Submission to the House of Representatives Standing Committee on Agriculture and Industry

Inquiry into the role of technology in increasing agricultural productivity in Australia

October 7th, 2015

Submission from

Aharon Arakel, PhD

Introductory Remarks

This submission primarily addresses the terms of reference 2 and 3 of the Inquiry, namely:

- emerging technology relevant to the agricultural sector, in areas including but not limited to telecommunications, remote monitoring and drones, plant genomics, and agricultural chemicals; and
- barriers to the adoption of emerging technology.

The submission is presented in a summary form; however, to facilitate the Standing Committee's understanding of the points raised in this submission, references are made to selected relevant public domain literature. Additionally, the author would be available to provide further explanations upon a written request from the Standing Committee and shall make himself available to provide a detailed presentation on the subject matter, should the Standing Committee requires so.

Summary Observations

(The Opportunity)

- Salt lakes (also known as playa lakes) form integral part of the geological evolution and hydrological (water) cycle in inland drainage basins of Australia. Numerous salt lakes of different origin, size and shape, but commonly containing highly concentrated saline solutions (known as brines) in the near surface sediments, are reported in the scientific literature [1, 2]. The Australian salt lakes also provide a time window through which to study and understand the evolutionary history of Australia's landscape and appreciating the rich indigenous heritage which is linked with this rather old and stable landscape. Thus, most playa lakes, containing concentrated groundwater that emanate from large surrounding catchments, reflect the presence of a delicate hydrological and ecological balance in arid inland Australia. [3, 4]

- Equally important, a recent review by Geoscience Australia clearly point to high potential of Australian salt lakes for containing large resources of brines for economic development of strategic minerals [2]. Most of the prospective salt lakes are located in the Northern Australia, a zone earmarked by the Australian Government for agricultural and other resource development. Further, public releases related to a hand full of salt lake potash exploration projects, in the recent years, concur with the observations of Geoscience Australia, with the latter representing the only authoritative publicly available information base on the potentiality of Australian salt lakes for their economic occurrence of strategic resources.

- Although less than a third of the number of Australia's salt lakes, in the rest of the world the brine resources from many salt lakes in Americas, Africa and Middle East have been developed for their strategic resources (primarily for potassium, lithium, boron). [2, 7]. Against this background, there is no single commercial production activity in Australia which exploits the salt lake brines for the recovery of strategic resources. In fact, according to Geoscience Australia there is less than 10 years history of serious salt lake exploration in Australia and unfortunately it still remains at its embryonic stage.

- Despite sever limitations with the quality and availability of public domain information on the strategic resources of the Australian salt lake basins (and particularly with the validity of the assumptions used by some of the Australian salt lake potash exploration companies for resource estimation and economic assessment), most available information point to the high prospects for the occurrence of large volumes of potassium-rich brine resource in the Australian salt lakes. Hence the potential for the multiples of large Australian salt lake brine resources for commercial scale production of fertiliser quality Sulphate of Potash (commonly known as **SOP**) is real. The pioneering 2013 study by the Geoscience Australia [2] identifies a number of hydro-geologically closed salt lake basins in the Northern Australia with high potential for occurrence of potassium-rich brine resources. This finding together with advantages of the spread/size of Northern Australia and its closeness to the regional fertiliser markets in SE Asia and China collectively point to the attractiveness of the opportunity for developing the Northern Australia into a world class potash production hub. Such a game-changing development will also support and complement the Government's desire in developing the Northern Australia as the food bowl for the fast growing Asian and Chinese populations.[5]

- SOP is a sought after potash fertliser salt commanding a premium price of 30-40% above the more common muriate of potash (potassium chloride salt). [7] The price of SOP has continuously withstood the fluctuations in the prices of other mineral commodities, one reason being the increasing demand for chloride-free potash fertilisers for a range of high value crops in countries with ever growing urban populations. Note that the Australia-NZ market demand for SOP, which was estimated early this year to surpass 100,000 tonnes per annum, is entirely met from imports that are largely produced in the Manehim process (by conversion of muriate of potash through reaction with sulphuric acid). [7] Thus import replacement will be an immediate important benefit arising from SOP production in Australia [8].

- Based on current information and the knowledge vested with the author, the potential for establishing a world class salt lake potash industry in Australia is very high and its synergy with the Northern Australia agricultural development zone is quite striking. Large playa lakes containing massive volumes of mineral brines, enclosed in the lake sediments, arid climatic setting for establishing energy-efficient solar evaporation ponds for salt recovery and the strategic location of the Northern Australian salt lake basins, with respect to existing and fast growing Asian and Southeast Asian markets, collectively make a compelling case for consideration by the Australian Government of establishing a new industry base to address the regional and global unmet demand for potash fertilisers – whilst the opportunity exists.

  The opportunity of completely replacing the bulk of SOP import by Australia and New Zealand and to supply the regional markets that currently source their SOP demand from the far away suppliers in North America, Europe and Russia, at elevated costs, is abound.

(Issues and Challenges)

- Firstly and importantly, the SOP fertiliser can not be directly recovered from salt lake brines, firstly they require evaporation of salt lake brines in evaporation and crystalliser ponds to produce an intermediate product (SOPM or Sulphate of Potash and Magnesia) and then treatment of this intermediate product in a processing plant for SOP production and its beneficiation for value adding. These processes require access to cost effective energy, transport means and workforce as well as significant capital investment.

- Considering the experience from overseas salt lake potash development projects, it is expected that a large-scale production operation would be needed for a greenfield potash development project in Northern Australia. A large scale production target would be essential for achieving an attractive economy of scale, before securing a sizeable capital investment. The Australian fertiliser industry is generally small on a world scale and thus currently has on influence on the world prices [6]. However, if SOP is produced at a large scale within a concentration zone (i.e., via a production and distribution corridor in the Northern Australia, thus allowing two or more strategically located SOP producers to benefit from the same infrastructure development) it has the potential to develop Northern Australia into a global supply hub for this high value chemical fertiliser. It is expected that such a regional but integrated strategic resource development strategy, if properly planned and implemented, will greatly enhance the economic and job creation opportunities in the Northern Australia for the Australians through the flow on effects.

- In the context of the opportunity for establishing a regional hub in Northern Australia for SOP production from salt lake brines, a number of challenges are however foreseen by the author as potentially hampering or even posing road blocks to the process, particularly for timely securitisation of private investment funds. Based on overseas experience and with reference to earlier point on the economy of scale, large investment funds would be required to enable a greenfield potash project to leap frog from exploration phase to development stage. The key challenges identified by the author are briefly described below.

  (i) Severe gap in the scientific knowledge base which is reflected in the alarmingly poor quality of the information released by the exploration companies on their salt lake brine resources. There is no potash production history in Australia (therefore no reference project for the large investors), and so, unfortunately, most exploration projects are currently thinly funded and are performed by junior exploration companies who approach salt lakes from a "hard rock minerals exploration" perspective with limited access to advice from the experts in the field. Consequently, there are many information gaps that if not addressed properly and in a timely manner, they may potentially reflect adversely on an exploration project, and even on the whole of salt lake potash exploration projects in Australia. This, if happens, will severely diminish the chance of transiting the Australian projects from exploration to development phase.

  As the time window for transition from an Australian mineral exploration to commercial development project is commonly 3-5 years, the Australian Government can effectively maximise the chance of this transition happening. For this to happen, the Australian Government and the State Governments/N.T. will need to encourage the process of scientific knowledge base development on the salt lake strategic resources through investment in an institution or a centre of excellence and also by offer of financial incentives to organisations capable of performing *pilot/demonstration scale production and producing authoritative techno-economic feasibility studies. The government investment in the salt lake science and technology is considered by the author as not only highly desirable for promoting significant investment in greenfield exploration and development projects in the Northern Australia but probably essential for protection of the national interest in wealth and job creation from its natural resources.*

(ii) The poor state of existing infrastructure for large-scale greenfield project development. This shortcoming is well understood and appreciated by all levels of governments and investment community, therefore not further commented herein.

(iii) The overwhelming need for streamlining project approval process particularly where the heritage and environmental issues are unresolved. The author is aware of potential large investors from overseas who are interested in the Australian salt lake potash opportunities but currently weary of committing large funds because of uncertainties and inconsistencies with project clearance processes in different States/N.T. Most of the large investors, being primarily focused on the potash commodity itself, are interested in the clarity of the commercialisation pathway, and the Commonwealth and State Governments/N.T. will need to address this potential roadblock in a timely manner.

(iv) Lack of R&D for salt lake research in the past 10 years has unfortunately driven away a significant number of highly capable scientists who did build up a formidable "intellectual capital" based at ANU through the untiring efforts of the highly eminent Professor James Bowler.

The overwhelming need for building up a nationally owned intellectual capital for assessing and developing strategic resources of the Australian salt lakes is now more than ever evident. The search for fertiliser chemicals for feeding masses in the developing countries and ever-growing middle class populations is an ongoing global effort. Our success will depend on how well we can handle the dynamics of a unique SOP opportunity that is very dissimilar to that of conventional minerals domain but more revolving around a set of new economic drivers, unforeseen before. This will need training and drawing from the skills of a new generation of scientists, mineral processing technologists *and economists who can articulate a salt lake potash exploration project into a world class investment opportunity to enable the transition to happen. This country of ours is blessed with numerous scientists and engineers with amazing innovative thinking skills – but we need to articulate these skills to convince the investors in the fertilizer commodities with our ability to achieve their expected end results. For this to happen, we firstly and more immediately need an organisational structure that while giving opportunity for innovation and lateral thinking it focuses on the delivery of end commercial results. In this context, it is heartening for the author to witness the new initiatives and current drive for innovation that is being promoted by the Commonwealth to rebuild our R&D capabilities for national prosperity.*

- Despite some degree of inter-relationship between the above-listed challenges (and hence relative ease to address them collectively), there are two current challenges that are considered by the author as the most critical and overwhelming, namely: (a) the absence of reliable basin-wide hydro-geological information, particularly for those of Australian salt lake basins that are strategically located and have already been identified by the Geoscience Australia [2] as offering the highest potentiality for accommodating sizeable brine resources (a fundamental requirement for large-scale SOP development), and (b) limited knowledge and practical experience in Australia with respect to SOP production and product value-adding technologies as well as with techno-economic evaluations for presenting robust potash project cases to those of investors keen to invest in end-to-end large projects. Having a quality large brine resource is one thing; the technical capabilities to economically produce potash is another thing.

  These two challenges are considered by the author as the most serious short- to medium-term shortcomings with potential to mask the potential for attracting major investment in the Australian salt lake potash projects. The salt lake exploration projects are relatively more complicated and thus generally costlier than an average mineral exploration program. And, as pointed out earlier, unfortunately limitations with the availability of exploration funds can potentially downgrade the quality of output for a reliable resource evaluation and hence compromise the chance of securing large investment funds for commercial development. There is no short circuiting option for this process unless a compelling case is presented to an investor who can bring in complementary expertise to enable the transition. A compelling case to a fertiliser/specialty chemicals trading company may relate to the strategic location of the Northern Australian salt lakes with respect to SE Asian/Chinese SOP markets. However, Governments' contribution to project infrastructure development and access to reliable information and expert advice can have a fundamental role in commercial decision making.

Accordingly, the short-to-medium term challenge is how to fill the knowledge gap for informed decisions by potential investors in future Australian salt lake potash projects. The answer is to invest in R&D on the salt lakes and strategic minerals technologies. R&D in these highly specialised fields requires time and financial resources for building up a multi-disciplinary skill base (critical mass) capable of taking up a project from the stage of resource assessment to technology development/piloting and then detailed techno-economic feasibility studies. If the primary aim is to support the SOP project opportunities in Northern Australia to generate national wealth, an integrated approach to developing appropriate information base and skill base is essential and for this serious commitment would be needed from the Australian governments at all levels. Foremost, the government investment will be needed for establishing a knowledge and expertise concentration centre where to build up a formidable intellectual capital, comprised of people having sound scientific knowledge and equipped with innovative technologies. As an indication, it took only two decades, after establishing the Salt Institute, for the China to become the world's largest producer and the most dominant exporter of strategic minerals produced from their salt lake basins.

Recommendations

Based on the above observations, the author consider that the "Developing the Northern Australia" is probably the most appropriate and timely Commonwealth initiative, through which the discussions and policy planning for the proposed investment in R&D on the salt lakes and strategic minerals technologies to be progressed.

The following two inter-related recommendations are made by the author:

- Preparation of a White Paper to facilitate discussion and road mapping for developing the potash agricultural chemicals and other strategic resources from mineral brine fields of the salt lakes in Northern Australia

- Establishment of a salt lake R&D facility (an institute or a centre of excellence) charged with building up scientific knowledge base and technical know how on the high-value strategic resources of the Australian salt lake basins. The proposed R&D facility will interact with the governments, resource explorers, investors and fertilizer companies and traders to ensure the flow of sound scientific knowledge and facilitate the exchange of techno-economic information for timely development of a potash production industry in the Northern Australia having considered the ecological and heritage values of the salt lakes.

Brief Resume of the Author

Aharon Arakel *BSc Geol (1972), PhD Geol (1979), Westpac Exec Dev (1995)*

Aharon obtained his PhD from The University of Western Australia in 1979 and then spent two years as post-doctoral fellow with Western Mining Corporation (now BHP Billiton). He has over 35 years of active engagement with Industry as a senior exploration geologist (potash, uranium, industrial minerals and oil/gas), as well as university lecturing, research centre leadership, water/wastewater technology development and directorship of technology companies in Australia and U.S.A.

Since early 1980s Aharon has researched and published widely on the hydrogeology and industrial minerals potential of the salt lake basins in Australia and elsewhere; he is widely recognised for his pioneering research and exploration work on the Australian salt lake basins.

Dr Arakel is the lead inventor of a number of saline water and wastewater processing technologies, with his first patent for the recovery of potash from salt lake brine fields dating back to 1991. This followed a decade long research collaboration with the Chinese technologists and salt institutes involving systematic field and laboratory trials in Australia and China for optimising the processes involved in large-scale recovery of Sulphate of Potash and Magnesia (SOPM) and Sulphate of Potassium (SOP) from salt lake brine fields. In recent years Aharon's technology development efforts have increasingly focused on the recovery of high-value salts and compounds from a range of unconventional sources, such as brine effluents from oil/gas fields, and desalination plants. These technologies provide a means for value adding while reducing the waste footprint of operations.

Dr Arakel is an adjunct professor at Macquarie University of Sydney, and until recently served as a director of Australia Salt Lake Potash Pty Ltd (now a wholly owned subsidiary of Wild Horse Energy Ltd).

References Cited

[1] Arakel, A.V., G. Jacobson, B. W. Lyons, 1990. Sediment-water interactions as a control on geochemical evolution of saline lake systems in Australian arid interior. Hydrobiologia, 197 (1990): 25-37.
http://link.springer.com/chapter/10.1007/978-94-009-0603-7_1?no-access=true

[2] Geoscience Australia. A Review of Australian Salt Lakes and Assessment of their Potential for Strategic Resources. Record 2013/39
http://www.ga.gov.au/corporate_data/76454/Rec2013_039.pdf

[3] J. Bowler. Spatial variability and hydrologfic evolution of Australian lake basins: Analogue for Pleistocene hydrologic change and evaporate formation. Palaeogeography, Palaeoclimatology, Palaeoecology: 54 (1986): 21—41
http://www.researchgate.net/publication/222001059_Spatial_variability_and_hydrological_evolution_of_Australian_Lake_basins_Analogue_for_Pleistocene_hydrological_change_and_evaporate_formation._Palaeogeography_Palaeoclimatology_Palaeoecology_54_21-41

[4] P. De Deckker. Australian salt lakes: thie history, chemistry, and biota – a Review Hydrobiologia, 105 (1983): 231 -244
http://people.rses.anu.edu.au/dedeckker_p/pubs/120.pdf

[5] The Australian Government. White Paper on Developing Northern Australia (2015)
http://northernaustralia.infrastructure.gov.au/

[6] Australian Fertilizer Industry Conference 2010. The Australian fertilizer industry – values and issues.
https://www.iama.org.au/sites/default/files/Australian%20Fertilizer%20Industry%20Value%20and%20Issues%20August%202010.pdf

[7] POTASH AND SOP

Potash is one of the three major fertilisers most widely used in the world: nitrogens (N), phosphates (P) and potash (K). According to the International Fertiliser Industry Association (IFA), the global fertiliser demand has been rising steadily and is estimated to reach 182.7 million tonnes in 2014.

Global Fertilizer Demand (Mt nutrients)

	N	P_2O_5	K_2O	Total
2011/12	107.9	41.6	28.2	177.6
2012/13	108.7	41.4	29.2	179.3
2013/14 (e)	111.1	41.5	30.1	182.7
Change	*+2.1%*	*+0.3%*	*+3.4%*	*+1.9%*
2014/15 (f)	111.9	41.5	30.4	183.8
Change	*+0.7%*	*0.0%*	*+0.8%*	*+0.6%*
2015/16 (f)	114.0	42.2	31.2	187.4
Change	*+1.9%*	*+1.8%*	*+2.6%*	*+2.0%*

Source: IFA Agriculture, Nov 2014

Potash denotes a variety of mined and manufactured salts, all of which contain the element potassium in water-soluble form. The term potash refers to potassic fertilisers, which are:

- Muriate of Potash (MOP), an agriculturally acceptable mix of Potassium Chloride (KCl), 95% pure or greater, and sodium chloride
- Potassium Sulphate, or Sulphate of Potash (SOP), usually a manufactured product
- Sulphate of Potash Magnesia (SOPM)

SOP is a premium chloride-free and highly concentrated quality nutrient for the growth of high-value chloride-sensitive crops such as fruit, vegetables, tea, coffee and tobacco. SOP contains approximately 44% potassium and 18% sulphur which are important plant nutrients, can be used in every application that MOP can be used, and is preferred as it enhances yield and quality, extends shelf life of produce and improves taste.

Production

Potash ore is typically extracted from two major ore deposit types: deeply buried marine evaporate deposits that usually have a depth of greater than 1,000 m below the surface as typically found in Canada and Russia, and surface brine deposits associated with saline water bodies such as the Dead Sea in the Middle East and the Great Salt Lake in Utah.

Most potash is sourced from buried deposits using conventional mechanized underground mining methods. Generally, these underground operations produce between 1 and 10 million tonnes of potash ore per year. The land area affected is typically confined to the immediate area of the shaft, plant and waste disposal but may reach up to several square kilometres. This is the most widely used method for the extraction of potash ore.

Surface brine deposits are exploited using solar evaporation ponds to concentrate and precipitate the potash. The evaporation ponds are extensive, with some operations covering in excess of 90 sq.km of land area to produce around 8 million tonnes of potash ore per year.

SOP is not a naturally occurring product, production of SOP takes place through a number of methods: ‘‘primary’’ production methods include directly extracting SOP from potassium minerals and ‘‘secondary’’ methods are based on the chemical conversion of KCl.

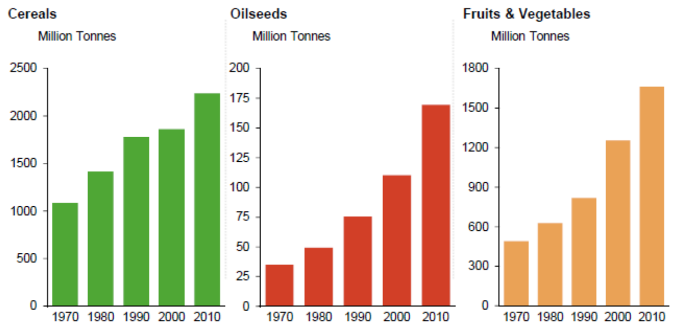
Processing of natural brines is a relatively low cost primary production method, although there are a limited number of commercial-scale deposits. These are found in Utah, Chile, Argentina, China and Australia.

SOP is produced from salt mixtures which are harvested from natural brines rich in sulphates. Consequently, not all natural brines are suitable for SOP production. As lakes with sufficient brine mineral levels are rare, this method only accounts for 15% to 20% of global supply of SOP and costs approximately $300 per tonne to produce.

Key External Drivers

The key external driver in demand for fertilisers is the growing world crop production.

While the world population continues to grow, the cultivable land is shrinking around the world. This forces producers to improve agricultural yields through the use of fertilisers.



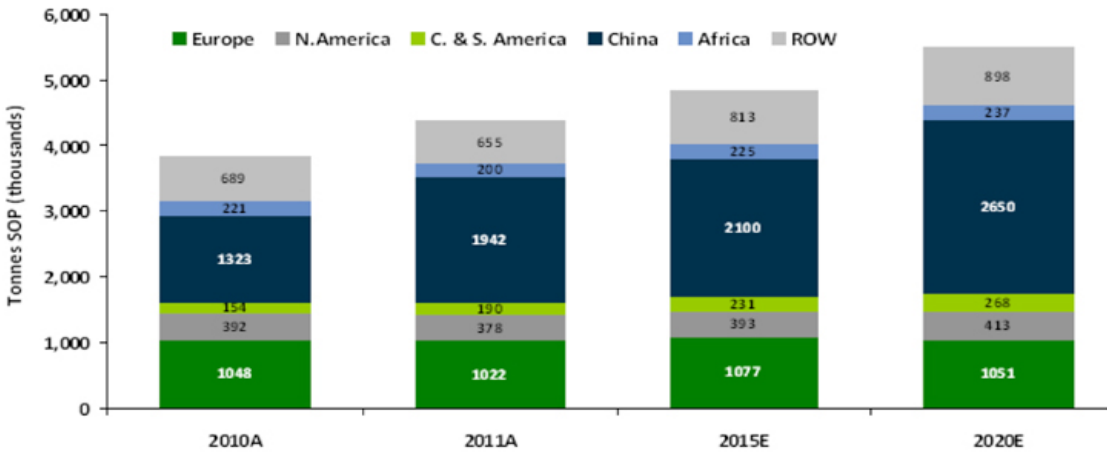
World Crop Production
Source: Food and Agriculture Organisation (FAO), www.fao.org

There is a price premium attributed to SOP due to the scarcity of primary production relative to MOP. Notwithstanding this price premium, SOP is the most commonly used alternative to MOP when the presence of chloride ions is undesirable. The majority of SOP use is for ‘‘premium’’ agriculture, broadly defined as all crops other than cereals and oil seeds.

China, with a population of 1.3 billion and the world's largest producer of tobacco, fruits and vegetables, is the largest consumer of SOP, accounting for more than 45% of global demand. Over the past 20 years, the demand for SOP in China has experienced significant growth, growing from approximately 0.5 million tonnes per year in the early 1990s to 1.9 million tonnes in 2011. SOP is also widely used in the fruit growing regions of Mediterranean Europe and the United States.

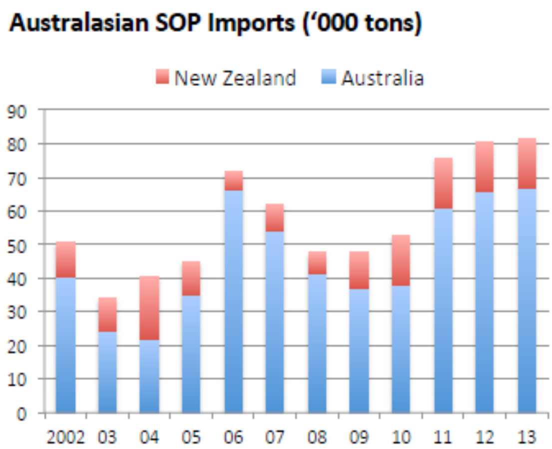
Market Size

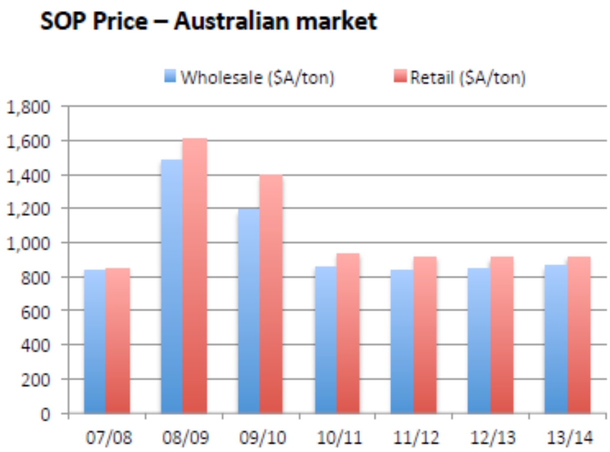
According to CRU, the global potash market is around 64 million tonnes (mt) per annum, including around 55mt of MOP and around 5mt of SOP. The demand is estimated to grow to around 6mt by 2020, driven by increasing consumption in China.



Australian Market

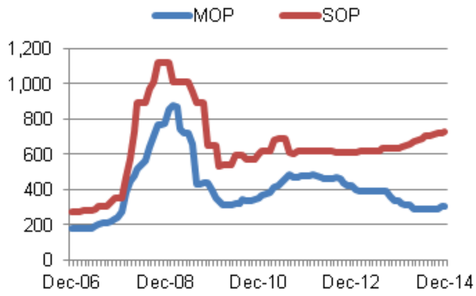
SOP demand in the Australian market reached 80,000 tonnes in 2013 with retail prices averaging $A970 per tonne. Prices in 2014 have risen to over $A1,000 per tonne. Distributors have cited frequent supply constrains from the traditional suppliers to the Australian market, which are high-cost secondary producers.





Global Prices

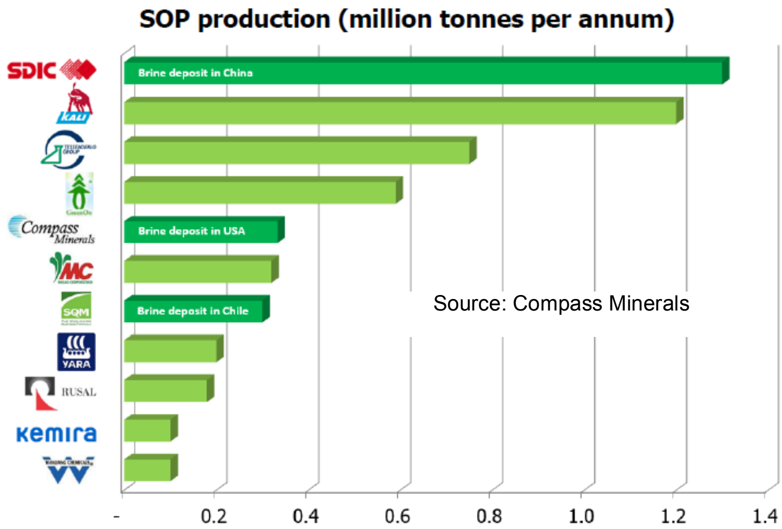
SOP has commanded a significant 30% premium over MOP due to its superior qualities, limited availability globally and high cost of production due to the scarcity of primary producers. The prices have remained stable throughout the recent potash market weakness and reached US$728 per tonne in December 2014.



The chart provided on the right tracks SOP and MOP prices in North America in US$ per tonne. The sources used include World Bank, Greenmarkets and various corporate reports.

Competition

70% of SOP supply is produced via processing underground mined MOP or Kieserite through Manheim process which is energy intensive and requires one tonne of MOP plus 0.6 tonnes of sulphuric acid per tonne of SOP.

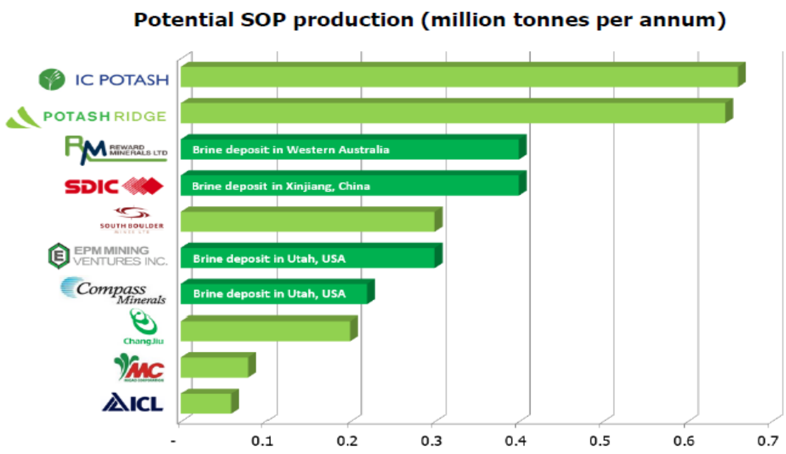


30% of SOP supply is produced from salt lake brines utilising solar evaporation which has the lowest industry operating costs – as low as US$200 per tonne compared to US$600 per tonne for the Manheim process.

Brines with sufficiently high potassium and sulphate levels are rare and currently only three companies produce SOP from salt lakes – SDIC in China, Compass Minerals in the USA and SQM in Chile.

A number of SOP projects are at the development stage: IC Potash in USA is at the project financing stage, Potash Ridge and EMP Mining Ventures in USA are at the feasibility stage, Reward Mineral in Western Australia is at the scoping level stage and South Boulder Mines in Eritrea is at the pre-feasibility stage. IC Potash's project is based on a Polyhalite deposit, Potash Ridge's project is based on an Alunite deposit, and South Boulder Mines project is based on a buried Kainitite deposit.

SOP projects which are not based on salt lake brine deposits are extremely capital intensive – both IC Potash and Potash Ridge have capital expenditure requirements of over US$1 billion.



[8] **"A little SOP to get most of your tomato crop"** (Extract from "The Australian", September 04, 2015)

"It's tomato planting season and the best bit of advice you'll ever get is to use a good sprinkling of sulphate of potash (SOP).

The combination of potassium and sulphur is guaranteed to deliver a healthier bush, an improved yield and, if you can believe it, tomatoes that actually taste like tomatoes.

But any SOP you do use will have travelled a long way given Australia hasn't produced its own since the 1950s, even though it has some of the most nutrient deficient soils in the world.

Farm gate prices for the stuff are about $1200 a tonne, making it a premium product compared with muriate of potash (MOP), the chloride carrying form of potassium used on cereal crops and the bulk end of the market, the sector BHP Billiton hopes to eventually break into with its $US10 billion Jansen project in Canada.

Global demand for SOP runs at more than 6 million tonnes, accounting for about 10 per cent of total potash demand.

It sells for at least twice the price of MOP and, naturally enough, has tight-fisted farmers using its sparingly.

Lower the price in this and other markets and it is London to a brick that there would be more SOP used in the growing of things where it works best — high-value fruits (15 per cent of usage), vegetables (25 per cent) and nuts/turf (60 per cent).

But supply is restricted to the extent that big brine salt deposits with operating costs of about $US200 a tonne of SOP are few and far between, with about half of production having to come from the high-cost Mannheim process (upwards of $US450 a tonne) that uses sulphuric acid to convert MOP to SOP.

Domestic production of SOP is on the agenda, with Reward Minerals (RWD) advancing work on getting its Lake Disappointment SOP project in Western Australia's Little Sandy Desert to the starting stalls. It is now an $83 million company.

Meanwhile, Melbourne-based EMR Capital is backing the SOP plans of Canadian-listed Crystal Peak Minerals at its Sevier Playa project in Utah.

But today's interest is in former gold explorer and SOP aspirant Goldphyre Resources (GPH). In the clapped out market for anything to do with resources, its shares have swum against the tide, doubling to 7.8c since June 30. It gives Goldphyre a market capitalisation of $8m.

The interest in the stock reflects the success of a drilling program that tested the SOP potential of its Lake Wells project, 400km northwest of Kalgoorlie.

Results from a drilling program reported last month returned "very strong" SOP concentrations in brine beneath the lake proper and in the surrounds.

It was a good start and made all the more interesting because despite Lake Wells' seemingly remote location, it has infrastructure access.

A resource estimate is the next signpost for the project but the pundits are already thinking about the potential for a 100,000 tonne-a-year SOP project.

Again, a lot more work to do. Goldphyre is positioning itself as a local hero in pursuing Lake Wells' SOP potential, which is not a bad idea in an environment where new resource projects of any description struggle to win political and bureaucratic support.

"Our goal is to target a low- capital operation that initially supplies farmers and other potash users in Australia with a product that they currently import 100 per cent of from costly overseas suppliers,'' the company states.

Can't argue with that."