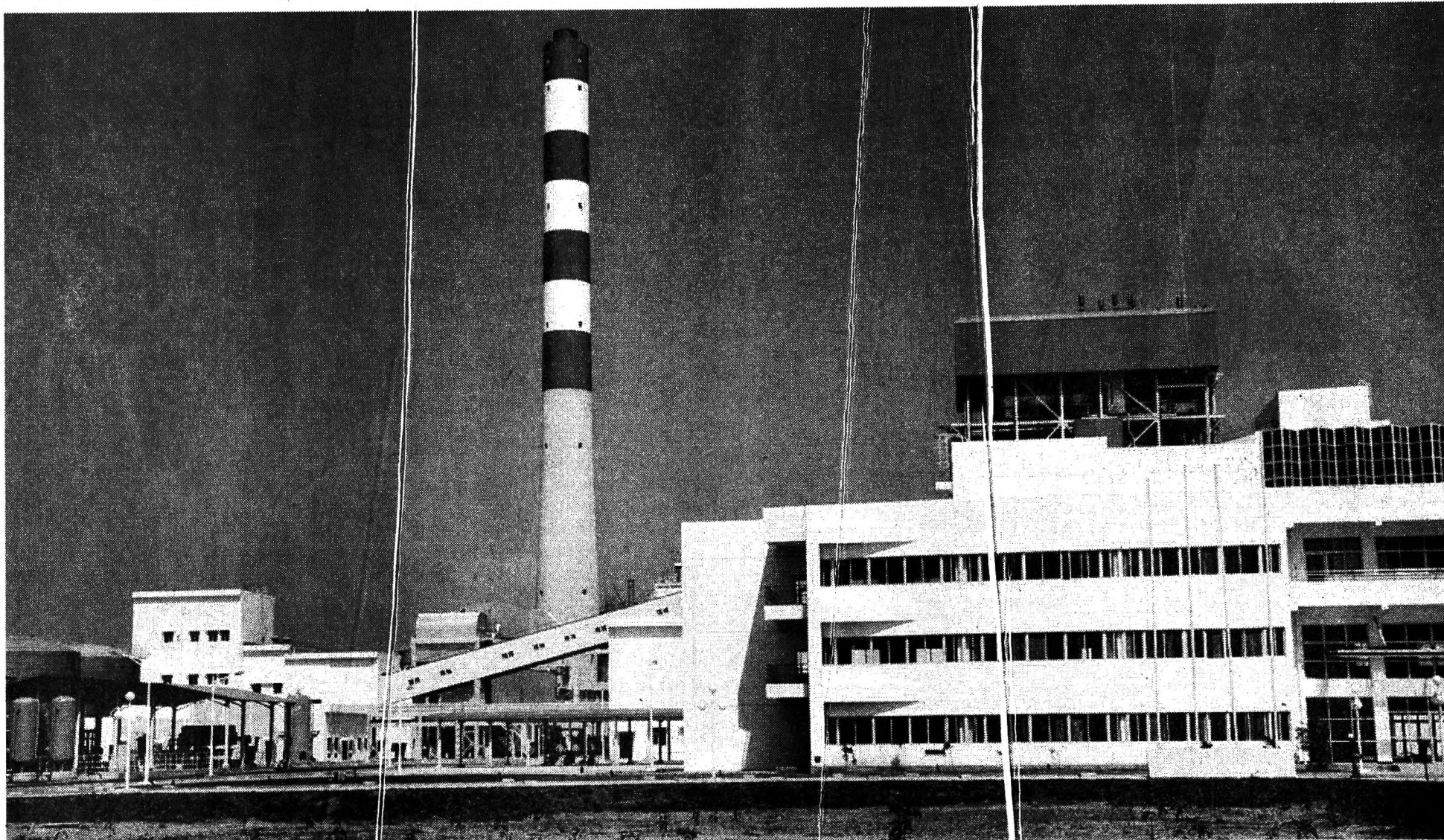


Feature



by DR PARAKRAMA WAIDYANATHA

Toxin-Free Nation: Rhetoric and Reality

Mr Asoka Abeygunawardene's (AA's) article on the title of 'Wither the toxin-free nation' in the Sunday Island of September 25 is interesting reading. However, the 'toxin-free nation' pursuit is confined to the agriculture sector only whereas pollution and toxins are far more serious in the energy and industrial sectors. For example how many tons of mercury does the Norochcholai 3,700 megawatt coal power plant spew out annually, and how many tonnes of toxins do combustion of fossil fuels emanate? Why must such a national policy be confined to agriculture only? Further, my enquiries revealed that the Department of Agriculture or other agricultural institutions have had no input in the formulation of this policy and activities! This is playing Hamlet without the Prince of Denmark! Why has the government chosen SEMA (Strategic Enterprises Management Agency) whose mandate is the management of government owned business undertakings, for the task; and why is an IT engineer chosen to manage an agricultural pollution-related project? Isn't one of Yahapalana pledges, appointing the right people?

Be that as it may, the article is full of empty rhetoric and much is furthest from reality. There is no argument that the post war development of agriculture and industry has caused environmental pollution and health problems, challenges to biodiversity and concerns of climate change, issues that need resolute addressing. In the agriculture sector these have been the unfortunate consequences in the quest for feeding a world with an ever increasing population and misuse of resources much of which was avoidable, but for human greed. We can, however, neither allow hunger and starvation nor pollution to decimate life. The food security-pollution-health trio has to be wisely managed. Mankind was compelled to drift from organic agriculture to conventional as the former could not feed the world. Even with the future development of new agro-biological technologies, total abandonment of conventional agriculture (fertilizer, pesticides) is untenable. AA's assertion that 'mankind careened down from heaven to hell and the planet went from sustenance to destruction' is a highly exaggerated, alarmist's view! This could actually

have happened but for the discovery of chemical fertilizers in the mid 19th century and the green revolution 100 years later. Nobel Laureate and father of the green revolution was called the man who saved a 'billion' lives. The Sri Lankan example of rice yields increasing by 700% from 1940 to 2010 whereas the population increased only by 350%, and the country became self-sufficient in rice demonstrates the transformation that took place in Sri Lanka and the world at large as a result of agrochemicals and new high-yielding grain varieties.

AA's argument essentially is that we to go back to the pre-1950 period with low yielding traditional varieties and organic fertilizers! The target under the 'toxin-free' program is to cultivate 30% of the paddy lands with traditional varieties, which on average yield of about two tonnes/ha, by 2018 whereas the national average now is more than double. The target will never be achieved given the current poor response of farmers to traditional rice despite massive promotional campaigns by the 'toxin-free' lobby. In the unlikely event of it being achieved, there can be a national food shortage.

There can never be a totally toxin free nation or world. All we could aspire for is to minimize pollution and health hazards to acceptable levels whether the system is conventional or organic; and organic farming is not toxin-free. Take the simple example of the nephrotoxic heavy metal cadmium which has been implicated in the chronic kidney disease of uncertain aetiology (CKDu). The permissible amount of Cd in triple super phosphate importable to Sri Lanka is 3 ppm. A 2004 Department of Agriculture publication reveals cow dung levels of 2.4ppm Cd on a dry basis. Assuming

standard applications rates, say, of 75 kg TSP/ha or 10 tons of cow dung/ha, far more Cd should enter the soil from cow dung than from TSP.

'Reductionism vs holism'

Let alone his above philosophy, AA states that 'lauding monoculture, all plants that were not profitable were considered to be weeds' and destroyed. Does he imply that weeds should grow alongside rice, for example, for our grandmas to pick pala at leisure! Does he not know that weed competition is a serious scourge substantially reducing yields in arable crops. Pala and rice should be ideally grown in separate plots! Mono-cropping is largely what is practiced with arable crops. There are of course rare exceptions of intercropping, multi-cropping and relay cropping, especially with vegetables. Multiple cropping should ideally be practiced with perennial crop systems as it happens to some degree with coconut, for example. He recommends slashing weeds and harrowing etc. in place of glyphosate. Does he not know that regular slashing encourages perennial grasses and sedges to grow at the expense of broad leaved weeds which are far more noxious and difficult to control. The picture of the sedge, *Cyperus* growing as luxuriantly as maize is a good example.

The ten point toxin-free programme

AA claims that we are mudslinging at the toxin free concept without reading the program. We have done so now but before dealing with it in depth we thought it apt first to deal with his article referred to here. Let me sincerely tell him that our criticisms are constructive. Our mission is to ensure that no calamity befalls the food security of the nation

nor farmer's livelihood. In fact my piece here deals broadly with some aspects of the 'toxin-free' policies.

The fertilizer subsidy

Extension of the fertilizer subsidy to organic farming, if it is argued, will now stimulate farmers to take on the technology. Hitherto there are no established and practical technologies available to the farmer to jump into the organic bandwagon other than the physical use of organic matter. In 2013 too the then Ministry of Agriculture was obsessed with replacing 25% of chemical fertilizer with organic matter. The effort was a total failure as rice farmers could not access adequate organic matter. At least 10 tons of organic matter should be applied per hectare to a rice crop and cost per ton exceeds Rs 5,000. The average net return is about Rs 65,000 per ha of irrigated rice and Rs 16,500 for rainfed rice. At a subsidy of Rs 12,500 per ha per season, would rice farmers use organic matter? Further exclusive use of organic matter will lead to serious nutrient imbalances in the long term.

Microbial techniques for soil fertility improvement

Mr AA appears to believe that microbes can provide all crop nutrient requirements. He asserts that 'so called agronomists pontificate that agriculture is not possible without urea'. I can't imagine anyone with a basic agronomy knowledge doing so! That legumes fix nitrogen which can be provided to other crops through soil incorporation of the legume crop and crop rotations is well known. However, why is this practice not popular in tropical arable farming? Free-living bacteria too fix nitrogen. There are microbes to solubilize rock

phosphate and make it available to crops. Are there, however, related proven and practical technologies acceptable to farmers? Of course, some 'concoctions' thereof are sold in the market. But do they work? The nitrogen for microbial fixation is from the air, but other nutrients, for example, potassium, phosphorus removed by crop should be externally replenished. Some local scientists claim they can be generated in the soil itself with biofertilizers! Microbes can, if at all, only make them available if present in the soil. However, arable crops such as rice, given the short growing period, need soluble phosphate for rapid uptake and early crop growth without which optimum yields cannot be achieved. Thus there appears no alternative technology yet to replace soluble phosphate (TSP) in arable cropping.

Already some multinational corporations are on a massive hunt in identifying beneficial soil microbes. For example, Monsanto and Novozymes are testing over 2,000 different microbes on some 500,000 test plots across USA for their benefits to crop growth. Let us hope that new technologies will eventuate.

I have seen a microbial formulation called 'biofilm biofertilizer' being advertised prominently at the SEMA website. However, Department of Agriculture research with maize did not find any response to this product. Mr AA plans to bring in foreign companies making microbial fertilizers. We trust strict quarantine procedures will be followed when importing live microbial concoctions as they may carry harmful microbes to the 'toxin-free' nation! **Agrochemicals and the chronic kidney disease**

Mr AA is wrong when he claims that the WHO Reports have 'clearly stated agrochemicals are one of the key contributors' to the disease. In the Report of the 2016 International Expert Consultation of 54 local and foreign experts in which I was one of the invited participants, it is clearly stated that the evidence of causality of the association of pesticides and CKDu is inconclusive.

Mr AA makes absolutely unsubstantiated claims such as glyphosate causing more damage to the soil than slash and burn agriculture. Where is the local evidence? It is unfortunate that no Sri Lankan agricultural research institution has hitherto done any comprehensive studies on glyphosate residue levels in the food, water, soil and human beings. The government should ensure that such a comprehensive study be undertaken though belated. Can SEMA ensure that this happens? However, the only few bits of analytical data after the government ban by the Office of the Registrar of Pesticides reveals that the levels of glyphosate in samples of food, water and soil analyzed are way below maximum allowable limits established internationally.

In conclusion, the total world organic farmlands do not exceed 1% of the total agricultural land of which 66% is in pasture. Of the croplands only 19% is in arable crops and 8% horticultural crops (World Agriculture Statistics and Emerging Trends-2013). As per the Paddy statistics, Department of Census, Sri Lanka, the total organic paddy extent in Maha 2014/2015 is a meagre 0.8%. Organic farming is thus a minor phenomenon and is a long way from replacing conventional farming locally or globally. This is because, as said before, there are no practical technologies other than the use of organic matter, which is in short supply, for organic farming. I, therefore, urge Mr AA and his colleagues to look at the issues realistically and dispassionately. Firstly, make a concerted national effort to minimize agricultural pollution and health hazards through effective farmer education and stringent agrochemical regulatory laws and their implementation. Secondly, before any of the so called new technologies are introduced they be tested at appropriate research institutes and then in farmers' fields before transferring to farmers.