FOOD PRODUCTION, FERTILIZER USE AND FOOD CRISIS IN SRI LANKA: REVIEW OF IRRATIONALITY AND ITS POSSIBLE IMPACT FOR PEOPLE

D N De Silva[1]

ABSTRACT

The level of paddy production that is the staple food among Sri Lankan and other major vegetable production in Sri Lanka have been satisfactory, despite significant quantities of certain kinds of pulses, spices and fruits being continued to be imported to the country. Especially the rice production had been in self-sufficient level from the beginning of 2000s except during drought-stricken years. This was achieved mainly through varietal improvements and improvements made in crop management practices, particularly the use of inorganic fertilizer. The fertilizer recommendation was to use not only inorganic fertilizer but organic fertilizers as well. However, with this background, in 2020 the government took a drastic decision to stop the import of inorganic fertilizer assuming the use of inorganic fertilizer in Sri Lanka is high and it contributes to prevailing kidney disease (CKDU) among farmers. Both of these assumptions are unfounded up to now. However, the banning of inorganic fertilizers compelled farmers to cultivate paddy using only organic fertilizer. Many people including farmers opposed the move, but the decision didn't change. Subsequently, farmers stopped cultivating or cultivated using only organic fertilizer resulting in an approximately 40% yield loss. Rice availability started to decrease, increasing the price as many predicted. The government started to import rice, and could decrease rice prices. The price became almost double and was unaffordable to ordinary people in the country. Eventually the government reversed the decision and lifted the decision to ban importing inorganic fertilizer. Now, inorganic fertilizer is available but it will not be able to change the scenario immediately as farmers cultivate paddy twice a year and one crop may need 5-6 months to reach its yield to the market, resulting in the people and the economy of the country suffering at least until the end of 2022/23 'maha' season that is the end of March 2023.

Key words: *Paddy production, inorganic fertilizers, farmers, organic fertilizers*

[1]Former District Director, Agricultural Extension and Development, Ministry of Agriculture, Sri Lanka.

INTRODUCTION

Food demand in Sri Lanka is primarily met through the local production and has been satisfactory during the last decade. Rice that is the staple food among Sri Lankans has been met to a 99 percent, while vegetable that is the other most essential food commodity is the same. But the situation of other important food ingredients such as grains, pulses and spices are different and only 50 to 80 percent of the demand is met locally, while the rest has been imported from other countries. Besides supplying the local demand, there have been exports of various agricultural products amounting to millions of dollars annually. Furthermore, there are imports of fruits, vegetables and rice, though the quantities were marginal except of fruits.

The farming community in Sri Lanka contributed the most for this level of food production; however, various other agricultural sectors have also been contributed immensely towards this achievement. High quality seeds and planting materials that were developed and distributed by the department of agriculture was also a crucial factor. The supply of inorganic fertilizer under a subsidy scheme was another vital contributor while the availability of effective agrochemical also played an important role especially in protecting the yield. Advisory services also contributed to a great extent.

The situation had been generally of this nature until the middle of 2020. The decision of the government to immediately ban the use of inorganic fertilizers in agriculture changed the situation. The decision was to supply organic fertilizers instead of inorganic fertilizers. Many individuals and professional organizations expressed their views against the decision of immediate banning, but the responsible authorities completely ignored such views. The moment the decision reached the farming community, they started reacting against the decision. However, the government proceeded with their decision assuring the supply of sufficient organic fertilizers and other alternatives for the farming community. Unfeasibility of immediate conversion to organic fertilizers was also adequately conveyed with facts yet those views were unheard by preconceived authority. The immediate banning of inorganic fertilizers was implemented.

According to the ministerial sources, the decision to ban the import of inorganic fertilizers was made mainly due to the speculation that the use of inorganic fertilizers contributes to chronic kidney disease

(CKDU) prevalent especially among farmers in the Dry Zone areas in Sri Lanka (Report of National Science Foundation of Sri Lanka, 2021). In addition, the belief that our farmers apply those fertilizers in excess quantities and the ongoing foreign currency issue also were reasons for this decision.

STATE OF FOOD PRODUCTION

As rice is the staple food of Sri Lankans, every efforts to increase food production in Sri Lanka has been revolved around paddy production and the primary objective has been to achieve self-sufficiency in rice. Traditionally, farmers had been cultivating paddy varieties that had low yield potentials. Yield potentials of traditional varieties did not exceed 20 – 25 bushels per acre and local production was not sufficient to meet the local demand. For example, immediately after independence in 1950, the total rice production was 0.60 mil tons with the average yield of 1.56 ton/hectare requiring almost 50 percent of country needing imported rice to feed the population that was only 6.0 mil people (Rice Congress, 2010). Though the quantities were in decreasing, successive governments had to import significant quantities of rice from various countries to meet the local demand until 1990s. Meanwhile the efforts were continued to increase the paddy yields bringing new land under cultivation and increasing the yield potential of paddy varieties. The yield increase was achieved mainly through varietal improvements. 50 years after independence, the yield potential was almost 6 times higher compared to that at the independence. Varietal improvement programme continue and new high yielding paddy varieties were introduced to farmers as they emerged. Today, more than 98 percent of farmers in Sri Lanka grow high yielding varieties bred locally.

The present situation is such that paddy is the most important single crop grown in Sri Lanka. The average annual extent cultivated under paddy is about 870,000 ha. On average 560,000 ha and 310,000 ha are respectively cultivated during 'Maha' (Sep.- Feb.) and 'Yala' (Mar. – Aug.) seasons producing more or less 4.00 mil tons of paddy annually (Central Bank of Sri Lanka, 2018). About 1.8 million farm families are engaged in paddy cultivation all over the country. Sri Lanka currently produces 2.45 million MT of milled rice annually and is virtually self-sufficient. Another aspect that should be kept in mind is that paddy production is mostly the work of smallholder farmers in Sri Lanka. About 70 percent of the land ownerships under paddy are less than 2 acres (0.8 Ha) and 95 percent

are less than 5 acres (2 Ha)

FOOD SECURITY AND RICE IMPORT

The ability to provide food for its people for reasonable price is the condition that is described as 'food security'. According to FAO, food security is defined as the process of "Ensuring that all people at all times have both physical and economic access to the basic food that they need" (FAO, 1983). Expanding the context further, FAO further explains that food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Accordingly, food availability is the prime requirement of food security though the quality of food is also a major concern. From the past, every successive government in Sri Lanka has taken special concern to ensure the supply of basic food components to every family. Rice has been the main concern, as rice is the staple food among Sri Lankans. Supply was always through two sources that are local production and imports. While all arrangements were made to increase the local production, import was only to meet the gap between production and demand. Though there were ups and downs, effort of producing rice and other food crops have been gradually reaching the expected levels.

For the last few decades, we have been basically safe in food production and food supply in Sri Lanka, though we had to wait until 2000 to achieve self-sufficiency in rice. Vegetables and fruits that are also essential components of our daily meal have also been in sufficient quantities, though there were imports of different quantities at different times. However, the requirements of grains, pulses, spices have been met manly through imports. The production of certain important crops such as potato, onion, chillies, green gram, black gram, kurakkan, maize etc have gone down due to various reasons. While the agriculture sector ensures the daily food requirement of Sri Lankan, it earns foreign exchange worth many millions through exports.

USE OF INORGANIC FERTILIZERS AND FERTILIZER SUBSIDY

Inorganic fertilizers are mineral or other compounds that release plant nutrients to soils moisture when they are mixed with soils. Chemical fertilizer or synthetic fertilizer also refer to inorganic fertilizer though technically they may not be exactly the same. In order to grow and produce yield, paddy plant needs various plant nutrients and the plant absorbs them from soils. There are

16 such nutrients, but three are required in high quantities and they are named as major or macro nutrients. Those major nutrients are Nitrogen (N), Phosphorous (P), and Potassium (K) and new high yielding paddy varieties require higher amount of nutrients proportionately to their yield levels. As the soil is unable to provide them continuously, those nutrients have to be provided externally. With the account of nutrient requirement for plant growth and yield production as well as absorption efficiencies of various plant nutrients, 105 kg of Nitrogen, 25 kg of Phosphorus and 35 kg of Potash are recommended per a land unit hectare (Department Agriculture, 2013). Accordingly, Urea (N - 46%), Super phosphate (P2O5 -21%) and Muriate of Potash (K2O -60%) respectively 225kg, 55kg and 60kg need to be applied per hectare but this quantity can change slightly according to the age group of paddy variety, type of water supply and level of soil fertility. While it is crucial for paddy plants is to meet this requirement; the source of nutrients is not an issue. In fact, the plant does not recognize the source of nutrients. However, the nutrient quantity is required and if the plant does not get the right quantity, plants will develop deficiencies and malfunction in the process of growth, and yield production will reduce. Further, plants will be susceptible to various undesirable situations.

FERTILIZER SUBSIDY AND ITS SIGNIFICANCE

Farmers were able to successfully cultivate traditional paddy varieties with low yield potential with organic fertilizers. The introduction of varieties with high yield potentials to meet the higher requirements led to the use of inorganic fertilizers as those varieties could not grow successfully only with organic fertilizers. Higher the yield potential of a variety, the need of using inorganic fertilizers increased. In order to support farmers to apply inorganic fertilizers, the subsidy scheme was introduced as far back as in 1962. The main objective of this effort had been to make fertilizer available as cheaply as possible in order to encourage its wider use. Thereafter, except during the period from 1990 to 1995, this fertilizer subsidy scheme remained in effect with different levels until 2020.

Initially all main fertilizers that are Urea, Super Phosphate, Ammonium Sulphate and Muriate of Potash which respectively provide Nitrogen (N), Phosphorous (P) and Potassium (K) were subsidized. Until 1975, the subsidy level varied according to the kind of fertilizer and the type of crop. Due to various reasons, in 1975 the government introduced a uniform subsidy scheme for all crop sectors. In 1990, the government

completely removed the fertilizer subsidy as it was heavy burden to the national budget. However, mainly due to heavy pressure exerted by farming community, the fertilizer subsidy scheme was reintroduced in 1994. In 1997, the government decided to restrict the fertilizer subsidy only to Urea with the objective of providing more benefits to paddy farmers and reducing the burden on the government budget. In 2016, an attempt was made to reduce the expenditure on the subsidy by converting it into an equivalent cash grant. However, this cash grant approach did not last more than two years mainly due to difficulties faced by farmers. In 2020, the subsidy was expanded to all crops. From mid-2020, arrangements were made to provide fertilizer free for paddy up to the maximum extent of 5 acres under this subsidy scheme. But on 6th May 2021, importation of inorganic fertilizer was banned surprising the farming community and everyone in the agriculture sector.

USE OF EXCESS INORGANIC FERTILIZERS

As it was mentioned earlier, one reason for banning inorganic fertilizer is the idea that excess amounts of inorganic fertilizers are used in Sri Lanka. In fact, there is no basis for this position because the amount used in Sri Lanka is 138 kg per hectare (FAO statistics, 2018) and it is within quantities that other countries also use. According to the same report, the use of inorganic fertilizer in selected few countries are as mentioned below. Bangladesh - 318.5 kg/ha, Pakistan - 156.0 kg/ha, India - 175.0 kg/ha, Maldives – 115 kg/ha, Nepal - 87.0 kg/ha, Israel – 241 kg/ha, UK – 245.6 kg/ha, China – 393.7 and Australia – 85.0 kg/ha (FAO statistics, 2018). These figures clearly demonstrate that the use of fertilizer in Sri Lanka is not in excess quantities. However, the aim should be to reduce this quantity further without damaging the crop productivity and food production.

USE OF ORGANIC FERTILIZER AND ITS IMPLICATIONS

According to the authority, the banning of inorganic fertilizer was to pave the way for the use of organic fertilizers replacing inorganic fertilizers. Organic fertilizers are materials or mixtures that contain plant or animal-based materials which are either a by-product or end product of naturally occurring processes, such as animal manure and composted organic materials. The use of organic fertilizers to grow crops is not new to Sri Lanka and already there are more than 77000 hectares of various crops grown using only organic fertilizers. The other important aspect is that farming using organic fertilizers had been in practice in the past and it

had to be changed mainly due to its limitations to meet the demand of food. There are different kinds of organic farming under different standards, but the most common feature of any organic farming is that it totally depends on organic matters for plant nutrients. Table.1 shows different kinds of common materials that can be used as organic fertilizers or to produce organic fertilizers with available main plant nutrients.

Table 1. Average nutrient content of commonly available organic matters

Organic matter source	Nutrient (% dry weight)		
	N	P2O5	K2O
Compost	0.8	0.4	0.5
Rice straw	0.6	0.2	2.2
Rice husk	0.4	0.2	0.5
Cattle manure	1.4	1.2	2.6
Pig manure	1.8	1.7	0.7
Poultry manure	3.0	5.0	2.4

Source: Tennakoon and Bandara, (2008)

Local availability (not in required quantities) and free from certain impurities that may find with chemical fertilizers are the biggest advantages of organic fertilizers. Nevertheless, low nutrient contents leading to requirements in huge quantities to meet nutrient requirements of crops, unavailability in required quantities and associated practical issues especially with bulkiness have been discouraging farmers adopting the use of organic fertilizers to a great extent (Maraikar and Amarasiri, 1988). However, the use of available organic material such as straw is strictly advocated under fertilizer recommendations.

If the nutrient requirement of paddy is to be met using organic materials, the requirement of specific material can be calculated using the above table (Table 1). As an example, the requirement of the most widely used nutrient component that is nitrogen (N) can be considered in the recommendation. In order to meet this N requirement using compost, it is necessary to apply more than 05 tons of compost (0.8% N) for one hectare. But if it is to be met by urea (widely used nitrogenous chemical fertilizer), 225 kilograms are adequate. Quantities required to meet other nutrients using organic fertilizer are also significantly high. No doubt if available and if it is practically possible, the use of organic fertilizer is better as organic fertilizers improves physical, chemical and biological properties including nutrient retention capacity

of soils. Under no condition the importation of organic manure can be accepted for common use as they can contain various harmful micro-organisms which may not be present in our soils.

Converting to organic fertilizers, the government had a plan to produce one million tons of organic fertilizers annually; however, until the beginning of 2022, no proper programme with adequate capability of producing organic fertilizers was initiated. In fact, we are not prepared and do not have capability to expand organic fertilizer production capacity to meet the current fertilizer requirement in the short run. Disagreeing with expert advices against importation of organic fertilizers, the government imported organic fertilizers. The shipment had to be returned due to adulteration with harmful bacteria and as the fertilizer imported was unsuitable for paddy crops in Sri Lanka. Eventually, the paddy crop suffered without the required nutrients causing law yields.

EMERGENCE OF FOOD CRISIS

As many individuals and professional organizations warned, paddy production declined drastically as a result of the inorganic fertilizer ban. During 2021 Yala season, the yield loss was somewhat less and it was approximately 25 – 30 percent. Relatively less yield loss was attributed to the fact that farmers could use fertilizers remaining with them and fertilizer traders. The paddy prices started increasing as early as in September and October in 2021. The biggest impact was on the cultivation during 2021/22 Maha season and the harvest of this Maha season reached the market during the months of February, March and April. According to the Department of Agriculture sources, production in this Maha season has been reduced by approximately 40 percent of the expected yield. This is the main reason for the prices of rice to increase beyond 200/- Rs a kilo, that is almost 100% increase over the prices a year ago. This will further increase toward the end of May and remain high until the 2022 Yala harvest reaches the market. If these high prices are to be kept under control, the only option available for the government is to import rice from other countries which also seems bleak at the moment. Already the inflation has started rising, and the inflation of food prices in the month of April is about 46 percent (Central Bank, 2018) depicting adequately what is to be expected in the coming months.

The government has overturned the decision of banning the importation of inorganic fertilizers now. Further, the government is making arrangements to import and

distribute fertilizers among farmers. But so far, no exact arrangement of importing or distributing has been stated, making farmers have no confidence in receiving fertilizers for this cropping season as well. Proper mechanisms are required and it has to be with concerns of fertilizers, prices, distributing mechanism, size of holding etc. Developing an appropriate mechanism itself is time consuming. Already it is late as the 2022 Yala season has commenced. The 2022 Yala yield will be worse compared to that of 2021/22 Maha season. In addition, farmers face more problems now. Issues of fuel for machinery, less availability of quality seeds and other agro-chemicals, higher prices of seeds and fertilizer, higher prices of land preparation, more time spent in various queues etc. are certainly affecting all types farming activities negatively. However, farmers are compelled to cultivate as it is the only source of income they have.

With the ongoing financial crisis in the country could there be any possibility of paying for the few stocks of rice from other countries? It is not going to be easy and there are possibilities for huge shortages of rice in the market in the coming months. Less availability, escalation of prices of staple food and shattered hopes in the current crop and the future may lead to unrest especially among the farming community.

CONCLUSION

There were sufficient strong facts and background to understand that paddy production in Sri Lanka has evolved to a satisfactory situation with the help of clear scientifically proved interventions. The use of chemical fertilizers has been one of the strong and clearly visible aspects behind this achievement. However, the irrational decision was taken to ban inorganic fertilizers and now the consequences have started affecting everyone in the country. Though the decision has been reversed, it will take long time to get the activities back to normal creating food scarcity and social unrest among people. Reintroduction of the mechanism of providing inorganic fertilizers with positive and appropriate steps with short term measures of facilitating farming activities as smoothly as possible are the requirements today, in order to get the food production situation gradually eased.

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