the clearly-extremely-clever Dr Jerry Knox, who is in charge of the water and food section of the Water Science Institute. He came here to study 20 years ago and never left.

We talked all things water, many of them grippingly complex and technical. Of the most general interest was a discussion on food production wastage. In discussing the widely understood challenge of doubling food production to feed a doubled population by 2050 (according to the UN Food and Agriculture Agency, the UNFAO), we noted that food wastage in the supply chain is a massive problem and that addressing it would be an excellent start. Jerry was able to put some numbers on it - around a third of crops in the UK are chopped back in to the ground (essentially not harvested) because they will not meet the quality criteria demanded by the major retailers (and, by extension, consumers). That's not quality issues in terms of there being infestations of Mongolian fruit fly or some such - that's "quality" in terms of minor blemishes or irregularities in shape. Perhaps it's us that needs to shape up rather than the vegetable?

Joining us with Jerry for the day was the delightfully English Melvyn Kay, the head of the Irrigation Association in this part of the world. After being based at Cranfield for "a while" as an engineer, Melvyn headed out as a consultant and quickly picked the UKIA up as a client. He's now also working across a range of European-based organisations, including the UNFAO and a ranger of other international non-government organisations. Sigh - Australia really is a long way away from the rest of the globe.

We braved the M25 - the notorious ring road around London - to make our way to a thoroughly acceptable Heathrow Airport hotel before dining on what is the English national dish (curry...) to celebrate a successful tour of England.

Onward to Israel!

9 November
London to Tel Aviv and on to Jerusalem

Four forty five in the morning is not a time. it is a concept - and a bad one at that. Still, to face the rigours of Heathrow and make it to Jerusalem in a day the concept must be embraced

There's a universal truth the tourism experts can't seem to get their head around - the airport will be both the first and last place in a country that a visitor will see. it will therefore be both their first impression and their last. Heathrow manages an epic fail on both. Before you even arrive here, they slug you with one of the heftiest taxes anywhere on the planet (that's a not insignificant part of the reason that we're flying through Frankfurt with Qantas rather than their traditional hub in London). Once you get here, luggage handling is about as fast as an octogenarian marathon.

But it's when you leave that you really get to see efficiency in action. The security operation here manages to make Alitalia look efficient. Hell, it manages to make a trade union stop work meeting look the picture of productivity. For no apparent reason, my carry on luggage was dragged aside to sit forlornly with a large line of others. This is the same luggage that on this very same trip made it through Sydney and Singapore with nary a sideways glace. The very same luggage that on previous voyages has merrily made its way past the terrified US gateways and countless others. But not here at Heathrow.

It turned out that there wasn't anything specific that they were looking for or at - this was a "random" check. Fair enough, I suppose - but why must it take 25 minutes of sitting forlornly whilst 7 (I counted 'em) security personnel stand about doing a grand total of bugger all? I've actually been pretty generous with that 7 number; on any practical assessment there were another 3 to add to that. I haven't made it ten as I've given the other three the benefit of being called productive for collectively moving a total of 6 (I counted 'em) plastic trays during the 25 minutes in question. When the surly woman who has been given just a little bit of power (and, damn, she's going to use it...) finished her random inspection, she asked if I'd like assistance in repacking my bag. "Thanks," I politely responded, "but I'll decline - I'm hoping to make it home in time for Christmas."

What a shame, England, that this was the last impression of what has otherwise been a fabulous week.

Still, Alitalia looks all the better for it - and that is no simple task. Breakfast consisted of a plastic cup of water with the option to enjoy some savoury biscuits. Hell, even Rex manage an option by including sweet biscuits in their service!

The biscuits were interesting, at least. They're Taralli from Southern Italy. The packaging suggests that they "probably" derive from ancient Greece. Probably. Wikipedia would likely have answered the question and obviated the need to include "probably" on the packaging. But why bother when you can write "probably" and retire for lunch? If you'd wondered why Italy was on the edge of a financial crisis, look no further! The entertainment system onboard was much like the Italian Parliamentary system - it didn't work. There's much to be said of Qantas.

Even if Wikipedia can't confirm the origin of Darathos, I can advise that they certainly tasted like they were from ancient Greece - direct.

It got more interesting on arrival in Tel Aviv. At the exit from the Customs Hall was the requisite multitude of signs from private transfer operators. None of them, however, had anything remotely resembling the name of our party on them. We proceeded, as directed on the documents in this instance, up to the agent in charge. He'd never heard of us, had no idea what it was that we were approaching him for and suggested that we grab a taxi onward to Jerusalem. He also suggested that we do it quickly - it was 15 minutes until the start of Sabbath and much was likely to turn in for 24 hours. Sound advice - we took off.

Catching a taxi was no issue - but in looking through our documents I noted that it was the same wholesaler who had booked the hotels as had been in charge of the aborted (and now double paid) transfer. I figured it was worth the fiscal impropriety of turning on and using my mobile phone to check ahead that we were expected at the hotel. Indeed we were - but it was solidly booked; as is the rest of Jerusalem.

We wandered for a bit, making our way to the old city for a brief wander through the fabulous narrow lanes and market stalls that I remembered from a previous visit. We planned our attack on the souvenirs of the Holy Land for tomorrow over Israeli beer and a Georgian meal.

10 November Jerusalem

People have wanted a piece of Jerusalem for thousands of years. How, then, to even begin to see or understand the place in a day?

One of the two elevators in the hotel wasn't working. It had proved a little difficult to get down to breakfast and was a bit time consuming getting back up to the room prior to heading out for a day's sightseeing. I let the girl at the reception desk know about the problem. "Ah," she said, "it's a Shabat elevator." Noting that today is the Jewish holy day where pretty much everything is closed, I laughed politely at the attempt at humour and congratulated Israel on finally developing a sense thereof.

Our tour guide for the day introduced himself as we finished breakfast. Yishay Shavit is an Iraeli of Jewish extraction who holds a Masters Degree in History. That'd be a good start. He also had a sense of humour - his first question was whether we'd seen Monty Python's "Life of Bryan". Like much that was to occur today, I laughed first and then wondered if he was serious second...

We headed out on foot to explore the Old City. As we walked down the very quiet shopping mall (it's the Sabbath)situated in what was effectively no-mans land before Israel took what is known as East Jerusalem, Yishay stopped to show us a couple of maps and to set our minds right to understand Jerusalem. "It is

vital," he explained, "that you suspend logic today. Unless you suspend logic, you cannot begin to understand why people do what they do here."

To appreciate the concept that he was setting for us, we continued on to Jaffa Gate (one of the handful of entries to the walled Old City) where we stopped and he pointed out the King David's Tower, one of the highest structures around. it wasn't build by David - historical records and timeframes prove it quite clearly. Despite being a structure apparently build for a Jewish King, it has a Muslim crescent atop the lot. "It's not about accuracy and logic," Yishay explained, "it's all about *belief*. Here in Jerusalem, if enough people believe it then it *becomes* true." It sounded a little strange but, frankly, it is also rather a neat summary of religion. Given that the Old City is pretty much the most sacred of places (or very close to it) for so many of the worlds religious sects (I choose sects deliberately - I was tempted to write cults...), then it's no wonder that the description he gave makes more sense the more you think about it.

We walked through the old Jaffa Gate. To repel invaders, you walk through a door that is set parallel to the wall and then make a ninety degree turn to the left to walk through the wall itself. The turn was such that a chariot could not enter the Old City. Nor, it seems, could the Kaiser in the days of the Ottoman Empire just before World War One. What's a poor Kaiser to do when he wants to visit the Old City of Jerusalem under his control? Why, knock a large part of the wall next to Jaffa Gate down so that he can ride directly into the city. I wanted to know if there was a Hebrew word for "prat".

As a result of the Kaiser, Jaffa Gate is now one of the few options for vehicles to enter the Old City. Buggered if I know why they'd want to - the streets are hardly wide enough to accommodate people, let alone vehicles. And parking? Not likely. Why do you reckon Jesus arrived on an ass? But more on him later...

It was at this point that Yishay became worth his weight in gold - and commenced a tour of bits of the Old City that you just wouldn't see if you didn't have a guide with a Master's Degree and an intimate knowledge of the history and laneways of the place. Where the vast majority would continue straight in to the place, we turned right and wandered up to view another of those delightful logic suspensions that he'd talked about. We wandered into a courtyard that could very easily have been directly from the English colonial period - tea house, lush courtyard and all. On the other side of the yard was a Protestant Church - in which a Jewish service was about to take place. Why not, eh? Bringing people together to talk about similarities rather than differences is perhaps something this part of the world might possibly do a bit more of.

Moving on, we entered the Armenian quarter. The Old City is divided into Jewish, Muslim, Christian and Armenian quarters. But three are religions and the other is a region, so what's going on there? The Armenians are a Christian mob, but they were actually the first nation to embrace Christianity as a religion - and when things went a bit pear shaped, a significant number of them moved here. (On occasion, the Ethiopians claim that they were the first to embrace Christianity as a nation - and if they believe it, then it's true - more on them later). The result is that the Armenian version of the various bits and pieces of Christianity has an ancient feel to it. Yishay led us past the pottery artisans that abound here and into the courtyard of the main Armenian church. Just the yard had a fantastic feel to it, but coming from behind a heavy leather cloak covered doorway was a deeply mellifluent chanting that indicated a service in progress. We asked if we might take a peek - and were surprised when asset was given.

Behind the cloth was a scene like nothing I've ever seen. There was little light, but from what was available I could make out *hundreds* of incense burners handing on chains of various significant length from the high domed ceiling. They were burning frankincense which provided both a powerful aroma and a thick, smoky atmosphere. Sitting on the floor in the middle of the church were perhaps twenty men in blue cloaks providing a background chanting to the whole scene as the High Priests conducted a service in a chapel just off to the left. The sound, the scene, the surroundings were all overpowering. If there is such a thing as a religious presence, it was in here.

Our next stop was the Zion Gate, another of the entry points to the Old City. Mark, a mate of mine, signs all of his personal emails "in search of Zion." I was delighted to send him a photo noting that I'd located it for him. Across the outside of the Zion Gate are the bullet marks left over from the 1948 conflict to which this area was central. This was East Jerusalem (it's actually not east, but that's thinking logically - stop it), and this was the heart of contested territory.

Our guide bought us what's known as a Jerusalem Bagel - a large swath of boiled and then baked dough that's served with zaatar, a combination of pounded spices not dissimilar to that which many countries enjoy with bread. In this instance, a portion of the bagel is simply pulled off the main and the fresh inside dipped into the dry spice mix which will stick to it. As we munched, Yishay asked if any of us had been to Jerusalem previously. I advised that the last time I was here was 20 years ago. He wanted to know what had changed. Mulling it over - after all, what has changed in Jerusalem in thousands of years? - it struck me; last time I was here there were fresh faced Israeli soldiers with automatic weapons on every corner. This time, they were something of a rarity. I posed the question to Yishay who pointed to a nearby tower. "Camera's", he said. There are now 360 closed circuit television camera's that cover the entirety of the Old City. Soldiers can be on the spot when needed without the overt threat they naturally entail.

We next entered David's Tomb. Remember we're outside the walls of the Old City at this point. That means that David is most certainly not buried here. The Bible (apparently) specifically refers to the fact that he was buried *inside* the walls. Never mind logic and reality - enough people believe that this is David's tomb, so David's tomb it is. We donned the provided yamulkah head coverings and entered the room where the tomb is *believed* to lie. There was one very large man in there praying, oblivious to our presence. Like many of the more fervent Jews, he was rocking back and forth - and with great vigour, even snapping his fingers a few times. I asked our guide why. There's no real reason, he tells us, it's just to really "feel and get into the prayer."

Ascending a narrow staircase brought us to a more densely populated room where the last supper shared between Jesus and his disciples is *believed* to have taken place. I asked Yishay why they were all sitting along one side of a table. He noted that the painting to which I referred came many hundred years after the event - and that I should cease and desist with logic. The room itself was nondescript - unless you were there with someone who knew where to look. Over here was the symbol of it having been a mosque. Over there was the symbol of it having been a synagogue. In a third location was a clear symbol showing that it had been a Christian church. And therein lies the conundrum - these religions each have their own set of claims to just about everything in this ancient city. Alternately, they have some much in common that perhaps someone might just suggest they all get along a little better.

Once further set of stairs upward brought us to rooftop level and a glorious view over the Old City and across the valley to the Mountain of Olives, mostly taken up with a cemetery. Across to the right, Yishay pointed out the "barrier" (his word) the Israel has recently built. I asked him what he thought about it. He responded that he used the word "barrier" very carefully. Some people call it a dividing wall, some people a security necessity, others a symbol of oppression. He wasn't sure which one was correct, but he did make it pretty clear that anything that made it safer for him and his family and friends (both Jew and Palestinian) to live, work and play was something positive. There has been a marked decrease in the number of suicide bombings since the erection of the barrier, although that might not have much to do with the barrier itself.

This led on to a larger discussion about the state of Israel and achieving peace. Yishay described the two sides of the Jewish Israeli population simply - there are hawks and there are doves. He said they couldn't be compared to the "left and right" of traditional global politics as, like with anything in Israel, there are far too many complexities for a one or the other definition. In general, the doves favour making peace with the Palestinians and finding a way for everyone to coexist. The hawks, on the other hand, favour a far more aggressive approach. Clearly a dove himself, Yishay feared that the hawks were on the ascendency and will have the best hand come early next year when elections are due. Adding further complexity to this is the growing importance, politically, of the orthodox Jewish population. Clearly frustrated, Yishay explained that

orthodox Jews have much larger families than the average (hence their future importance to politics), tend to vote as a bloc (hence their importance to current politics) but refuse to work (and hence are a welfare burden on the country) or to complete military service as they choose to devote their lives to religion.

We delved back a little in history to understand more. The term "West Bank" refers to the western bank of the Jordan River. The area used to belong to Jordon, as did East Jerusalem. Israel launched an effective hostile takeover bid for the lot, which it now holds. When they took East Jerusalem, there was a bitter in fight about what to do with the Palestinian population who lived there. Eventually, they were offered citizenship of Israel. Having fought or been within a family who had fought in the recently concluded hostilities, the Palestinians were unlikely to take up such an offer - they saw it (perhaps understandably) as an act of virtual treason. Yishay explained that they now have "full rights" as associated with citizens, but they are not allowed to vote at national elections and are not allowed to carry passports. I asked if perhaps those two were not the primary "full rights" generally associated with citizenship. He agreed with that trademark israeli shrug that says all at once, "you're probably right, but what are we going to do about it?"

We descended the staircase, each deep in thought at the complexities that we'd managed to stumble across in such a short time. If it could be this hard in under two hours, how bloody difficult would it be if you had a deeper grip on the lot? Yishay pointed to the Freemason symbols in the latticework of the staircase railing. Right, so it can get that much more complex...

Our next church (for surely that is the way to describe a tour of Jerusalem) was that of the Virgin Mary. It was here that she entered an "eternal sleep" (she didn't die). The dome above her tomb is completely undecorated, unlike any other such construction elsewhere on the planet. We were encouraged to look down, whereupon we discovered that the floor is laid with a fresco of what would normally decorate a ceiling. the symbology was obvious - this wasn't a place from which the Virgin had ascended - for she's merely fallen to an eternal sleep - and that the detail was actually *underneath*. We descended into the crypt to view what believers *believe* is the tomb.

Moving on, we entered the very quiet streets of the Jewish Quarter which was largely deserted on this the Sabbath (Shabat). The buildings look far cleaner and better cared for, but the reason is not neglect - it's as simple as age. Much of this area was destroyed in the 1960 fighting (the War of Independence) and has since been rebuilt in the old style. Of course, if you dig down on any project you're going to find something. It was under the Jewish Quarter that they found the old Cardo - the trading centre used for hundreds of years under the Romans. This caused all sorts of angst - there were those that wanted to preserve it and those that wanted it destroyed for what the Romans had done. Sigh.

Our next stop was to be the Western or Wailing Wall, but to get to it we needed to pass through a security check. Once through that check, we wouldn't be able to take photographs as this was Shabat. Stopping at an area overlooking the lot for some happy snaps, I questioned the "no photographs on Shabat" arrangement. Yishay explained that it goes back a long way and has required the translation of rules derived long before modern technology existed. It's the job of the Rabbi's to consider the rule of God and to apply it to modern situations. In application to cameras, there's a strict rule that says a Jew on Shabat cannot light a fire. The obvious extension is that they can't turn on their stove at home and hence the heavily Jewish populated areas smell of warm meals from Friday evening until Saturday evening as food is left on warming plates for the whole period. A little more extended is the result that you cannot drive a car - turning on the ignition lights a fire in the engine to provide propulsion.

Extending things to quite close to breaking point, in my opinion, is the rule that you cannot press a button that will light up. I looked quizzical until an example came up. "Did you notice that one of the elevators in your hotel wasn't working as normal?" he asked. "Yes," I replied. "That's called a Shabat elevator - it stops on every floor on the way up and the way down so a Jewish passenger is not required to press a button to use it service."

And there it was - the girl behind the reception desk at the hotel hadn't developed a sense of humour on behalf of the nation at all. There really is such a thing as a Shabat elevator.

What we discovered next, though, was that there isn't such a thing as a metal detector to enter the Western Wall on Shabat. There's lots of stern glances and a visual once over as you pass through, but that's it. Seems something of a weak point in the whole shebang, I'd have thought.

The Wailing Wall is actually the western retaining wall of the platform that used to hold the temple mount. The remaining portion of the wall is already enormous, but it needs to be considered in context - this bit was only the retaining wall. The temple itself was actually built on top of all of that. it's not hard to see, then, that this was actually the largest temple in the Roman Empire. Within the area was the Temple Mount. Here lay the foundation stone so central to the Jewish faith, the place from which Mohammed ascended to meet Allah and the place to which Jesus (who was a Jew) came and overturned the tables of the money changers (which ultimately led to his unfortunate demise - you may have heard about that bit).

We approached the Wall, again donning yamulkah, and were astonished to be guided right up to it. That's the sort of thing that you wouldn't think was permissible if attending alone - but nobody paid us a second glance. in fact, Yishav had brought blank pieces of paper with him in case we wanted to write a prayer to lodge in the wall in the way that tradition dictates. What on earth could I pray for here? That people could understand each other and perhaps be a bit nicer? Maybe I could follow President Obama's lead and pray for world peach (a journalist followed him up to the wall and retrieved the piece of paper he lodged there - which might explain why people are still having a go at one another).

The wall itself actually extends under the Muslim quarter. There's an interior area which is both wall and synagogue. We entered to watch the faithful about their business and to have a look through the books which explain to them how they must conduct their daily lives. No wonder they don't find the time to work or serve in the army...

The Muslim quarter was next - and it was far more chaotic and bustling than the Shabat-quietened Jewish quarter. One of the first stalls that we came across was selling frankincense for burning in churches, the distinctive smell that anyone who has been into one will recognise. Yishay explained to us that it actually predated Christianity. It was burned in pre-Christian temples to mask the smell of the sacrifices that were made therein. Christianity picked up and continued the practice to smooth the path of transformation from old to new for converts.

Christians the world over will know the Stations of the Cross. They adorn just about every Christian church. Here, then, on the Via Delarosa is what Christians *believe* to be the path the Jesus followed with the crucifix to which he would eventually be nailed. Hordes of pilgrims were travelling the route, smiles of religious fervour and rapture fixed firmly to their stern faces. Good on 'em, I thought, perhaps being just a touch - is it jealous - of their conviction.

We viewed the first couple of stations and their attendant churches before retiring for a well earned lunch of - what else - falafel. There really is no finer way to treat the humble chick pea.

Continuing along the stations of the cross, I asked Yishay if it were at all likely that this was indeed the path taken. He smiled slightly before noting that Christians *believed* it was and therefore it was - unless you happened to have a deeper view of history and understood that the streets have changed over a couple of millennia and it is highly unlikely that anything remains in the same place. it didn't bother the pilgrims, though.

We approached the last few stations in the mighty Church of the Holy Sepulchre through perhaps an unusual route. Up a set of stairs and across a rooftop we came to a building whose architecture was completely out of place in Jerusalem and much more at home in northern Africa. And for good reason - for

this was the Ethiopian Monastery. The second (or first, depending on whom you talk to) country to adopt Christianity also wanted its place in the holy city, so determined to establish a Monastery as close as possible to the holiest of holy's - and what better place than on the roof? From the Monastery, we wandered into their chapel and then down stairs to the courtyard outside the main church.

Only here can you understand that the difference between Catholic and Protestant is actually only the tip of a very large iceberg. There's a number of churches that each hold an interest in this church. After centuries of bickering, they came to an agreement as to who has responsibility for what. None of them will give up even the smallest of those responsibilities as they view it as the thin edge of what might be a very big wedge. For example, if a Russian Orthodox Christian Priest decided that the courtyard was filthy and needed cleaning, he'd find a very angry Greek Orthodox Priest bearing down on him the moment that he wielded a broom - for the courtyard is the responsibility of the Greek Orthodox Church. Similarly, the Armenian Church had a right to access the building via its windows, thereby avoiding the toll charged through the main courtyard. They did that by scaling a nearby wall, risking life and limb to walk across a narrow ledge and then climb a short ladder to the main windows. The ladder remains in place - nobody will remove it.

So with all of those small responsibilities divided, what then to do with the keys to the main doors? That was an argument eventually solved by looking outward. Try this on for size - the keys to the most holy of Christian churches were handed to two Muslim families for them to keep. The same families continue the role today.

Surely - *surely* - there's something in that for the entire Middle East?

Wandering inside, we came to understand what Yishay had been explaining about the difference between a pilgrim and a tourist in Jerusalem. A pilgrim will stand in line no matter how long it takes to see the main sites inside the building, whereas a tourist will get as close as he or she can, snap some photos and move on. The queues were a couple of hours long. We were tourists.

At the entrance to the building is the Anointment Stone. It was here, Christians believe, that Jesus' body was anointed with oils in the Jewish tradition after he was taken down from the cross. The site now sees hundreds of pilgrims rubbing religious icons on the stone to make them holy and provide them something to assist in worship when they returned home. I felt the need to join them - actually, I felt the need to touch the stone to see if I could understand what the fuss was about - but I didn't have any icons with me. I reached into my pocket to see what I could come up with - and there was my iPhone. Why not? And so it is that my iPhone is now, as I understand it, a religious icon. I wonder who'll answer service calls?

Just across the room, Pilgrims were lining up to enter the chapel - three at a time - where Jesus they *believe* died on the cross. On the other side, they were lining up to see where he was entombed. One problem with that, of course, is that Jews did not bury their dead inside the city walls - which this well and truly is. Never mind - as long as people believe.

We went to exit, but found the way blocked by security. The area was being prepared for a procession of the Armenian Church leaders that we'd seen early in the day. We dutifully stood with the faithful whilst a whole host of fellows with very mysterious hats indeed chanted their way past. All very immersive and wondrous.

Enough of churches, though - and just about enough of the day. It was tiring trying to take it all in. Instead, we opted for a cafe in the Muslim quarter to consume some Palestinian beer. On any other day, that would have seemed unusual - but perhaps not today. We bid a fond farewell to Yishay and hit the tourist trap flea markets of the Muslim quarter to bring home silly souvenirs, walked back to our hotel and settled on a local cafe for dinner.

Jerusalem. That's all I have to say about that.

11 November The Negev Desert

Jerusalem wasn't designed for motor vehicles. It's a place best negotiated by ass, but we were headed for the Negev desert and didn't have time to arrange ass-travel. Instead it was off to the thoroughly indifferent Hertz office to obtain a thoroughly modern motor vehicle.

The Hertz agent told us that he had programmed the GPS to avoid Hebron. He offered to change the setting when he found out that we were headed south. We politely declined. I explained that I have a rule to avoid any place name that has been linked with the word "massacre". Hasn't done me wrong yet...

Our first destination was just outside the city of Be'er Sheva in the Negev desert. The town of Be'er Sheva itself is well known to Australian military history buffs, for it was here that the last great cavalry charge in history occurred during the First World War. The Australian Light Horse marched across the parched landscape for a number of days before making a charge across a couple of miles of open ground to the ancient city which had the only fresh water wells for miles around. Their speed managed to get them under the Turkish guns and they took the city in what became a pivotal moment in the Palestine campaign.

Just outside the city is Kibbutz Hatzerim - the birthplace of the globally recognised water efficiency leader in Netafim. The Kibbutz was established early in the settlement of Israel. Through necessity, they had to work out a way to feed themselves when the soil was essentially desert and the available water was severely limited. It was drip irrigation that they came up with and that they have now become one of the global commercial powerhouses of.

Outside their headquarters flew the Israeli flag - which flies from so many flagpoles across the country that it's difficult to miss the nationalism which I suppose is understandable when under constant threat from your neighbours. On the next flagpole, however, flew the Australian flag. It was a nice touch of welcome, I thought.

In the boardroom inside, we were introduced to the remarkable story that Netafim is. Operating in over 100 countries, it was founded here on the Kibbutz in 1965 and is still partly owned by them. A number of other Kibbutz own parts of the company (when Hatzerim ran out of capacity to produce, they invited others in) but the majority is now owned by private equity firm Permira. I rather enjoyed the irony of a Kibbutz - perhaps the last bastion of socialism - having become very well resourced through the process of selling a business to that thoroughly capitalist construct, the private equity firm.

They presented us with some sobering statistics that underscore the necessity for the globe to seriously consider how it goes about producing the food and fibre that sustains us all. There's over 4.1 metric tonnes of water in a pair of blue jeans. I find it remarkable the number of people that criticise the growing of cotton whilst wearing jeans - perhaps the only thing more remarkable is how many of those people have no clue that denim is made from cotton.

Globally, saving just 15% of the water used in agriculture will double the volume available for domestic use. Of course, that's merely a nifty way of saying that 70% of the world's water use is in agriculture with only 30% used for human consumption. If there's a saving in agriculture, it won't necessarily end up available for domestic use. More likely it will be used in the expansion of agriculture (which is entirely necessary with a growing population) or, as in Australia, the "saving" will be as a result of environmental demand for ecosystem service from that limited pool.

Only 17% global agriculture is irrigated - but that portion represents 40% of global food production. In short, water gets applied and food gets grown. It's a remarkably simple equation that leads to such overwhelming complexities.

There's more to the story, as Netafim told us - the application of drip and subsurface irrigation (as opposed to flooding) has the capacity to address that other global political nemesis; climate change. Irrigated agriculture - particularly those methods where water stays on the surface (such as rice bays) - is a major contributor to greenhouse gas emissions. It's not the carbon dioxide emission that we've all become overly familiar with, but methane to some degree (no pun intended - I actually only got it after I wrote it...) with nitrous oxide being by far the biggest issue. Nitrous Oxide (also known as laughing gas) is actually 300 times more powerful as a greenhouse gas than carbon dioxide.

Quite clearly, opportunity exists here - but everything must come down to simple economics. Drip irrigation is expensive to install, obviously. It goes further than that, though. Gravity is free, whereas drip irrigation requires pressurisation to a certain degree which requires pumping which requires energy which results in the emission of greenhouse gases. And so we come full circle. As governments globally intervene to price greenhouse gas emissions, it's quite possible that the economic scale will fall in the balance of products like those produced by Netafim - but perhaps not just yet.

The other key component of agriculture in Israel was introduced to us in this sessions - the reuse of water to grow food and fibre. Globally some 60% of water used in agriculture is recycled in one fashion or another. Israel is a clear leader in the field with some 75% of its effluent being reused (they call 'em "date" palms for a reason). By way of contrast, Australia sits within the top ten countries globally on this scale with a reuse of some 13%. Still, there're bits of our country that aren't desert I suppose.

We retired to the Kibbutz canteen for lunch. I'm not going to claim it was either the best or the worst meal that I've ever eaten. In fact, it probably sits entirely in the middle of that spectrum - but I will claim it was one of the more interesting, not on the basis of what we ate but on the basis of where we ate it. This was a Kibbutz. This was socialism. The people who were out very generous hosts were self-described *kibbutz-nik*. It was a term I'd only heard from 1960's era literature, yet here we were right in the middle of it. Our hosts had been some of the founding members of this operation and were most content in this surrounding. This dining room - think 1960's era mass consumption dining room complete with decor of the era - was where they'd eaten the vast majority of the meals they had ever consumed. I couldn't help but ask impertinent questions - which they graciously answered.

If you're a member of a kibbutz, your salary is paid directly to the communal pool. Regardless of your position or role (many from Hatzerim work at Netafim, but not all), your salary goes into the pot and each member draws equally from it. Housing is provided by the kibbutz (granted, the houses of Hatzerim were pretty reasonable, largely as a result of the profitable Netafim business) as are all your meals provided you're prepared to eat them in the canteen. There's no limit on the food you eat, but only in the canteen. If you want to take food home, you buy it from your (limited) personal budget at the kibbutz shop and can cook at your place.

Transport was a fascinating subject. The kibbutz has a pool of vehicles which all members are entitled to use. They're issued with a magnetic tag which they must apply to the vehicle prior to starting it. In this way, a sharing of costs amongst personal budgets is accomplished. If multiple members are on the same trip, each applies their tag and the costs are equally shared. That's all pretty straightforward - until you get to company cars that go with the jobs of some. If your employer gives you a car, that also must go to the kibbutz for others to share. They've overcome the scenario with *another* keytag. If the trip is a business trip, that keytag is applied - where for a personal trip then the personal tag is applied. If the trip is a bit of both, you use both tags. Ah, Israeli practicality at its best, eh?

I asked if the era of the kibbutz was waning, wondering if anybody was applying to join any more. I was surprised to hear that they've no shortage of applications, but they're unsurprisingly a bit picky in whom they accept. As an example, they noted that contributions to a communal arrangement clearly change over time. In the peak of your working life, you'll be a net contributor. As your working career winds down and concludes, that position is clearly reversed. To that extent, an application has more chance of being accepted if you happen to be younger and on the upward employment curve. If your application is accepted, at least at this kibbutz, the first step is to come and live with them for a year. After that, it's a full democratic vote to determine acceptance.

The open and honest nature of the answers drove me to ask the big question - is living on a kibbutz a good idea? Will you stay here? Would you do it again? The headline answer didn't surprise me; it was yes to everything. The underlying reasoning was, however, interesting - it seemed it wasn't so much a commitment to the kibbutz, but more to what it stood for. This way of life was what created a country from a desert. It's not surprising that there's a deep, emotional tie to it.

Leaving Hatzerim, we stopped briefing in a jojoba plantation which they've recently established a market for before visiting a park in Be'er Sheba that has recently been constructed though the largesse of the Visy Corporation owning Pratt Foundation. It's always an odd experience to be on the other side of the planet and find a tribute to Australian military achievement. Such a small country - what the hell were they doing here? Still, a moving experience like so many others across western Europe and, in particular, just to the north of here in Turkey.

Our next stop was the Yatir Winery. I'd read about this at the time I was organising this trip and it was one of the first places I determined that we needed to stop. So much about it seemed fascinating to me - a winery in the high desert of Israel making internationally recognised wine under strict Kosher conditions for sale to a defined niche market under the guidance of an Australian-trained winemaker. What wasn't to look forward to?

Yatir didn't disappoint. It's owned by the Carmel multinational, but operates entirely independently. It started life as a cooperative with the growers of the region recognising a niche for Kosher wine. They take their religious obligations seriously - only a practicing Jew can handle the wine or any part of the process. In fact, an Orthodox Rabbi had been specifically brought in to accompany us on our visit. I'm not sure what it was that we might have done to taint the product, but he was a stern fellow who shadowed every move with a grave face and sufficient concern to make us all jumpy. Surely wine making is hard enough without the added stress of religion peering over your shoulder?

The winery produces some 150,000 bottles a year - enough to give you a hangover that'll outlast religion - from vineyards that are located between 600 and 900 metres above sea level. That's pretty high, resulting in very cold winters with hot days and cool nights in summer. Still, wine has been made in this area for well over 4,000 years so there's clearly something in it. They get zero rainfall across summer (what little they do comes in winter), meaning that the 200mm per annum required all has to come from irrigation.

For those interested in the details of growing grapes, they aim at 7 tonnes per hectare with plantings on an east/west axis. The leaves on the southern side are left alone with some northern plucking (remembering this is the northern hemisphere - so leaving the southern side is about providing some shade for the fruit). They get a bit of powdery mildew, but not downy mildew. They deal with it via chemical spray and they also spray for moths (about 4 - 5 sprays per year).

Eighty percent of what they produce goes to domestic consumption, which surprised me a bit. I thought they might have had a not inconsiderable export market, particularly to North America. The price of decent wine on that continent is exorbitant (which, to a certain extent, has given a significant opportunity to Australian labels) and I can't imagine there's a great deal of Kosher wine there. I asked about this, but was told they simply can't compete internationally on price (which is perhaps a bit surprising given we

uncovered this morning that the minimum wage is around 25 New Israeli Shekels are year, or about $6). At around $25 per bottle, they're considered expensive on the local market.

Unsurprisingly, it all got better with a tasting. Credit must go to the winemaker, Eran Goldwasser, for having a real crack. He's not afraid to try some bold styles and experiments. From our perspective, each and every one has paid off. I'm putting it down to his experience in the Australian Coonawarra and Margaret River regions!

Being around the outside of some of Israel's great reds, it was time to move on. We had a quick look through a nearby plantation of almonds and olives growing on the recycled effluent of the nearby town of Arad before pointing the car northward - and down.

"Down" because we were off to the Dead Sea, some 400 metres below sea level. Even though it was dark, it was pretty clear for the next hour that it was all downhill as we descended a thousand metres. The Dead Sea is a fascinating place for so many reasons, not least the fact that it has become something of a tourist resort, primarily for Eastern European folk (particularly Russia). There are a number of hotels along its shore, many of which appear to offer significant facilities and a great place to stay. We'd not booked any of those. Nope, we'd clearly prefer the Stalinist-holiday-camp disaster that is the Leonardo Inn. It's one of those hotels where you don't take off your footwear.

Let's ignore that for now, though, and concentrate on the Dead Sea - for it is truly a marvel. As you probably know, it's salty. Not just a bit salty, but really very salty indeed. It is, in fact, saturated with salt - which is why you see crusts and towers all over the place. We went for a night swim in it, which was quite extraordinary. It's not really a swim as such, because it's virtually impossible to do anything other than float on your back. Obviously you don't want to get this stuff anywhere near your eyes or mouth, but everyone will have a crack at some form of traditional swimming. Everyone will fail - you can't kick with your legs because you can't hold them under water!

One of our travelling companions was keen to test out the warning not to urinate. Fortunately, he listened to our warning - but flatulence struck nonetheless. The noise that came from his as salt invaded where it really wasn't wanted and didn't below was quite remarkable. It was followed by some sort of forced transit to the egress area and a buttock-clenched run to the nearest cold water shower. It's no simple task to force fresh(ish) water to the required area - but, damn, it's funny to watch.

Perhaps a little more sobering is the fact that around 95% of the Jordan River, which flows into the Dead Sea, no longer flows into the Dead Sea. It's extracted for use upstream. That volume that remains in the channel is not so much water as - how do I put it delicately? - raw sewage. Knowing this, why on earth were we comfortable swimming here? The answer is pretty simple - the water is so salty that it's toxic to anything toxic. It's crystal clear because every bug that flow into it is killed by the salt.

Like much of Israel, the Dead Sea itself is a mind-bending logical conundrum - but fun to float about in!

12 November The Arava Valley

By definition, the Dead Sea is on the western bank of the Jordan River. Obviously. So why is that of any interest whatsoever to this story? Allow me to capitalise and add the voice of a newsreader;

The West Bank.

It's a phrase generally accompanied by The Gaza Strip. So we're in the middle of the bit that has been yelled over strenuously by Jordan and Israel. The day was to progress further into it.

But the day started at the hotel which promised so little and delivered even less. Breakfast was enough to make a pessimist cry. Outside, the weather was threatening. In the driest place on the planet, the weather was threatening - and was later to carry out said same threat.

Downstairs was our host for the day - yet another affable Netafim chap, this time by the name of Dubi Segal. He'd driven an hour and a half or so from his home only a few miles from the Gaza Strip. He later told us that he despises urban living, so chooses to live in the country - close to one of the most violent regions in the world. He really doesn't like urban living...

We drove south along the Dead Sea, amazed at the concentration of salt around everything. Power lines ran overhead with their poles in the brine, collections of salt crystals gathering at their base. Water pipelines ran along the side of the road, their metallic bases eroding from under them seemingly as we drove. A collection of industrial works was deemed by us to be the necessary blight from those producers of Dead Sea mud and salt that flogged their wares to suspecting tourists from Russia just up the road.

Further along, though, was a more serious industrial affair comfortably belching all sorts of nastiness into the otherwise not-particularly-pristine atmosphere. It was a potassium plant that produces large swathes of the stuff by extracting it from the mud and brine around the area. They use some of it here and export great quantities.

We made our way to the Arava Valley where popular lore has it that farmers have "made the desert bloom" through extraordinary use of limited water resources. We couldn't help but think as we drove through this classic desert landscape - with its regular 'camels on round' warning signs - that something just didn't stack up. The feeling only got stronger when we came across the top of a dune to be fronted with the first of the farms that we were to visit.

Under hectare upon hectare of shade cloth, the farmers of the Arava Valley grow relatively enormous quantities of capsicum, tomatoes and various other bits and pieces (including ornamental fish) for export to Europe and North America. They grow it on soil that has been *trucked in* using water that is pumped from between two hundred metres (that's already a lot) and one kilometre below ground. The soil is so bare that they then have to add all sorts of fertiliser to it to make the whole shebang productive. To add to the challenge, the water that they're extracting is - as you'd expect this close to the Dead Sea - heavy in salt load. They have to use around twice as much as they'd otherwise get away with in order to wash the salt load through the soil. Above the roots in a build up of salt - below the roots is the same - and they aim to simply keep the root zone fresh. If salt intrudes to that root zone (generally as a result of the one to two inches of rainfall a year), they have to flush it through with more water.

Their aim is to hit the off-season markets in Europe and the US so that they achieve a price premium from we consumers who are keen to eat fresh produce in a homogenous fashion all year round. To a not-insignificant extent, they seem to be achieving that. A price premium is also attached to the organic methodology that they've engaged. They're also achieving massive productivity - they're getting 80 tonnes of capsicum per hectare and up to 200 tonnes of tomatoes.

But something doesn't stack up. The systems are unquestionably state of the art - it's massive productivity in the middle of the desert. But why here? Why would you pump water from that deep, live in the middle of nowhere, deal with some of the worst soils in the world and suffer massively high temperatures in the summer, to the extent that *everything* has to be grown under shade cloth?

The answer became apparent as we drove along the 'Peace Road' through the 'Badlands' to our next stop - the Hatzeva Reservoir. Along both sides of the road was a barbed wire fence with the unmistakeably forbidding no entry sign alone with text in Arabic, Hebrew and English reading very simply; "Do Not Enter - Minefield".

Oh, fark! This is about as close as a political strategist is every going to get to cutting edge danger. Mines. A minefield. A real one. With things that go bang.

They're left over from the significant conflict between Israel and Jordan. Whilst a peace agreement has been signed between the two of them, this is still frontier territory. These farms are right up to the border - and I mean right up to the fence. On one side is a shade-cloth covered farm, on the other side is a minefield.

Standing on the side of the Reservoir talking to the farmer who'd shown us around it became apparent what this all is. It isn't an agricultural settlement - it's a military settlement. Israel took the West Bank and quickly realised that in order to hold and secure it, they needed a population here. But how on earth do you get people to move to the middle of nowhere to populate a dangerous desert with very little water?

The answer was agriculture - and the government has spent a fortune to make it happen. Despite the enormous productivity that they've achieved, the costs remain far more than just daunting - they're just about impossible to cover. The farms are all highly labour intensive (which, of course, adds to the population base that they're seeking), they have to use incredibly expensive materials to overcome the elements (shade cloth, drip technology for irrigation, pumps from incredible depths) and it isn't close to any of their markets. It has been government dollars to develop everything (we suspect up to 100%) and to provide ongoing financial support (we suspect up to 30%).

Don't get me wrong - the people here have achieved incredible things. They have, indeed, made the desert bloom with mind boggling technology and an iron will. What needs to be understood, though, is the reason that it all happened. Moreover, the question of efficiency has to come into it. If they're not producing a profit in the absence of government funding or farming sustainably (the aquifers are under significant pressure), is this efficient or sensible production? Dan had the best conclusion - agriculture was cheaper than a military base. There's at least some return on the agricultural production to offset the costs and so the country is better off. A fair conclusion, I concluded.

After a visit to a couple more farms and to the water officer of the local town (Moshav Hazeva), we ended up at the agricultural research facility. They're working on strawberries grown with desalinated water, they're trying solar electricity to remove salt via nano-filters rather than reverse osmosis and they're assisting farmers to diversify to crops including clown fish for the aquariums of Europe. You've just got to give it to these people - they are having a serious crack at farming in perhaps the least likely spot on the planet.

Our final stop for the day was at a date palm plantation using extremely low quality water that's being recycled from local settlements. They don't waste a drop here. The water is virtually black and you can see the salt leaching through the soil - yet still, here in the middle of the desert, palm trees are flourishing. Good on 'em - I can report that the dates are mighty tasty, too.

We needed to get Dubi back home. He was going to guide us as far as Be'er Sheva, where he'd continue west to his peaceful country retreat on one of the most dangerous borders in the world and we'd turn north to Tel Aviv. In looking at the map, that involved a fairly circuitous route south with a climb up out of the Dead Sea Valley as we headed towards Eilat on the Red Sea. Dubi, though, had other ideas...

We turned off to the west and headed directly toward massive, truly *massive*, desert hills. I couldn't see a way through them and wondered what it was that Dubi was taking us to see before doubling back and continuing on our merry way. About a kilometre out, I saw the dots that revealed themselves as forty gallon drums marking an insanely steep switchback pattern *straight up* the what-seemed-vertical mountain. I don't mind reporting what came from my mouth; "oh, fuck me..."

Dubi stopped at the base of the hill. I can admit to a small relied that perhaps he was just showing us a silly round from the base - the sort of road that you see in documentaries. Impossibly steep, ridiculously narrow and good only for South American buses. He called us over to a blank spot of desert (because there are other sorts...) where he explained that this wasn't any old road - this one was pretty special.

The road itself was built a few decades ago by the British, but it was on the path used for centuries before that. This was the old Silk Route from Europe to the Far East. Marco Polo had trod this same path - and now it was time for a Kia seven seat family sedan with an underpowered diesel engine to attempt the same.

That's clearly not challenge enough, of course. In this, the driest place on the planet, the middle of a bloody desert, where water comes from over a kilometre underground where it has rested peacefully for hundreds of years - the skies opened up. Not just the spitting that teased every moisture starved plant in the place yesterday, but proper grown up rain.

How on earth do I describe it? The elation of driving on the Silk Route. The majesty and desolation of the desert, seen in spectacular three dimension. The beauty of rain falling on such a barren landscape. The sheer sphincter-widening terror of a road that seemed quite regularly narrower than the vehicle and steeper than a Korean engine could possibly contemplate.

It was marvellous. Even more so when we reached the top and trepidatiously looked back down.

But it wasn't over.

The road kept climbing out of the Dead Sea valley and up to the Negev Desert. Whilst not as steep as it had been, it was still serious enough to merit comment. The challenge now was coming from the water. It was still raining, but the water that had already fallen really had nowhere to go. The ground is rock hard, so there's no option to seep in. So where does water go? Well, downhill first of all - but primarily along the path of least resistance. Or, as it is more commonly known, the road...

There were large tracts of the road that simply disappeared. All we could see was a sheet of water rushing at us. Fortunately, we were following Dubi who just kept on moving, even though his wheels were up to 40 centimetres under fast flowing water. I figured he was confident and he was showing me where the road was, so why not? It wasn't until we were through the lot that I learned from Hayden, who had been in Dubi's passengers seat, that the poor fellow was particularly unsure. Of course he was. He lives in a country that sees little rain and was in a location that gets less than two inches a year - and he was faced with flash flooding!

So we made our way through that and congratulated ourselves on a fascinating journey.

Over the next rise, as we happily snapped pictures of the landscape and the "camel" warning signs, was another sign that made life interesting - "Military Area; No Photos". Dan merrily snapped a photograph of the sign.

Up ahead was the reason why - a massive, massive balloon in the shape of a World War Two bomb. We conjectured as to what it was, coming to the conclusion that it must be some kind of observation device and listening post. No wonder - it can't be easy to live in a country where each of your neighbours either despises you, has reason to despise you or actively wants you wiped from the face of the earth. I suppose I'd want to listen to what was going on as well. When eventually we stopped to reclaim Hayden, we questioned Dubi as to the balloon and whether our conjecture was correct. He reported that, yes, he knew what it was - and that most people knew what it was. But, no, he wouldn't tell us. It's a national security secret.

And that, I think, is the key to Israel. They deal daily with stuff that to us is merely conjecture. And I don't just mean the Israeli's, of course - I mean *people* on either side of the border and, indeed, even within the borders of what is Israel. Buggered if I know how they do it.

We continued on to Tel Aviv, checked in to a quite delightful beachfront hotel and drank beer. I presume Marco Polo once did the same.

13 November Tel Aviv

Israel makes a fantastic job of breakfast. I'm pretty critical of a change in breakfast regime. When it comes to food I'm very prepared to be adventurous with food (hell, I made it through two weeks in Chine without starving), but I do not feel particularly adventurous first thing in the morning. I don't want anything glutinous or unrecognisable. I'm content with toast, love it when someone wants to go to the effort of eggs, am prepared to accept pastries and must have any of the above with coffee. Israel has done it well by *adding* to the regime rather than *changing* it.

I ordered eggs. Unsurprisingly, bacon wasn't an option. Having ordered said eggs, I was pleasantly surprised when a large basket of warm bread rolls arrived. This was followed by a large bowl of salad. After than came an array of tuna, some vegetables and a couple of other dips. Next was a bowl of hummus with a drizzle of olive oil. Then coffee. Eventually, with the table groaning under the weight of this food, along came the eggs. I knew we'd get there eventually!

After a number of days on the move, it was time to stay put in one city for a day. But for a series of meetings this morning we needed to get to the other side of town. Taxi's are never a simple or straightforward arrangement at the best of times. Add the complexity of a foreign language and a foreign city (our fault, not there's) and it gets more complicated. There are a few cities in the world that also develop an attitude amongst taxi drivers where they choose if a fare (based on destination) is sufficient to spark there interest. Tel Aviv is one of them. Even with the questionable assistance of the hotel front desk, it all proved too hard and we decided it was simpler to walk the half an hour to where we needed to be in 15 minutes.

The morning meetings were all hard-core water policy stuff. We met with a couple of ex-Commissioners, some very-high-up folk at Netafim and a long-serving senior kibbutznik from just outside Tel Aviv where they're using effluent from this large town. There was lots to learn, but much of it was technical. One point of more general interest was a decision to price water at a flat rate across the country. That was interesting given many places that people live are extremely expensive to get water too. They're not remote in an Australian context - you can drive across the country in a few hours - but for a place with the size and fiscal capacity of Israel, providing water at a flat rate to all sees some quite large subsidy effect taking place. I wondered why and was advised by Professor Uri Shani that, like so much here, the answer is political. Many of those who are remote from major cities are Palestinian. The term "pricing discrimination" would rapidly have the first word scrubbed from it were there differential charges- In essence, it's a political smoothing mechanism.

Perhaps surprisingly, water is one of the few issues that neighbouring countries can agree on in this area - at least according to Shimon Tal. He told us that around 40% of the water resources in Israel come from outside the "green line" borders, but this is actually not unusual in the area. For Jordan, the same statistic sits at 30%. For Syria it skyrockets to 60% (with much of their watershed lying in neighbouring Turkey). There's a theory advanced in some quarters that Israel's occupation of the Golan Heights on the Syrian border wasn't about a land grab or a safety barrier, but about securing the watershed of the major freshwater reserve in the country - the Sea of Galilee. That, however, would clearly be a question too far.

The United Nations says that a per capita figure of 500 cubic metres per year is the "red line" below which water shortage should be considered serious. That's a bit laughable in this area - Israel has around 150. They must supplement this with desalination (a process expensive to build and operate) and use and reuse every drop. Their neighbours are worse off. In context, the average global consumption is around 1,080 cubic metres per capita annually. It's pretty clear that this area must import a large quantity of the food it consumes - and that isn't going to change any time soon as the population continues to increase.

But enough of the meetings! Allow me to share a curious event over lunch. We proceeded to a nearby sandwich shop where we bought - you guessed it - sandwiches to enjoy at the tables they had arrayed outside. Given that the sandwich was created for the Earl of Sandwich (after whom the Sandwich Islands were named by James Cook, as the Earl sponsored the voyage - you might know it better as Hawaii) so that he could specifically eat it from his hands whilst playing cards, we enjoyed eating our sandwiches with our hands with no assistance from cutlery. Much to our surprise, then, we were accosted by a woman who had been watching from inside and approached us with a handful of napkins and a disdainful look. She explained that she was an Israeli who was proud of her country and that certain manners must be observed here. She threw the napkins at us entirely oblivious to her great slight against history, the Earl of Sandwich, the intrepid Captain James Cook and exactly how close she'd come to an entirely antipodean "garn get f$%ked"...

From the other side of the city of Tel Aviv, we decided to walk back to our beachfront hotel in search of a city centre. That proved difficult. There rather isn't one. There's a big shopping centre connected by an overhead walkway to a very large (indeed) military base, but that seemed to be about it.

What Tel Aviv does boast, however, is the International Diamond Exchange. Forget Kimberly, South Africa. Forget De Beers. Antwerp is entirely irrelevant. A very great deal of the international diamond trade occurs through here - and almost exclusively via Orthodox Jews. Even by Israeli standards, the security associated with the International Diamond Exchange is extraordinary. If you look at it for too long, they look back at you with a stare like you owe them money.

The look gets a bit better if you wander into one of the places that sells the stuff, though. Inside, somebody took advantage of somebody. I'm not sure which one I was.

We returned to our Mediterranean beach front hotel and thought perhaps Israel wasn't too bad a place at all.

Tomorrow would change all of that - and the world would know about it.

14 November Northern Israel

To this point we'd investigated only the southern part of Israel. Whilst this is a pretty small country, particularly when viewed from Australia, we knew that there were significant differences between the north and the south. The south is primarily desert. The north, apparently, isn't - so we set off to find out.

If the absence of desert means it isn't desert, then it became clear pretty quickly that it wasn't desert. Whilst it wasn't what you'd call verdant, lush or bountiful, it was certainly a bit greener and had a reasonable covering of vegetation. Plenty of rocks intersperse the lot and it clearly gets bloody hot in summer, but it's considerably different to only an hour or so south of here.

Our first stop was Kibbutz Nagal, another part owner and manufacturer of Netafim gear. Once off the highway and onto the back roads to Nagal, it became obvious that the issue of urban encroachment on agriculture is pretty much universal. We found ourselves driving through suburban areas interspersed with

dairy's. There's a certain unique aroma to a dairy in the best of circumstances which is accentuated by heat. These houses weren't just within olfactory assault from the dairies - they were quite literally next door to them!

Israel used to have agriculture contribute up to 30% of its exports. They're now facing huge competition pressure from Spain, Turkey and Morocco who are quite simply able to produce at a lower cost. It's primarily about wages. Even though minimum wages here seem ridiculously low to us, they're high in comparison to whom Israel must compete with. To me, it further underscores the challenges that farmers in Australia and New Zealand must face - the tyranny of distance and the associated transport costs, high wages and very, very low comparative levels of government support through direct subsidy or capital investment. Interestingly, those three countries who now provide such stiff competition from Israel are voracious users of the very technology that Israel employees to "make deserts bloom" - drip irrigation. Netafim are making good money exporting equipment to them.

It's not only know how and equipment being exported - a number of Israeli farmers have set up operations in Morocco to take advantage not only of cheaper labour costs but also of the proximity to European markets. What was previously a very strong agriculture lobby in Israel is - because of this and a range of other issues - losing some of its influence. They're seeing a rising tide of imports, particularly of milk and milk products. There are currently tariff barriers in place which the Government is contemplating removing, which our hosts insisted would spell the end for many small scale milk producers here. On some issues, it's hard to tell which country you're in...

With a different climate to the deserts of the south, the area that we were in grew a different sort of product - one of the key crops being banana's, although they're also grown under shade netting. The owner of the farm at which we stopped was of the opinion that the netting wasn't only about sun protection, but also provided shelter from hail which occasionally comes through here and, perhaps more importantly, created a microclimate within which provided the best possible growing conditions. And so it is that they're getting between sixty and eighty tonnes of bananas to the hectare, where they'd only be getting fifty in the absence of hte netting.

The land that they were using was being rented from the local village. We'd uncovered some interesting approaches to land tenure across Israel and this was to be another. Yesterday we'd been told that it was vital to use land for a whole range of reasons, primarily that unused land would be occupied by somebody if it stayed unused too long. If it was on a border, it risks being taken away by a neighbour if its vacant (which explains in part why the Arava Valley, the least likely place on earth for agriculture, is populated by farmers). Inside the borders, land left vacant can find itself being populated by Bedouin's, perhaps the Arabic equivalent of Gypsies, as seems to be the case on the outskirts of most large population centres. In the case of this banana plantation, the local village had been able to insist in the lease negotiations on what crop was planted. We wondered why - and quickly worked out that it was down to the dollar, or shekel as it were. Rent is higher for land that grows banana's - hence the village insisted on banana growing.

As we stood under the canopy chatting, some of the farm labourers wandered past. The owner smiled at them and greeted them with "Sawasdee Krap". They were Thai. They responded in Hebrew. Obviously.

A very large portion of the crop that they were growing here was destined not for export, as we'd thought, but for domestic consumption - and primarily for Palestinian markets. The majority goes to Gaza and the West Bank. Even when the borders are closed to "all" traffic, the banana crops still get through. Apparently they're a staple food source - the "potato of the Arabic world" as it was explained to us.

I wondered aloud if this caused any consternation in the minds of the Jewish people. The response, to my mind, summed up Israel;

Ideology is bad for business.

Like anywhere where politics has taken over completely, it's really only a relatively small percentage on either side of the equation that dominate issues and ensure there's no solution. To my mind, the majority just want to get on with business and get on with life.

Two weeks of extraordinary experience was coming to an end. Our next stop was to be the final of this trip - and was probably thrown in more as a tourist destination than anything; the Baha'i Gardens of Haifa. They're apparently spectacular. I say "apparently", because our GPS system apparently thought they were in an entirely different spot to where they were. We drove to Haifa, we drove through Haifa, we kept driving north of Haifa and eventually turned up at a what seemed to be a private garden. The security guard dutifully told us that it was, indeed, the wrong spot - and suggested that we check our map. We did.

Bloody hell! I'd heard of people slavishly trusting their GPS are continuing on roads that had barriers across them advising they were closed. Unsurprisingly they come to an understanding that GPS was not the be all and end all of navigation. Staring at the hard copy map and working out where we were drew us to a similar conclusion - we were within a stone's throw of the Lebanese border and, frankly, not all that far from Syria where things were completely out of hand. We turned south. Quickly.

On the drive back on the motorway, we stopped for something to eat and a coffee in an entirely nondescript services centre that could have been anywhere in the world - expect, perhaps, for the soldiers wandering in an out in full uniform and equipped with assault weapons. This was the Israel that I'd recalled from a visit in my youth, yet it was out of context with the past few days. In Jerusalem, we'd been told that camera's had largely replaced the overt appearance of soldiers. Still, it's not the question that you front a twitchy soldier with, so I was left to ponder it.

The pondering became a little more detailed between the services centre and Tel Aviv when travelling companion Dan piped up from the back seat to wonder aloud why the jet contrails just off the coast to the south were circular. It was pretty clear that something had been circling the area for a while before dropping pretty quickly. Consulting the map and guestimating the distance, we soon realised that it was highly probably what we were looking at was directly over Gaza. We switched on the news immediately once through the doors of our hotel to discover that Israel had just assassinated a senior Hamas leader and things were about to get very freaky indeed. As history will now show, this was the event that set off a week or so of significant conflict in the region. What wasn't reported on much of the international news was that in the week prior, Hamas had launched over a hundred rockets into Israel. Their "iron dome" defence arrangement was managing to knock around 70% of them out of the sky, but that still left 30 rockets. Israel was pissed off - and this was the result.

In the circumstances, we weren't overly disappointed to be leaving the country the following morning. At this stage, it wasn't entirely clear how hairy it was going to get - so we set off to join the Vice-President of Netafim for a final evening on the waterfront in Tel Aviv. A more congenial host you could not imagine - and a more interesting conversation could not have been hoped for. Let me set the scene first.

Like many cities, Tel Aviv has developed part of its old waterfront into a pedestrian friendly precinct where restaurants, bars, cafes and retail outlets flourish. It was into this environment that we immersed ourselves, surrounded by Israeli's out enjoying a perfect evening. Some jogged or rode bicycles along the waterfront pathway that stretches the several miles from one end of Tel Aviv to the other, some ate, some drank, some simply strolled. We were destined for a Tapas bar with outdoor seating. Next to it was an indoor food market with stalls selling delicacies of all sorts from all over. Ervin, our host, suggested a wander through that first to whet our appetites for tapas.

We enjoyed a chat with the wine stall manager, who wanted to know if the Australian and New Zealand wines that he had on offer were the right ones (we couldn't answer - he'd imported them from California where they'd arrived in bulk and were bottled). We marvelled at the selection of olives available at the next

stall and drooled over the French cheese at the following one. As my companions chatted to Ervin, I stopped, puzzled, in front of a smallgoods stall. I stared at the goods hanging over the counter. Something wasn't right - so I called Ervin over and politely asked what they were.

"Salami," he replied, "you have that in Australia, yes?"

"You know it's made from pork, right?" I stupidly asked.

"Of course," he tactfully replied.

I fumbled for the next sentence, but managed to get out, "Am I missing something about the Jewish faith?"

"No - but I'm atheist."

You're what? Hang on. Something wasn't right here.

"There's a very large percentage of Israeli's that are," he continued.

I told Ervin we were going to need beer to discuss this one. He readily agreed!

It got weirder. On the menu was soup topped with grilled prosciutto. And a toasted ham and cheese sandwich. Sure, they're a little odd to see on a tapas menu - but that had to grow exponentially when it was written in Hebrew and served in Tel Aviv. Grinning, Ervin ordered both. I tried both. They were excellent.

On the second beer, I plucked up the courage to risk offending Ervin greatly. I warned him I was about to do it. He seemed relaxed with the concept, so I jumped in.

"You live in a country that is almost entirely barren. You have to truck soil in to an area where the water is so salty that you nearly kill plants. All of that has to be heavily subsidised by you as a taxpayer. You pay a huge rate of tax not only for that but also for the military that has to protect you from neighbours who just about universally declare the existence of your country to be an abomination. Several of them want to wipe you from the face of the earth. You have to give up three years of your life to service in the military. The Orthodox Jews don't work and live on welfare provided through your taxes and won't serve in the military that you pay for and devote time to. Even from within your own borders, people launch rockets at you designed to do maximum harm to the person and psychological wellbeing. Here's the question - if you're not religiously bound and committed, why on earth do you choose to live here?"

I took a deep breath, wondering if I'd overstepped the mark as Ervin looked on curiously. After a few seconds, his face broke into a broad grin.

"An excellent question," he opened with, "the answer to which will either confuse you completely or lead you to understand Israel better than ever."

We went back through history, noting that Israel was in fact but one location considered for a Jewish homeland after the Second World War. Australia had actually been considered as one of those locations (the Northern Territory). Ervin turned to the present, telling us that if a referendum were to be held in conjunction with the elections due early next year asking people if they might prefer another homeland somewhere else, a surprising number of people would say "yes".

Here was the crux of the matter. A large number of Israeli's are not Jewish in the religious sense but are Jewish in the *nationality* sense. Their home is where the people are. Being Jewish to many is being a people, being surrounded by your people and living with your people, your culture, your history. Religion is perhaps only a small part of that for many.

I understood. For the first time, I think, I understood Israel and Israeli's. I understood how people chose to live here, despite the challenges, hardships and danger it entails. Perhaps it's the same for the other "side"; many of the Palestinians who choose to live here rather than move to Egypt of Lebanon or Syria or Jordan. They live here because this is home.

Only a handful of miles to the south, the situation in Gaza went from bad to worse. It took us two hours to get through security at the airport the next morning to *leave* the country. The fact that I had visited a Tasmanian friend six years ago on a 5 hour stopover in Dubai meant I got the special interrogation and treatment. The fact that an ex-housemate (whom I haven't seen in ten years) now lives in Qatar doubled it. For the first 90 minutes, I didn't mind - after the discussion last night, I realised that this was just the price you pay for being part of Israel, no matter how briefly.

Even with this newfound revelation of the place and all it entails, I wasn't disappointed when we reached rotation speed and headed for skies. We were on the long journey back to Australia via Europe. Back to the southern hemisphere.

Back to our people.

Our home.

On the television for the next week, we watched the news in horror as the Gaza dispute went from bad to worse. Ideology is bad for business, but surely worse for those who just want a place to live.

NSW IRRIGATORS' COUNCIL
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Board Briefing Note

UK / Israel Study Tour

26 July 2012

Andrew Gregson
Chief Executive Officer

Background

NSWIC has previously approved international travel for two separate study tours that I have undertaken. The first led a delegation to California prior to attending World Water Week in Stockholm. The second also involved California and attendance at the Intelligent Use of Water Summit. The expenses of the first were met by NSWIC, whilst the second were met by a sponsor of the Summit as I was keynote speaker at the conference.

Note that NSWIC previously budgeted for an "international travel" expense. This was deleted during my tenure

Proposal

I propose to lead a delegation to the United Kingdom and Israel over a 12 day period between November 3 and November 15 this year.

Assistance in developing an itinerary and providing introductions to on-ground personnel is being provided by;

- Professor Tony Allan, the head of water policy and research at the University of London. Professor Allan is a global though leader in water policy and the preeminent authority on the concept of "virtual water".

- Michael Gilmont, a PhD candidate and researcher with Professor Allan who will be familiar to many NSWIC stakeholders subsequent to his article for our Journal and his time travelling across the Basin.

- Levi Schneider, the Managing Director of Netafim in Australia, who contacted us after we'd initially made contact with their head office in Israel. He has offered to organise the entire Israel itinerary.

Whilst in the United Kingdom, the delegation will spend time discussing irrigation policy and practice with academics, government representatives and farmer representative organisations. It will also visit irrigation operations to observe practice and process. Contacts at Kings College London are assisting. Initial plans include:

- A water group policy round table with leading international water academics from Kings College, University College and Imperial College of the University of London;

- A meeting with the National Farmers Union, the peak representative group for farmers in the UK, at their Newmarket Office (close to irrigation regions);

- On-farm inspections in East Anglia and Lincolnshire;

- Meeting with the Water Science Institute at Cranfield University;

- Meeting with UK Irrigation Association; and

- Water policy group round table at Oxford University.

The delegation will then travel to Israel where it will again meet with key policy makers and agricultural leaders. In particular, this leg of the tour will concentrate on water use efficiency measures and trans-boundary water sharing. Initial plans include:

- On-farm inspections in the Arava Valley irrigation district;
- A new irrigation development at Tel Arad (Yatir Winery);
- Inspections and discussion of Netafim operations;
- Discussions with policy leaders in Tel Aviv; and
- Inspection of Northern Israel operations with greater reliance on rain-fed storages.

Travel Policy

The NSWIC Board approved a Travel Policy in 2010 which provides as follows:

> *All travel must be approved by the CEO pursuant to the "Managing Expenditure" provisions of the protocols manual.*
>
> *Where, in the opinion of the CEO, the proposed travel is within the parameters of the Budget, the CEO may approve the proposed expense.*
>
> *Where, in the opinion of the CEO, the proposed travel is not within the parameters of the Budget, the documented approval of the Chairman is required where the proposed expenditure is below $5,000. Where the proposed expenditure exceeds $5,000, the documented approval of a majority of Directors (or a motion of the Board) is required.*

Recommendation

Strong interest from NSWIC Members has been received for participation. The Tour will reinforce the reputation of NSWIC as a policy body. Participants can be expected to return with valuable information for dissemination, as previously experienced.

Recommendation That the proposal be approved.

NSWIC
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Study Tour

Irrigation Policy, Management and Practice in the United Kingdom and Israel

Call for Expressions of Interest

Andrew Gregson
Chief Executive Officer

Introduction

NSWIC Chief Executive Officer Andrew Gregson will be leading a study tour to the United Kingdom and Israel in November this year. As with a previous study tour to California, representatives of Members and stakeholders of NSWIC are welcome to join the tour.

Tour Focus

The tour sets out to understand all facets of water management and use in agriculture from a series of perspectives. The itinerary includes meetings with government officials, user representative groups and individual operators. We'll blend our time in board rooms and academic halls with time on farm. Our discussions will range from global perspectives on water use efficiency to the latest technology in use in both delivery and on-farm use.

Some time is set aside for more general appreciation of sights - including a guided tour of Jerusalem and free time in London - but the tour itinerary sets a cracking pace to gain the most from the time available.

Itinerary Overview

Events commence in London on November 5 with a briefing from the UK Government. Whilst in London we'll enjoy a closed session with global though leaders at Kings College before an open session with academics and research students from across colleges of the University of London.

Leaving London, we head for East Anglia where National Farmers Union representatives and farmer-members will provide us an overview of irrigation in their area. We'll visit farms in the Norfolk and Suffolk Brecks and a local groundwater abstractor group. A visit to the Denver Sluice Complex and a meeting with the Environment Agency shows us the delivery mechanism at use. We'll staying in Cambridge and dining as guests at Robinson College, Cambridge University.

From Cambridge we travel to Cranfield to further discussions with the Cranfield University Water Science Institute and the UK Irrigation Association. We'll then participate in a policy discussion at Oxford University.

Moving to Israel, we'll enjoy a guided tour of Jerusalem followed by a trip to the south of the country, with highlights including the Yatir Winery, the Australian Light Horse Memorial and the Kibbutz Hatzerim. We'll be meeting with large cotton and corn operators, considering greenhouse gas emissions across irrigation techniques and visiting irrigation equipment manufacturing facilities.

Travelling back to Tel Aviv, we'll enjoy policy discussions with some of the leading government and academic figures in the country before moving to the north to view orchards, plantations (including view water efficient shade netting) and considering irrigation automation techniques. The tour will conclude back in Tel Aviv.

Dates

The formal program commences on Monday 5 November in London. Participants are free to arrange their own itinerary to that point or join others in departing Sydney on Saturday 3 November travelling with Qantas.

The tour moves from the UK to Jerusalem on Friday 9 November. Participants will travel on the same flight to ensure continuity of the program.

Departure from Israel is scheduled for Thursday November 15. Participants can make their own arrangements from here, although the formal tour will return to London before connecting to Sydney.

Costs

As a guide only, total costs of around $6,500 should be anticipated. This figure includes allowances for all air travel (ex Sydney), all ground travel, all accommodation (twin share), all meals and all events on the itinerary. A full breakdown of costs will be provided to all intending participants. A final price will be determined subsequent to bookings - and should be lower than that quoted here.

Itinerary

A draft itinerary is included with this document. It is subject to change and should not currently be relied upon for any bookings.

Expression of Interest

There is a limit on the number of participants to take account of transport logistics and to ensure adequate access to discussions and inspections for all. Invitations to participate will be issued to those who express interest early. Please contact Andrew Gregson (andrew@nswic.org.au) at your earliest opportunity if you wish to be considered.

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New South Wales Irrigators Council
UK and Israel Study Tour
November 2012

Participant Biographies

- **Andrew Gregson - New South Wales Irrigators Council CEO**

  Andrew is strategic communications professional who with experience inside politics, in the corporate arena and as a consultant to large scale public campaigns both in Australia and abroad.

  For the past five years, he has led the New South Wales Irrigators Council (NSWIC) as its Chief Executive Officer. NSWIC is a policy, advocacy and lobbyist organisation acting on behalf of water access license holders in the largest irrigation state of Australia. Andrew has been at the forefront of policy development in the water field, including the Murray-Darling Basin Plan; the rules and regulations governing access to minerals and coal seam gas; and the development of market regulations for water and water-derived products.

  Andrew has travelled extensively to learn and share information of relevance to agricultural water users. His knowledge and expertise in the development of water markets to manage scarcity has been much in demand, leading to providing advice in California, Canada, Sweden and New Zealand along with all States in Australia.

  He knows all about the business and social fabric of farming.

  New York Times

  He is a fierce campaigner and a daunting foe.

  Business 21C

  One of the most refreshingly straight-talking representatives you'll ever meet.

  Crikey.com.au

- **Hayden Cudmore - Rice Growers Association Representative**

  Hayden is a 3rd generation farmer at Griffith southern NSW. Cropping 800 Ha with an annual rice planting of around 190 Ha producing approx 2200 tonne. Balance of the irrigated farmland usually cropped in the winter producing Wheat (1500t), Canola (250 T) Barley (100T) and Sheep (500 head) from time to time. Recently diversified into turf production 4 years ago to support the growing city of Griffith. Griffith's economy is based largely around water and irrigation and the subsequent value added agricultural products that stem from it. Our local irrigation company has water entitlements of approx 1200 GL and gravity surface channel water delivery system of some 4000km of network.

  Chairman of a local water users association and vice president of our local Rice Growers Association branch (Mirrool Branch). Central executive delegate to the RGA. The RGA consists of 8 "branch's" geographically spread across the Riverina where an average crop size of 700 000 - 900,000 tonne is produced, value added regionally and exported around the world. The RGA represents approx 1500 ricegrowers mostly located in southern NSW. The RGA deals with the issue that impact ricegrowers economic viability and sustainability.

Water has always been and remains the area of the most importance and energy expenditure for the RGA.

- **Andrew Curtis - CEO of Irrigation New Zealand**

  Andrew is the Chief Executive of Irrigation NZ (INZ). INZ is the representative body for irrigation in NZ, with over 3,600 irrigator members (covering approx. 60% of NZ's current 650,000 irrigated hectares) and over 140 irrigation service industry members (suppliers, designers, installers, consultancies, research organisations and financial institutions). INZ's mission is to promote excellence in irrigation, and provides a proactive leadership role for Policy, Irrigation Scheme and On-Farm Irrigation 'Good Management Practice' development and implementation.

  Andrew has a practical background in irrigated agriculture, experience in water policy development (both quantity and quality) and has environmental management tertiary training. His recent experiences include active participation in the national Land and Water Forum, NZ's collaborative water policy development experiment (as an alternative to the traditional litigious approach), the Canterbury Water Management Strategy, the regional parallel development approach being implemented for; improving irrigation reliability to 90%; irrigating a further 250,000ha (up from 500,000ha); meeting community set water quality and biodiversity objectives and limits.

  He has also driven the development and adoption of an NZ irrigation resource package including irrigation standards, codes of practice, guidelines, training, benchmarking and decision support tools.

- **Dan Bloomer - Irrigation New Zealand Board Member**

  Dan Bloomer is Principal of Page Bloomer Associates, consulting to industry bodies and government organisations. Active in soil and water management with special interest in irrigation and precision farming, Dan established the Centre for Land and Water, a hub providing offices and seminar facilities for like minded professionals.

  Dan has been a Board member of Irrigation New Zealand since it's re-launch in 2001. He is on the Technical sub-committee involved in development of Codes of Practice and qualifications in irrigation design, dairy effluent design and system evaluation. He authored the Code of Practice for Irrigation Evaluation and has developed tools for irrigation system calibration.

United Kingdom

(3 November - Andrew and Hayden)

1655	QF005	SYD - FRA	0525 (4 November)
0720	QF3601	FRA - LHR	0815

November 4 - Sunday

Commencement of organised tour.

Accommodation	2 nights Imperial London Hotel Russel Square London WC1B 5BB +44 2 20 7837 3655 Single rooms. Breakfast included.
1700	Participants meet at reception Dinner included for hotel first night

November 5 - Monday

1015	Depart hotel *on foot* for 45 minute walk.
1130 - 1300	Meeting with Henry Leveson-Gower, Head of Future Water Resource Management Project at Department for Environment Food and Rural Affairs (DEFRA). Ergon House (Area 2C) Horseferry Road - near Westminster London SW1P 2AL 0207 238 5393
1315	Lunch at leisure 30 minute walk to Kings College (near 170, The Strand) Walk north on Embankment to Northumberland Ave
1500	Round table session with Kings College London. Front Lobby of Kings College - on The Strand Through revolving door - benches on rights
1800	Cross-London seminar series with academics and research students from across London colleges.

November 6 - Tuesday

0745	Depart hotel on foot
0800	Collect motor vehicle
	Hertz Russel Square 156 Southampton Row London United Kingdom 087 0850 2664
	Ford Galaxy or similar
	Michael Gilmont will be joining us for the trip to Newmarket
0815	Depart London
1100	Arrive NFU offices
	Agriculture House Willie Snaith Road Newmarket Suffolk CB8 7SN 01638 672100
	Meeting with NFU
	Round table session. Introductions to organisations and people by Andrew Gregson, Andrew Curtis and Paul Hammett (NFU).
	Presentation and discussion on local issues, practices and challenges from Paul Hammett.
	Presentation and discussion on Australian processes - particularly property rights and water markets - from Andrew Gregson.
	Light lunch to follow
1400	Depart Newmarket - following Paul Hammett
1430	Arrive at Elveden Farms near Thetford to be hosted by Andrew Francis, Farm Manager.
	www.elveden.com
	London Road Elvedon, Thetford

	01842 898048
1630	Return to Cambridge
1730	Check in to accommodation
Accommodation	2 nights Crowne Plaza Downing Street Cambridge +44 0 871 942 9180 Standard single rooms
1840	Depart hotel on foot
1900	(For 1930) Dinner at Robinson College, Cambridge University with Michael Gilmont.

November 7 - Wednesday

0900	Depart Cambridge by vehicle
0945	Arrive at Russel Smith Farms to meet host Andrew Nottage, Farm Manager. www.russellsmithfarms.co.uk College Farm Duxford Cambridgeshire 01223 839 002
1200	Depart Duxford
1300	Arrive Jenyn's Arms, Denver Sluice for lunch (www.jenyns.co.uk) Downham Market Norfolk 01366 383366
1400	Arrive Denver Sluice complex Environment Agency to explain manager of water on the fens for flood protection and irrigation. Contact is Daniel Pollard.
1600	Depart Denver

1630	Arrive Welney Washes - meet with Leigh Marshall
1645	Talk and presentation
1745	Free time at centre
1830	Floodlit swan feeding
1900	Return to Cambridge
2000	Dinner at leisure in Cambridge

November 8 - Thursday

Travel to Cranfield (approximately 1 hour).

Meeting with Cranfield University Water Science Institute (Dr Jerry Knox)

Meeting with UK Irrigation Association (Melvyn Kay)

Travel to London airport accommodation

Accommodation 1 night
Double Tree by Hilton (formerly Ramada Heathrow)
745 Bath Road
London Heathrow Airport
+44 0 20 8564 4450

Standard single rooms. Breakfast included.

Israel

November 9 - Friday

Travel to Jerusalem via flight to Tel Aviv

0500	Depart hotel to Hertz Centre		
0515	Return rental vehicle and take Hertz bus to Terminal 4		
0530	Arrive Terminal 4, Heathrow		
0645	AZ201	LHR - ROM	1015
1145	AZ812	ROM - TLV	1605
1630	Minivan transfer from TLV to Jerusalem hotel		
1730	Arrive hotel		

Accommodation 2 nights
Harmony Hotel Jerusalem
6 Yoel Moshe Salomon Street
Jerusalem

(For arrivals by car, 14 Shamai Street, Jerusalem)

+972 2 6219999

Breakfast daily

November 10 - Saturday

0830 Tour Guide to meet us at hotel. Full day tour.

Ishay Shavit
shavit14@gmail.com
+972 52 834660

November 11 - Sunday

0730	Depart hotel on foot to Hertz
0800	Collect hire car
0830	Depart Jerusalem by hire car
1000	Arrive Kibbutz Hatzerim
	Met by Naty Barak for tour of Kibbutz

1145	Early lunch
1215	Depart Kibbutz
1245	Visit Memorial of the Australian Light Horse (Accompanied by Rony Rot for the afternoon)
1315	Depart Light Horse Memorial
1400	Arrive Yatir Winery at Tel Arad
	Tour and inspection of facilities
1700	Depart Yatir Winery
	Ensure briefing from Rony on timing for tomorrow
1800	Arrive hotel
Accommodation	1 nights Leonardo Inn Hotel (Dead Sea) Ein Bokek M.P Dead Sea +972 8 6684646
	Dinner and Breakfast included

November 12 - Monday

Morning	Drive from Dead Sea to Arava to view various irrigation methods and their impact on greenhouse gas emissions.
	Met and accompanied by Dubi Segal for balance of day
Afternoon	Travel from Arava to Tel Aviv via corn/cotton/row crop operations.
Accommodation	3 nights Orchid Park Plaza 79 Hayarkon Street Tel Aviv +972 3 519 7111

November 13 - Tuesday

0815	Depart hotel *via taxi* to Netafim Headquarters

	Derech Hashalom 10 Tel Aviv
0845	Register at Netafim Reception
	Conference Room "Australia" booked for us
0900	Meeting with Professor Uri Shani, former Head of Israeli Water Authority and current VP of Makhteshim Agan (crop protection).
1100	Meeting with Shimon Tal, former Water Commissioner (2000 - 2006), former Co-Chairman of Israel-Jordan and Israel-Palestinian Water Committees.

November 14 - Wednesday

0800	Depart hotel in Hire Car
0900	Arrive Kibbutz Magal Zip Code 388445
	Met by Ms Sarit Klas
Morning	Visit orchards to inspect irrigation automation
	Accompanied by Yigal Mazor.
Afternoon	Visit banana plantations (focus on water use efficiency shade netting).
	Accompanied by Kfir Roffe
Afternoon	Visit Baha'i Gardens in Haifa.
	Accompanied by Avishay Sternlieb
	Return to Tel Aviv

November 15 - Thursday

Departure from Israel