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**From food security to nutrition security**

**M.S. Swaminathan**, a plant geneticist renowned for leading the green revolution, locates the gaps in India’s policies and programmes addressing hunger and nutrition. Principal among these gaps, says the former director general of the Indian Council of Agricultural Research and principal secretary of the ministry of agriculture and irrigation, has been our failure to see malnutrition as more than a health issue, and nutrition as more than calories.

*You have been part of India’s fight against hunger and malnutrition for decades. In all these years, India has put in place several policies and welfare programmes to address hunger and nutrition, including the Integrated Child Development Services (ICDS), Midday Meal Scheme, the Food Security Act, 2013, and more recently the Poshan Abhiyaan. While we have made progress, malnutrition remains a major challenge. What are we are missing in our efforts?*

There are several key issues that are missing. First, somehow malnutrition was considered a health issue, to be handled by the ministry of health, rather than seeing it as a broader issue involving food and livelihoods. The question is how to combine agriculture, nutrition and health, because as long as we do not bring all three together – agricultural production, both micro- and macronutrient nutrition, and above all the health problem – malnutrition will remain a challenge. Gradually though, there is a realization that these three should be brought together.

The second reason is that somehow we concentrated on macronutrients like calories and proteins and not the whole range of micronutrients like vitamin A, vitamin B12, iron, iodine and zinc. Now, people realize that nutrition does not mean only calories. Earlier, the food for work programme and other policies interpreted food as calories. Even today, the Indian National Food Security Act, 2013, talks about ensuring minimum *calories* to each individual.

The third important area that is neglected is non-food factors such as drinking water, sanitation, healthcare and so on. People now know that clean drinking water is important, and without it, we may have any amount of calories, but still be undernourished.

Fourth, the relationship between health, nutrition, agriculture and employment has not been fully realized. For achieving food security, you also need adequate resources in terms of money to buy the necessary items from the market. So gradually, the concept of food security has evolved from food to nutrition security.

And finally, I must say that until Mina Swaminathan started pressing for attention to the preschool child and early childhood, this phase was not given adequate attention. We realize now that the first 1,000 days in a child’s life are very important for cognitive and physical development. In the ICDS programme, there is now an emphasis on early childhood education, nutrition and health.

These five areas are key, and we have to put them together in a holistic manner to meet the food security and nutrition challenge.

*More than half (53%) of Indian women, and 59% of children (between 6 and 59 months) are anaemic, according to the National Family Health Survey (NFHS-4, 2015-16). A study by CNNS found that one in two adolescents suffer from at least two of the six micronutrient deficiencies (iron, folate, vitamin B12, vitamin D, vitamin A and zinc). What explains the widespread prevalence of micronutrient deficiencies in our country?*

There are several reasons. First of all, a lack of understanding that micronutrients are part of nutrition. For a long time nutrition meant only wheat and rice. Even when I was a young boy, we ate *dosas*or *idlis*, and there was no understanding of the full need of nutrition. The idea that nutrition is much more than just calories, that micronutrients are essential, was born gradually. Even a small amount of vitamin A, if it is missing, can lead to blindness. These realizations all came only after child nutrition started receiving adequate attention, with organizations like UNICEF taking the lead. Now, the importance of adequate nutrition for pregnant women, nursing mothers and infant children, particularly in the first 1,000 days, has been established. That nutrition is not considered holistically is one of the weaknesses of our nutrition policy. I have long pointed out that a small deficiency in micronutrients can cause a number of challenges. There is much more understanding of the importance of micronutrients today, and we hope by the end of the century we will find a change. So, one problem was the knowledge gap. Second, agriculture somehow meant only rice, wheat, *jowar, bajra.*We didn’t extend the concept of agriculture to address micronutrient deficiencies, except in the case of horticulture. But horticulture again became more expensive and available to those who could pay for fruits and vegetables, so we didn’t create a reliable and easy source for all. I can go to a ration shop and take my wheat or rice and come back. But I have no ration shop where I can go for micronutrients, bringing them home at affordable prices.

Alongside affordability, the non-integration of nutrition with agriculture is a major issue. For example, at the M.S. Swaminathan Research Foundation, we have our own garden of biofortified crops, which includes varieties of tomato and sweet potato, which are rich in vitamin C or vitamin A. Agriculture and nutrition have to come together if the problem is to be addressed. Otherwise, as I started by saying, nutrition is considered a health problem and not an agriculture problem. That is why one of the first things I did when I became the director general of the Indian Council of Agricultural Research (ICAR) was to appoint an assistant director general in charge of nutrition and to start nutrition courses for agriculture graduates in five or six agriculture universities. This was not there earlier.

*You have said that India’s focus should now shift from food security to nutrition security. What does that mean for our agricultural policies and practices? Is there a way in which protein- and micronutrient-rich foods can be made affordable and accessible to our population while also ensuring that our farmers are able to earn a fair price?*

This can be done. In fact, farmers will earn a better price if we include a nutrition dimension in agriculture. In countries like Canada, the payment for wheat is made according to the protein content. In India, Dr Varghese Kurien’s contribution through the National Dairy Development Board (NDDB) was that milk should be priced according to its fat and protein content. That is why buffalo milk started getting a higher price, though people thought that the buffalo was inferior to the cow. Similarly, even in the case of fisheries, you will find a difference in the price based on the nutrient content of different fish species.

The consciousness of the importance of nutrition is also reflected in the pricing policy of the government when quality is given some value in its pricing. By marrying agriculture and nutrition we can easily reduce the price of micronutrients. Biofortification, such as what we do with sweet potatoes in our garden, is not expensive, and by ensuring that the crop is in line with the taste of communities, we can make it both affordable and accessible, while ensuring farmers a decent price.

Unfortunately, in our country’s caste system, people thought that the staple consumed by the upper castes – rice in South India or wheat in North India – is the best crop. While we can’t shift the emphasis on wheat and rice, millets are very important, as they contain a number of nutrients that rice and wheat lack. As a result of pressure, the government has introduced not only sorghum, but also pearl millet, *ragi*and others in the PDS (public distribution system). Unless they are available in the PDS, people won’t pay, just as pulses are not consumed in sufficient quantity as they are difficult to get at affordable prices. But once pulse production increased, consumption has gone up enormously. So nutrition is also related to the pricing structure. The price gives value: if I say an object is very expensive, then I think it is very valuable. Similarly in food, if the price is high, you think somehow it is very good. Even if it is junk food.

*How can we support the Indian farmer in achieving that nutrition security amidst the increased challenges posed by climate change?*

Climate change has three important implications for agriculture. First is higher temperature, second is deficient or excess rainfall, and the third is sea level rise. There are solutions to each of these problems – that is why hereafter we should create much more awareness among farmers on the implications of climate change for agriculture. If the temperature is going to be high, how are you going to manage it, or if there is too much rainfall how will you manage that. Considerable attention is being paid to this dimension. In fact, when I first organized an international seminar on climate and rice in IRRI (International Rice Research Institute) in the 1980s, these dimensions were not included in research. It was the same problem with women – the gender dimensions were not included. So, supporting farmers on dealing with climate impacts through education is critical. I would say that every textbook on agriculture at the BSc level must very clearly indicate the relationship between climate and agriculture.

Secondly, there must be a climate insurance policy to deal with seasonal variability. Depending on the location, if near the coast, the area may be prone to floods or cyclonic storms. We need to ensure that farmers derive benefits and not just experience problems as a result of climate change. The benefits are not only in terms of money, but could also be higher yields, for example. Countries like Canada will be happy to have higher temperatures, as this would increase the duration of crops and subsequently yields, but for India, it can result in more problems. We have shown in our foundation that it is important to have what we call plant tolerance to salt. We have a garden of halophytes in Vedaranyam. Mangroves were neglected until we started talking about them in terms of protection from climate change and sea level rise.

*In addition to ensuring the supply of nutritious food, what are some steps we can take to ensure more awareness (and therefore, increased demand) of nutrient-rich food in the Indian population?*

Obviously, awareness and education are essential. The second is pricing policy, and the third is a minimum support price for procurement of nutritious food. Fourth is attention to distribution. Near every anganwadi centre or school, which provides nutritious food to children, we should put up a food store, where food can be kept hygienically. I think the government should make investments both in education and infrastructure, so that the farmer also realizes that nutritious food is not only good for the public but for themselves and their own children too. It will take a little time, but in my view, in another five to 10 years, India will be a different country from the point of view of linking nutrition and agriculture. I proposed the idea of Leveraging Agriculture for Nutrition in South Asia (LANSA) to DFID (UK’s Department for International Development). They liked the idea, and many international institutions such as IDS (Institute of Development Studies) and IFPRI (International Food Policy Research Institute) came forward to support it very enthusiastically. While planning, it is important to realize the need to bring together agriculture, nutrition and health. Planning should include a focus on production, purchases, marketing and consumption – not only production. At the same time, culinary diversity and culinary characteristics need to be recognized as these are important to people’s lives.

*One of the most tragic consequences of the Covid-19 pandemic and the lockdown has been hunger and starvation for many in India, particularly our migrant workers. What is missing in our public health and food distribution systems that a health crisis ended up becoming a food crisis for so many, and how do we ensure this does not happen again?*

We have to learn from our past, from both our success and failures. I think it is now clear that people realize the importance of ensuring there is enough food supply during a crisis like Covid-19. In fact as early as the 1960s, I had told the then prime minister that in a country like India we should have enough food stock. We decided to have a food stock of 20 million tonnes; now it is 75 or 80 million tonnes. So we have enough food stocks of basic cereals. We need to place greater emphasis on pulses and also fisheries as we have a very large area of ocean fisheries and inland fisheries. There is an enormous possibility in India to improve consumption. We are known as the largest producers of poultry products, especially eggs. In fact, after egg was introduced in the school midday meal programme, there is evidence that child nutrition is much better. So to meet the nutrition goal, public policy should change in terms of pricing, purchase, procurement and marketing.

*Lastly, how can we mitigate the impact of the Covid-19 pandemic on agrarian India, considering there are restrictions on transport, storage and sale? And of course the backbone of any harvest and post-harvest – the migrant workers – have gone back home.*

This is very unfortunate, particularly the migrant labour going home with no money or resources to survive. There are a number of issues coming up from the management of Covid-19 that we should chronicle and learn from. I feel that we should really make use of our panchayat system, as they know what is locally available and what is missing in the diet. We have raised a wonderful system of grassroot level democratic structures, but I am sorry to say we are not using that system of grassroot level democracy to manage food and nutrition security during the crisis. There are of course some generic issues like keeping enough foodgrain storage at the local level, but also other foods like poultry products, which can be distributed in the local community. While this is a new problem, unprecedented in many ways, we do need to be prepared for such emergencies in the future, as becoming wise after the event is not a long-term solution. We need to ensure basic food and nutrition security to all our people in all eventualities.