



Combating Hunger and Achieving Food Security. M.S. Swaminathan. Cambridge University Press, 4823/24, 2nd Floor, Ansari Road, Daryaganj, Delhi 110 002. 2015. 183 pages. Price: US\$ 125.

The book under review contains 30 articles written by M. S. Swaminathan, the great Indian scientist, development thinker and one of the architects of green revolution. The volume is a collection of papers written and transcripts of speeches made by him between 2012 and 2014. It highlights the issues to be addressed in combating hunger and food security. The book starts with genesis and growth of yield revolution in wheat. Then it takes up, among others, important topics such as nutri-farm movement, nutrition-sensitive agriculture, food losses and food waste, importance of ecological conservation, conserving biodiversity, women's role in agriculture, youth as agents of change, from Bengal famine to right to food and the future of Indian agriculture. One enjoys reading all the chapters as it conveys in a lucid way important issues and policies in agriculture, hunger, food security and malnutrition. The book is timely in the context of Sustainable Development Goals (SDGs) approved recently by the Member States of the United Nations. This review covers selected issues as it is difficult to cover all chapters in the book.

The first chapter of the volume deals with origin of wheat revolution in India. This gives the reader particularly the youth an understanding of the efforts made for achieving the green revolution of the 1960s. As the author notes, green revolution was possible because of synergy among technology, public policy and farmer's enthusiasm. Public policy

particularly in terms of providing remunerative prices and procurement mechanism was crucial for the success of green revolution. In Africa, green revolution was not successful at that time because there were no arrangements for procurement at minimum support prices. In other words, technology alone will not succeed unless it is accompanied by public policy in terms of remunerative prices and marketing.

It is known that Swaminathan, the author of the book, played an important role in green revolution. On the occasion of his receiving the Nobel Prize in 1970, Norman Borlaugh wrote: 'The Green Revolution has been team effort and much of the credit for its spectacular development must go to Indian officials, organizations, scientists and farmers. However, to you Dr Swaminathan, a great deal of credit must go for recognizing the potential value of the Mexican dwarfs. Had this not occurred, it is quite possible that there would not have been a Green Revolution in Asia' (p. 8).

Swaminathan recognized in the early days of India's green revolution that the new breakthroughs could create major new ecological problems if not properly managed. In the Presidential address to the Agricultural Science section of the Indian Science Congree, he appealed to the farmers as early as 1968 not to harm the long-term production potential for short-term gain and also advised the farmers for avoiding the temptation to convert the *green* revolution into a *greed* revolution. Later he also coined the word 'ever-green revolution'. In the concept of ever-green revolution, technologies can help farmers improve productivity in perpetuity without harming the ecology. By mainstreaming ecological principles in development of technology, the country can achieve sustainability in agriculture.

In the chapter on future of Indian agriculture, the author gives the following six areas for stability and sustainability of agricultural production in the country. First one relates to conservation and improvement of soil health. Second is on irrigation water security. Here integrated approach and conjunctive use of different sources of water for raising water use efficiency is advocated. Third, technology and inputs should be in tune with socio-economic and agro-ecological conditions in which farmers work. Bio-technology, information technology and mechanical technology should attract and retain

youth in farming. All these technologies have to be gender sensitive. The author is not against GM technologies. But, he says that first public concerns including safety have to be adequately addressed. Fourth, appropriate credit and insurance support need to be given to farmers. Loans should be given at lower interest rates and insurance procedures must be more effective. Recently, the government introduced 'Pradhan Mantri Fasal Bhima Yojana (PMFBY)'. This new insurance scheme which has good features can be effective if it is properly implemented. Fifth, remunerative prices and marketing are needed for economically viable agriculture. The author advocates that minimum support prices (MSP) should be C2 (i.e. total cost of production) plus 50% as recommended by the National Commission on Farmers. He also indicates that we should take a stand in WTO negotiations to have a *Livelihood Security Box* on the lines of green box provisions. Final and sixth one relates to organization of small holders. This can be in the form of producer companies or cooperatives. All these six suggestions can make farming economically viable and sustainable.

Returning to hunger and malnutrition, Goal 2 of Sustainable Development Goals deals with 'End hunger, achieve food security and improved nutrition and promote sustainable agriculture'. Achieving zero hunger by 2030 is a challenge. Globally, one in nine people in the world today (794 million) are undernourished. Two billion people experience micronutrient malnutrition. 1.9 billion adults are overweight or obese. Twenty six per cent (165 million) of world children under five suffer from stunting while 16% (101 million) suffer from underweight. These are big challenges at global level.

In the post-2015, what happens in India regarding food and nutrition security is crucial for success of Goal 2 of Sustainable Development Goals at global level. This is because large percentages of global children suffering from underweight and stunting are in India. Recent estimates show that 39% and 29% of children India suffer respectively, from stunting and underweight. About 48% of women have problem of anaemia while 45% of children 6–59 months old have problem of vitamin A deficiency. Swaminathan provides the strategies needed to achieve zero hunger and reduction in malnutrition.

The author mentions several times the importance of National Food Security Act 2013 for reducing hunger and malnutrition in India. This Act has provided the backdrop for many of his observations in the book. In one of the chapters, he says 'The brightest jewel in the crown of Indian democracy is the conferment of the Right to Food through the National Food Security Act, through which India has taken the essential steps necessary to convert Mahatma Gandhi's dream of hunger-free India into a reality (p. 15). One of the good features of the Act is the enlargement of food basket to include cereals like ragi, jowar, bajra and group of minor millets. The author calls them 'climate smart nutri-cereals'. However, deficiencies in the Act are also mentioned. The Act does not refer to other essential components of food security such as drinking water, sanitation, primary health care and nutrition literacy. There is no convergence of different programmes relating to food and nutrition security. The Act also should focus on agricultural production. Similarly, India should be prepared to face adverse impacts of climate change. If the legal entitlement of the Act is to be fulfilled, efforts should be made to improve productivity, profitability and sustainability of small holdings. One criticism of the Act is that it helps increasing only calories and neglects proteins and micro nutrients. It may be noted, however, that consumers can buy pulses and other commodities if they get cheaper rice and wheat.

The volume also mentions the concept of a 'food security floor' recommended by the UN Committee on World Food Security. It recognizes that freedom from hunger is a fundamental right. The minimum steps needed for hunger elimination are nutrition literacy, clean drinking water, sanitation and primary health care.

Another emerging area for research and policy is linkages between agriculture and nutrition. According to the author, hunger has three major dimensions. First one is calories deprivation, which can be improved through the National Food Security Act. Second, protein hunger is another deprivation, due to inadequate consumption of pulses, milk, eggs, fish and meat. Third is hidden hunger, caused by the deficiency of micronutrients such as iron, iodine, zinc, vitamin A and vitamin B12. In the case of protein hunger, India should become

self-reliant in pulse production. The year 2016 is the International Year of Pulses. One innovative idea is 'Pulse Panchayats' started by M. S. Swaminathan Research Foundation. For example, the people of Edaipatti Panchayat have passed a resolution to put maximum available land into pulse production. Pulse Panchayats assist farmers to improve pulse productivity and profitability. Regarding micronutrients, biofortified crops would be useful. Due to Harvest Plus programme of CGIAR, biofortified varieties are becoming available in several crops, such as iron and zinc-rich rice, iron-rich beans and pearl millet, vitamin A-rich cassava, sweet potato and maize. This programme has introduced iron-rich pearl millet in India. Swaminathan also advocates introduction of naturally occurring bio-fortified crops and varieties such as *moringa* (drumsticks), sweet potato and maize. Nutrition-sensitive agriculture should be capable of addressing all forms of hunger and also converge with other sectors such as drinking water, sanitation, health, etc. to reduce malnutrition.

Farming system research (FSR) is needed to strengthen linkages between agriculture and nutrition. This will involve crop–livestock–fish integration in research. FSR will help in providing balanced diet with the introduction of dairy, poultry, fish and other animal protein along with cereals. This approach will give unique opportunity for enhancing nutrition-sensitive agriculture. In the chapter on agricultural heritage, the author provides two inspiring examples of innovative and creativity in the field of agriculture and nutrition. Two systems, namely, Koraput's tribal agri-biodiversity-based sustainable agricultural system and the Kuttanad below sea level farming system have been recognized as globally important agricultural heritage systems (GIAHS) initiated by FAO. Using mixed cropping, local level gene, seed, grain and water banks, Koraput's tribal women and men have developed a climate-smart food security system. It may be noted that they have also identified naturally bio-fortified crops like *moringa*, pearl millet (iron rich), sweet potato (vitamin A-rich). The below sea level farming of Kuttanad provides an example of how to prepare for sea level rise caused by global warming. Construction of biobunds is used for salinity management which is the key for suc-

cessful agriculture. The farmers of Kuttanad grow one crop of rice during the monsoon time and one crop of fish during non-rainy season reflecting farming system approach.

Finally, throughout the book, the role of women in agriculture and combating hunger and achieving food security has been discussed. One of the chapters of this volume discusses on the role of women in agricultural production. Swaminathan introduced the Women Farmers' Entitlements Bill in the Rajya Sabha in 2012 to strengthen the livelihood security of rural women. The Bill provides for the gender specific needs of women farmers. This Bill also protects the rights of women by empowering/entitling them with enforceable rights over agricultural land, water resources, credit and other related rights. The role of women is also important in reducing malnutrition. One of the reasons for 'South Asian Enigma' or 'Indian Enigma' in malnutrition is the lower empowerment of women. The chapter on nutrition sensitive agriculture advocates that women should play a lead role in all issues related to balanced diets and improvement in nutrition. This is because rural women are, in general, in charge of household food security and also play a lead role in dairy enterprises.

To conclude, one of the main conclusions of the book is that there must be synergy among scientific knowledge, political will, farmers' active participation, appropriate nutrition policies and implementation to achieve the goal of achieving zero hunger and reduction in malnutrition in India and other developing countries.

As Shenggen Fan, Director General of International Food Policy Research Institute (IFPRI) mentions, Swaminathan's 'gift for explaining complex concepts in terms everyone can understand means the book will be valuable for policy makers and lay readers alike'. This book should be read by all the stakeholders who want to know about the issues and policies that attack hunger and malnutrition in India and other developing countries.

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