CKDu: Scientific evidence and anti-science zealotry - I

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(Continued from yesterday)

The WHO Final Report

The much awaited WHO Final Report is now out. Although officially not in the public domain, the media and many other sources obviously have had access to it! However, it is not without contradictions and questionable data. For example, it states that of the 15.2% of the people affected, the majority are women, whereas the previous WHO releases and other research groups claimed a preponderance of males in the age group of 30 to 60 years, largely of rice farming families.

The Report quotes significantly higher concentrations of As and Cd in the urine of people from the endemic area than those of the non-endemic area, and significantly high Cd levels in the urine of CKDU patients in the endemic area than of people in the unaffected area. So Cd is strongly back in the picture! By contrast As levels are reported as significantly lower in the urine of CKDU patients in the endemic area compared to that of people unaffected from the same area. How come if As is a purported causal factor? On the other hand, significantly higher Cd and As concentrations in the nails and hair respectively of CKDU patients than those of healthy people are also reported; and the mean Cd and Pb levels in bone (post-mortem samples) were higher in the CKDUE subjects than in healthy subjects. The report postulates that co-exposure to As may aggravate the effect of Cd. Selenium (Se) protects the oxidative stress caused by other heavy metals and low Se levels, the Report says, may be a contributory factor in increasing the susceptibility of the kidneys to oxidative damage. However, the Report contradicts itself in stating in another place that the Se levels were normal in CKDUE affected persons!

The As, Cd and Pb levels in the drinking water sources of CKDU affected areas were within normal limits, refuting the findings of Jayasumana and others that the As and Cd levels in the water to be above normal levels. In the section on analysis of food, tobacco etc for As Cd and

Pb, there is only reference to the last two metals and not to As. Higher concentrations of Cd in lotus , fish and tobacco in the endemic area compared to the non-endemic area are reported and it is concluded that Cd and Pb in fish and vegetables is high in the endemic areas and exceeded the safety limits. However, there is only analytical data just for one vegetable reported, and that is lotus rhizome, which is anyway known to accumulate heavy metals. Except for one location (a home garden) As and Cd were within permissible limits in the soils and so in the phosphate fertilizer analyzed. The Report refers to maximum acceptable levels of As, Cd and Pb at '1% nutrient level'. The nutrient level in phosphate fertilizer is given either as P205% (phosphate) or as P%, and hence the reference is confusing unless the form is specified.

Pesticide residues in the urine are reported to be detected in both CKDU patients and of those of the control area. The percentage of CkDU subjects with pesticide residue levels above reference limits are given for some pesticides. However, no comparable values are given for the control subjects, which is a serious omission. It is reported that ,for example, 3.5% of the patients had 2,4 –D in their urine, an unbelievable piece of data, given the fact that this herbicide has not been used in Sri Lanka for about a decade! I am not competent to comment on the other pesticides residue data.

It is also a serious omission that the WHO study did not incorporate comparative analytical data from the up country, a geographical area where there is far more intensive use of pesticides and fertilizers than the Rajarata, particularly as agrochemical are implicated as causal agents. Apart from contradictions and questionable data, on the whole, the physical data in the Report is not presented satisfactorily. Instead of tabulating or where appropriate, graphically presenting the numerical data, figures are extensively quoted in the text making reading laborious. Clearly, WHO should have censured the release of a more professional report.

The WHO Report implicates long term exposure to cadmium and co-exposure to arsenic as causal factors of CKDU with the heavy metals entering the food chain through the soil and not through drinking water. However,the physical data on heavy metal in food is inadequate to reach conclusions. Pesticides and fertilizer are implicated to be the sources of the toxins. Pesticide residues directly are also suspected to aggravate the illness The Report recommends stringent regulatory measures on the import and use of agrochemical and educating farmers on their safe and judicious use. The regulatory authorities, however, maintain that the existing regulations are stringent enough and what matters is judicious use of agrochemical for which effective extension, farmer training and awareness building are critical. These are at present grossly inadequate.

Potable water

Poor quality of drinking water hardness and pollutant contaminated) has featured prominently as a causal factor of CKDU and that farmers in the Rajarata, it is argued, work in intense heat leading to dehydration and accumulation pollutants (toxins) in their viscera over the years.

Malnutrition and illicit liquor may aggravate kidney diseases, and most farmers are undernourished and drink illicit brews. It is argued that intake of good quality water, at least 2 - 3 litres per day to flush out the toxins should be the key to escape the disease. The disease is far less in townships in the region where tap water is available. Providing quality potable water to people of the region should be of highest priority in the government's agenda to counter the disease. Surprisingly, however, it has been reported that they drink far less water and that they do not feel adequately thirsty!

Returning to traditional / organic farming?

Be that as it may, some anti-science zealots are arguing the need to return to organic / traditional farming with minimal or no agrochemical as the answer to the CKDUE problem. The settlers in the Rajarata, they argue, believe that the disease aggravated following the green revolution and the use of fertilizer and pesticides. It has been said, for example, that the pioneer young settlers under the Minneriya Irrigation Scheme who are now in their 80's are virtually devoid of the disease but not the next generation. Whilst this may well be true, can we reverse the current direction of agricultural development and at the same time meet the food demand of the growing population? It is the green revolution- the high yielding, fertilizer-responsive varieties that also require pesticides to ward off pests and diseases - that have pushed our national rice yields from 1.6 Mt/ha in the 1960s to about 4.5 Mt/ha today. The high potential areas record average yields of 6-8Mt/ha and the potential (research) yields now stand at over 10 t/ha. Such high yields should come from the farms in the future to meet the food demand given the limitations of land and water. Traditional varieties can never produce the high yields needed to meet the food demand. That traditional varieties are more pest and disease resistant than improved varieties is also a myth according to leading rice scientists. As regards organic farming, there can never be enough organic fertilizers to provide the nutrient demand to reach the current crop production levels on a national scale. Moreover, in a 2007 study in Belgium it had been reported that consumers of organically grown wheat had taken in more than twice as much Pb, slightly more Cd and nearly the same amount of mercury as consumers of conventional farm wheat! Furthermore, the country continues to import large quantities of food. Are we testing them for heavy metals and other toxic contaminants? The current mode of farming has to continue but there can be no compromise on judicious and safe use of agrochemicals.

Concluding remarks

The fact that other geographical areas with similar environmental conditions and farming practices have hitherto not reported the disease questions the validity of the suspected risk factors. It is a serious omission that the WHO failed to carry out comparative studies in the upcountry where agrochemical use is far more intensive than in the Rajarata.

Moreover, the conflicting analytical data makes informed decision making difficult. Far more comprehensive analytical data relating to causal factors in the endemic areas in comparison with non endemic areas are thus necessary for more conclusive evidence on the disease

etiology. The analysis of heavy metals and other chemicals and their residues in minute quantities requires highly sophisticated equipment and very competent persons to man them. A former Director of the Institute of Fundamental Studies once remarked that senior scientists often leave such analysis in the hands of untrained graduates with inadequate supervision. So the reliability of the data is in jeopardy, and this may be a factor in the discrepant data from different sources.

Let alone the CKDU matter, the number of laboratories in the country with the requisite equipment and competent staff are woefully inadequate considering the seriousness of environmental, food and water pollution problems looming large, and the need to regularly monitor adequate numbers of samples to caution both the policy makers and the public. In the US for example, there is the "National Water Quality Inventory Report' submitted to the Congress' regularly. It is the primary vehicle for informing the law makers and the public about water quality and related problems of national importance, and programmes implemented to restore and protect waters. We have nothing of that sort. Given the indiscriminate use of agrochemicals, do we know how much poison we are ingesting daily? Addressing this issue is of highest national priority and should take precedence over building of highways, airports and harbours!

Concluded