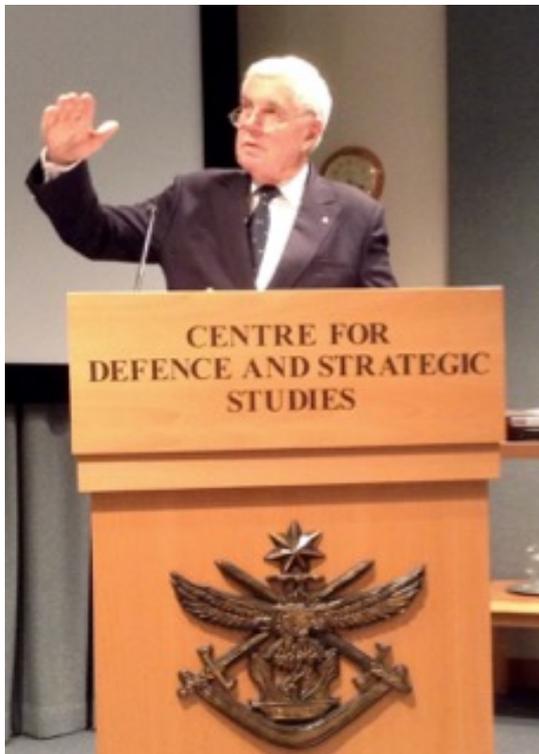




## Global food and water security: Australia's opportunity to contribute positively

Major General the Honourable Michael Jeffery AC AO (mil) CVO MC (Retd) spoke to the USI of ACT in Canberra at the Australian Defence College on 4<sup>th</sup> June 2015

*The United Services Institute of the ACT hosted this presentation by its Patron. As the Prime Ministerial appointed National Advocate for Soil Health he focused attention on issues of global food and water security as he described a coordinated strategy to the integrated management of our soil, water and groundcover.*



*(RUSI Photo)*

Thank you for inviting me to speak tonight on a topic which I feel is one of the most important of our time in respect to both the security of our nation and the planet; namely - the sustainability of our global food, soil and water resources.

This is why as a retired soldier and former Governor-General, I have taken a great interest in the health of our soil, the sustainability of our water supplies, and the need to rejuvenate our agricultural lands to enable sustainable food and

fibre production. In particular, I am very concerned for the well-being of our children and grandchildren, as the planet's capacity to adequately support a global population of around 10 billion by 2050 - up from the present 7 billion - in terms of food and water is I think seriously in doubt.

Accordingly, the potential for widespread social unrest is very high and will be exacerbated by the impact of climate variability, bringing with it longer droughts, hotter and more frequent wild fires, more severe flooding, cyclones and sea level rises. Indeed the President of the World Bank stated last year that within five years we will be fighting land and water wars, and I think he may be right. This potential for social unrest could become a major issue for our military and political leaders across the globe and should be a key component of our threat assessment process.

It is therefore fortunate that we have in this country, people and organisations already working to improve our soil, our agricultural lands and our general landscapes, because it is in restoring our soil to a healthy condition, lies a critically important component of global well-being.

Throughout history we have seen many examples of unrest caused by the loss of

agricultural lands and the ability to farm and provide food for families. The Fertile Crescent which is now occupied by the modern territories of Iraq, Jordan, Lebanon, Israel, Palestine, Syria, Iran and Turkey is a good example, where aridification followed in many cases by desertification, was a result of poor land management. More recently we have seen social and political unrest following the increase in prices of staple foods and fibres or the destruction of agricultural lands. Often these lands are intricately linked to cultural identity.

In Egypt, the toppling of President Hosni Mubarak in December 2010, in the period labelled “the Arab Spring”, had a great deal to do with the state of their economy, sustainability of their food and water and the price of every day essential items. In the Sudan, the loss of viable agricultural lands to the encroaching desert provides a very fertile breeding ground for the extremist elements that are disrupting that area. The men often feel they have nothing left and nothing to lose.

So what is the situation today?

The United Nations Food and Agriculture Organisation or FAO estimates we will have an increase in food demand of 70% by 2050 with some 235,000 new mouths to feed every day. The pressing need we now have is how to provide this food and water when we have major landscape degradation and real landscape management problems. Let me explain:

- The planet is losing around 1% of its agricultural land annually with about a quarter of the existing arable land already degraded through urbanisation, desertification and so on.
- Our national and global soil health has been depleted, with for example severely reduced carbon content. Carbon content is usually derived from organic matter and a lack of it leads to poor soil health and structure and an inability of the soil to hold water.
- Across the globe we have over used chemicals and inorganic inputs such as nitrogen and phosphorus at a rapidly increasing rate, instead of employing more natural inputs to farming, which has

compromised the nutrient availability for plants and animals.

- Many nations have over done irrigation in an effort to produce more food or improve profits. This has resulted in situations where the essential irrigation water for major food bowls in China, India, Africa and the Middle East are rapidly running out, due in large part to irreplaceable aquifer depletion. California faces a similar situation today, where they are facing the extraordinary situation of having only 18 months of aquifer water left, compounded by four continuous years of serious drought and loss of snow fed streams.
- Our global water situation is dire, even in high rainfall regions, as almost every major river in developing countries is heavily polluted. For example, the Buriganga River flowing through Dhaka in Bangladesh, the Yangtze and Yellow Rivers in China, the Yamuna and Ganges Rivers in India, the Rio Grande in the USA, and the list goes on. In other developing regions, countries do not have access to funds to manage water for agriculture and domestic use. In January this year the World Economic Forum announced that the water crisis is the number one global risk as a measure of devastation based on the impact to society. We know that globally approximately 750 million people lack access to safe water – that is one in nine people. An estimated 842,000 people die every year from drinking unsafe water and that includes one child dying every minute from a water related disease. Access to safe water for many in the poorer, underdeveloped countries means walking a kilometre or more each day to it.
- Another global water issue occurs where the headwaters of rivers are damned by one country for their own purposes and this causes reduced flows to neighbouring countries. This is occurring more often, particularly in South East Asia, where for example, damming the Mekong River upstream has interrupted the supply of water

to Vietnam, causing major problems for agricultural production in many areas. Over the past decade, as new Chinese dams have come online on the Mekong, the fish catch has plummeted. Similarly, the pollution from untreated sewage and agricultural run-off and damming in the Jordan River basin is affecting Syria, Israel and Jordan who are reliant on this river system for 98% of their fresh water for domestic use and for most of their agricultural purposes. China is building hydroelectric generation stations on the wild rivers of Tibet including the Tsangpo, the Salween and Mekong and this is in turn affecting those rivers flowing through Tibet, Western China and also into India, Cambodia, Vietnam and Bangladesh.

- And finally, across the planet poor soil management over decades and often centuries has led to aridification and desertification of which the Fertile Crescent as I mentioned previously is an excellent example.

Here in Australia, although we're getting better, we still have considerable landscape management problems. Although we have many good farmers, supported by some good science, around 60% of our arable land is degraded in some way – we have salinity issues (many areas have overcome this with appropriate planting of perennials and trees), acidity and loss of soil carbon, over use of pesticides and herbicides and overgrazing which has led to serious soil erosion.

Around 1 million kilometres of our streams and rivers are eroded (excised), which has them flowing below their flood plains.

And 50% of our wetlands which are the kidneys or filters of our river and stream systems have been filled in or drained for urban or farming purposes. Unfortunately in previous eras we thought of wetlands as smelly swamps and many have been destroyed.

Our water management policy needs a rethink. 50% of our annual rainfall needlessly evaporates because it cannot penetrate the soil – again linked to the lack of organic carbon and

vegetation coverage. This evaporation is 25 times the total quantity of water in all our dams and five times the quantity in all our rivers, so patently dealing with the evaporation problem must become a national priority.

And our soil has not escaped the ravages of mistreatment either. Current rates of soil erosion by wind and water across much of Australia now greatly exceed soil formation (about 0.01mm per year) and although we are at last improving this situation through better ground cover measures, we still have a long way to go. Further, the soil we do have is not as fertile as it should be. The State of the Environment Report of 2011 notes that of our 39 soil types, only four now have the adequate levels of carbon needed to hold water and support microbiological and fungal action in the soil.

Broadly speaking every gram of carbon in the soil helps to hold up to 8 grams of water and vice versa; thus the evaporation problem I mentioned earlier.

So what is soil carbon and why is it important?

The carbon content of soil is one of the key indicators of its health and is a master variable that controls numerous processes. It is the carbon content of soils that largely governs their capacity to absorb, retain and supply moisture within the soil and to sustain active plant growth. Soil carbon helps support a healthy balance of nutrients, minerals and soil microbial and fungal ecologies, improving soil fertility. It is these soil constituents that ensure healthy soils and it is healthy soil that promotes vigorous plant growth and helps to build plant and animal resistance to disease and insect infestation.

Unfortunately, across the Australian dry land cropping and grazing sector, it would be unusual to find actively farmed soils with a carbon content of 1.5% or more. Yet to deliver its myriad of benefits, soil carbon levels for quality agriculture should be around 3% to 5%.

Notwithstanding the challenges I have just outlined, I believe that Australia is well placed to make a lasting contribution to the future well-being of the planet, through the improvement of the health of the global landscape. We already have the proven examples of how to do this

supported by a land blessed with resources and space, clever and creative hardworking people and a stable democracy. We are increasingly aware that we need water and carbon for healthy soil, we need healthy soil for healthy food and we need healthy food for healthier people.<sup>1</sup>

I believe that these national and global challenges are inter-related and that landscape management practices here and across the planet can be revived and re-focused. We can reclaim our precious resources of soil, water and vegetation which are so necessary to sustain life and maintain social security. We have altered natural bio-systems but we can adjust them again to rejuvenate the landscape. It is all about 'healthy soil' and restoring and maintaining the landscape to make it 'fit for purpose'; that is fit for agriculture, fit for mining and fit for urban etc.

We have a serious urban/rural population disconnect and our agricultural science up till now has been penny packeted and often inconsistently focused. However, this too can be overcome.<sup>2</sup>

As the Prime Ministerial appointed National Advocate for Soil Health I am focusing attention on these issues and proposing a coordinated strategy to the integrated management of our soil, water and groundcover.

The strategy comprises the following:

- Firstly, to establish the Office of the National Advocate for Soil Health.<sup>3</sup>
- Secondly, I aim to have established and collect information from 100 approved research test case farming/grazing sites, to highlight successful methods of soil and water management. This information will include soil moisture retention and evaporation rates, the microbiology, mineral and physical properties of the soil, the

---

<sup>1</sup> Extemporaneous explanation given on why this cost is

<sup>2</sup> Extemporaneous explanation given on necessity for establishment of priorities.

<sup>3</sup> Extemporaneous explanation given on the current setup.

measured impact on soil health using various organic and non-organic inputs and the impact of various management practices. Another of the organisations of which I am the Chairman, Soils for Life, is already involved in this process and has 21 case studies which are outlined on the Soils for Life website ([www.soilsforlife.org.au](http://www.soilsforlife.org.au)). What this means is that other farmers and graziers are able to look at these case studies, see which suits their own environments and adapt the solutions to suit their properties.<sup>4</sup>

- Thirdly, I am proposing that we produce a coordinated, nationally agreed soil health policy, which might have as its aim 'to restore and maintain a landscape fit for purpose' involving inputs from key players (agriculture, environment, mining, health, education, the indigenous community, trade, defence and so on). To support the National Soil Health Policy, a soil health measuring system, perhaps soil carbon oriented, needs to be developed to commercial standards. There is promise of a satellite or a drone based set up linked to a ground truthing system that is currently being tested in Australia.
- Fourthly, we need to reconnect urban Australia with its rural roots, to ensure that people know where their food and fibre comes from and to provide better support to our farmers. This can be achieved to a certain extent by encouraging the development of a garden in every primary school, hospital and community.
- Fifthly, I am suggesting the establishment of a National Institute of Soil Health as a 'one stop shop' covering all aspects of soil, water and agricultural management to enable national and international experts to collaborate and share innovative ideas. This Institute will have a cellular style of organisation whereby experts in each relevant area of soil management will work in

---

<sup>4</sup> Examples given for towns of Beetaloo and Wyalcatchum in WA, There have been more than 30,000 downloads of our 21 case studies to date; a most impressive result.

collaboration with for example, the farming organisations, the Mulloon Institute, CSIRO, Agricultural science research bodies, banks and superannuation funds, overseas centres of excellence and so on, to ensure vital research is shared, that we don't reinvent the wheel and we have faster information flow and maximum implementation of successful solutions.

Ladies and gentlemen we live in times of unprecedented change – there are enormous pressures on our natural resources. Regeneration of both our urban and regional landscape is of fundamental importance if we are to address this global challenge. Land and water management have important links to the key challenges of global food security and the impact of climate change.

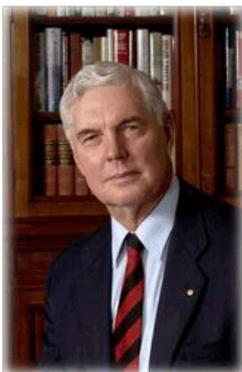
I have touched briefly this evening on a number of challenges I see looming ahead and provided insight into positive solutions to address them. Orchestrating positive change comes about when individuals working together as an efficient team in a logical and coordinated manner, establish a

clear aim with an achievable outcome, as I am sure this audience appreciates.

The widespread adoption of regenerative landscape management is a strategic imperative for Australia's future wellbeing. To regenerate our landscape and address the impact of a changing climate, it is important that we in Australia have a co-ordinated approach to these challenges. We do have solutions as I have outlined to you this evening. We simply need the political and national will to implement them and of course appropriate funding.

Ladies and gentlemen – my message is this: food, soil and water security will be a major concern for Australia and the world, but with great opportunities for us if we move quickly and cohesively. For us to play our part in dealing with this national and global imperative, we must fix the soil in our own backyard and then export our knowledge of proven best practice solutions to other countries in need.

In summary, 'to save the planet we must save the soil', and 'if you eat you're involved'.



**Biography:** Major General the Honourable Michael Jeffery AC AO (mil) CVO MC (Retd) is the Patron of the USI of the ACT. He was educated at the Royal Military College, Duntroon. He graduated into Infantry and served operationally in Malaya, Borneo, Papua New Guinea and Vietnam, where he was awarded the Military Cross and the South Vietnamese Cross of Gallantry. After command of all combat elements of the Army from platoon to division - including the Special Air Service Regiment - he retired in 1993 to assume the appointment of Governor of Western Australia, which he held for almost seven years. On 11 August 2003 he was sworn in as the twenty-fourth Governor-General of the Commonwealth of Australia.