

Guest Editorial

Winning Back the Lost Paradise through Chemistry

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A tiny, yet a mighty island situated in a very strategic position of the silk route along the Indian Ocean served as a busy trade hub exchanging locally produced goods with international traders.

Enriched with precious natural resources, affluent biodiversity and with prosperity showering upon the nation, there was no other word than “Paradise” to match this surreal island. If you rewind the time 500 years back from now, this was what Sri Lanka looked like. There was a time this Serendib island produced the world’s best high carbon steel using the natural monsoon wind which even used in the making of Damascus sword. Where do we stand today? How did we lose our paradise?

During the ruling period of the Portuguese, Dutch and British for 450 years, the fertility of this paradise island was extracted to prosper their economies. Even after gaining independence, further to continuing with the ‘gunny bag’ export economy introduced during the colonial era, in the 1980s, men started to join armed forces while women moved to middle-east countries, transfiguring the country’s economy more towards a

labour based economy.

As a nation how do we regain the lost paradise? With the advent of Artificial Intelligence (A.I.) traditional jobs are being rapidly replaced by robots and machinery. Blue collar jobs which involve manual labour will not thrive in the future world. Sri Lanka’s practice of earning dollars from the local labour force in foreign countries will soon be obsolete with new, advanced and low-cost technologies. How can we overcome this hurdle in this ever-changing technological world? The only exit would be to move towards a knowledge-based economy.

Globally, ‘the creative economy’ has been recognised as a critical force for fostering new drivers of competitiveness, and promoting new business opportunities. In creating an innovation-based ecosystem in Sri Lanka we should identify the areas where we can generate significant value. To recoup the status of a centralized trade hub, Sri Lanka should identify the ideal entry point.

Chemistry, being the central science towards innovation, could perfectly come in as a magical hand to support this journey. Chemical industry is an enabling partner to provide technological solutions to many challenges of the economy – it underpins sustainability in all downstream and derivatized industries.

LETTERS TO NATURE

An ancient wind-powered iron smelting technology in Sri Lanka



Source: Letters to Nature, VOL 379, 1996



Unfortunately, at present, there is little contribution to Sri Lankan Gross Domestic Production (GDP) from chemical and other high-tech industries (<0.06%). Sri Lanka is a treasure trove which is rich not only with many varieties of naturally available mineral resources but also with a wide assortment of flora and fauna. If we can glue our knowledge of chemistry with these natural resources, the potential to create high revenue generating industries is limitless. As a head start, we could begin with low hanging fruits, manufacturing of products which require minimalistic efforts and capital such as mineral value addition, agricultural value-added products, high grade activated carbon, paints, steel, glass, ceramic and copper-based products.

Industrial mineral resources which have a high economic value take a prominent spot amongst the natural resources of Sri Lanka. These mineral resources are vividly distributed throughout the island. Rutile, ilmenite, zircon, monazite mineral sands, Eppawala rock phosphate, high-quality graphite, clays, gems can be named as a few of the highly pure minerals which are originating from the earth resources in this country. How can we create great value out of these industrial resources? For example, The North-Eastern coastal line of Sri Lanka consists of approximately of 8 - 9 million tons of ilmenite, 1 million ton of rutile with a heavy metal content of 60 – 80 %. At present we earn US\$ 8 million per annum by just exporting 80,000 Mt of these minerals which has a high demand as the raw material for producing high quality TiO_2 . Sri Lanka spends US\$ 12.5 million to import 5,000 Mt/y of TiO_2 for paint industry only. The amount we spend to import TiO_2 is more than what we receive from exporting raw minerals. According to the statistics, current global market for nano TiO_2 and TiO_2 is US\$ 1.2 million and US\$ 25,000 respectively. By looking at these figures it is crystal clear that if Sri Lanka establishes factories to produce TiO_2 , much needed foreign exchange can be brought back to the country which will enable the country to reach global economic standards.

Sri Lanka is a country which was once considered as the “granary of the ancient east”; why don't we try to win back this status today? Fertilizers play the key role in sustainable agriculture as it is the major factor responsible for increased crop yields. Eppawala rock apatite is a gift from nature which is a rich source to produce high-quality phosphate fertilizers. On the other hand, naptha

which is a by-product from petroleum refinery process could be used as the feedstock for a urea manufacturing plant. If done right, we can gain the dual advantages of being a country with sustainable agriculture and gaining foreign exchange through exporting manufactured fertilizers and high quality agro based products.

A tropical island named as one of the 34 biodiversity hotspots in the world, Sri Lanka has a lavish distribution of flora and fauna with a significant number of endemic species. These organisms consist of bioactive compounds with anti-fungal, anti-bacterial, anti-cancer properties. Isolation these natural products from Sri Lankan flora and fauna would lead to new discoveries in the pharmaceutical/ nutraceutical arena.

Innovations based on diversified fields of value addition would be a unique catalyst for transforming the country's economy that is in-line with the global trends of the 21st century. The “Silicon Valley” in USA is an economic hotspot! So are Boston in USA, Tel Aviv in Israel and Eindhoven in Netherlands. So why not a tech-valley in Sri Lanka?