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Chief Editor
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NUTRITIONAL AND FOOD SECURITY : WAY AHEAD

Aman Verma, Devendra Singh and Sunil K. Singh

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Introduction

Between 1950 and today, the world's population grew with the pace of 1-2% each year, with the number of individuals rising from 2.5 to around 7.5 billion. As per UN Department of Economics and Social Affairs, 2019, if it follows the same trend, then by 2100, the world's population is projected to reach approximately 10.9 billion (figure 1). The world's median sustainable age is thirty one and it is expected to increase up to 42 years at the end of this century, though it was 24 years in 1950. Sub-Saharan African region alone is expected to have more than triple increase in their population by 2100. And it is projected that India will surpass China in terms of population and would be the most populous country of the world. This is an alarming situation and compels us to think about our persistence of coming generations. Therefore it is important to pay attention towards nutritional and food security for sustainable future.

Defining Food and Nutrition

The saying "You are what you eat" seems to be proven true in present time where the COVID-19 pandemic has resulted in somewhat natural screening on the basis of immunity levels. Those with stronger immunity were able to keep the corona virus at bay while people with lower immunity levels and with co-morbidity were not spared. Food and Nutrition, in fact, are two sides of the same coin. They are, therefore, inseparable. Health depends to a large extent on nutritional status of an individual, and nutrition depends on the food intake. So food is the most important single factor for health and fitness. According to Food and Drug Administration (1999) Food Code, food is defined as a raw, cooked, or processed edible substance, beverage, or ingredient used or intended for use or for sale in whole or in part for human consumption. It is the basic necessity of life. Besides giving energy, food provides protection from disease and regulates body's functions. In addition, Nutrition is defined as the "branch of science which deals with all the inclusive factors of which food is composed and the way in which proper nourishment is brought about". While this summarises the physiological dimensions, nutrition has psychological, social and economic dimensions too.

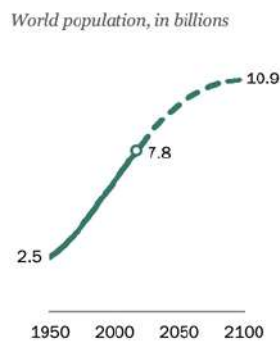


Fig-1 : Projection of world's population (in billions). Source: UN Department of Economics and Social Affairs, Population division, 2019.

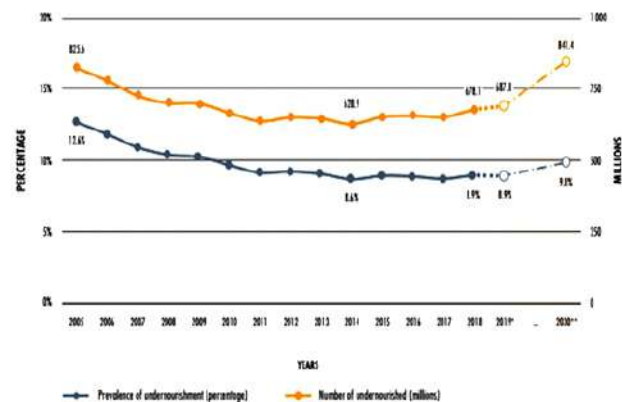


Fig-2 : Prevalence and number of undernourished people in the world (Source : WHO, 2020)

What would be the impact of increasing population on nutritional and food security?

Naturally, population burden which is expected in times to come will increase the demand for food. That would in turn attract additional investment in the agricultural sector. It would be difficult to manage these additional inputs when economy is itself in reviving phase. Extent of competition for natural resources is also rising. There is an urgent need to value forests, water, oceans, land and soil and promote an ecosystem approach to extract greater agricultural yield with fewer inputs. Generation nutrition (2020) in a report stated that the impact of nutritional and food insecurity is complex and multidimensional, and include conflict and insecurity, natural disasters due to climate change (droughts, floods, water scarcity, higher temperatures, etc.), environmental degradation, economic instability or other stressors like desert locusts as witnessed in western part of India from last 2-3 years. Emission of green house gases would increase for which agriculture practices should transform so that it contributes to lesser fossil fuel reduction. Adoption of holistic approaches, like agro-ecology, agro-forestry,

climate-smart and conservation agriculture should be the choice. Increasing prevalence of malnutrition is another impact of food insecurity (Figure 2). Majority of people cannot afford healthy, diverse, and nutritious food (SOFI report, 2020). Healthy diets are unaffordable to nearly 03 billion people worldwide.

Levels of Food Insecurity Severity

The global crisis induced by the COVID-19 pandemic even has impact on European and American countries, which have traditionally been more food secure. Based on Food Insecurity Experience Scale (FIES) which is a global reference scale for determining extent of food insecurity, there are three levels of food insecurity severity (Figure 3).

First level *i.e.* Food security level means where people have adequate access to food in terms of both quality and quantity.

Second level *i.e.* of moderate level insecurity, here people face uncertainties about their ability to obtain food so they are forced to compromise either on the quality or on quantity of the food.

Third level is of severe food insecurity where people experience severe food insecurity. They actually run out of food for a day or even days.

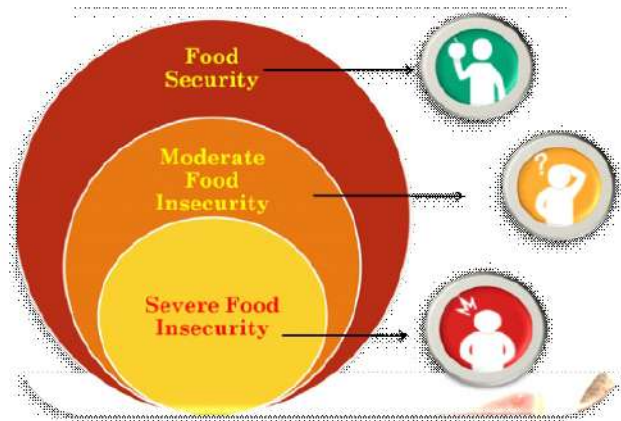


Fig-3 : Levels of Food Insecurity severity.

Way Ahead....

Pulses : Key to achieve Nutritional And Food Security

Pulses are a low fat alternative for healthy protein, enriched with high fiber content. They possess low glycemic index (Rizkalla et al 2002) and contain nearly twice the amount of protein found in whole grain cereals like wheat, rice, oats and barley. Fibrous content contains both soluble and insoluble fibers, where former reduces blood cholesterol levels and later improves digestibility and regularity. In many countries meat, dairy and fish products are not affordable and thus remain out of the reach of many. Plant based protein diets are therefore necessary for such deprived population. Protein energy malnutrition (PEM) is a manifest for such underprivileged groups with prevailing stunting or wasting. Additionally, the iron bioavailability of pulses and the protein quality of the diet are enhanced when pulses are supplemented with cereals and vitamin C rich foods in diet. There are many drought-resistant pulses, like pigeon pea (*Cajanus cajan* (L.) Huht) that can grow in arid ecosystems where rainfall pattern is often erratic or between 300 to 450 mm per year. Pulses have longer shelf life than other protein rich sources; therefore the proportion of food waste at the consumption stage due to spoilage is very low (FAO report 2013). If properly stored, pulses remain edible for several years.

Nuts and Oilseeds

Nuts and oilseeds are rich in fats and hence are a concentrated source of calories. A handful of nuts can supply a large amount of energy. They also contain protein, vitamins and minerals (iron, zinc, magnesium and selenium), fiber and other phytochemicals. Almonds are highly nutritious and a concentrated source of energy as they have 60% fat. It possesses low carbohydrate content but is a fairly good source of B-vitamins and contributes to vitamin E content. It is extensively used in skin care products. Brain nut or walnut is grown in Kashmir, Himachal Pradesh, Uttar Pradesh and in hilly areas of Punjab in India. It is rich in omega-3 fatty acids and manganese. It is of great commercial value. Omega-3 fatty acids are found to be protective against certain cancers and cardiovascular diseases, as they become part of cell membranes and thus maintain membrane fluidity. Groundnuts are particularly rich in thiamine and nicotinic acid. Its protein lacks methionine amino acid but is rich in the antioxidant flavonol. Protein isolate from groundnut flour is used in milk, baby foods, confectionery and as coffee/tea whiteners. Mustard oil is one of the highest yield oils; containing nearly 45% to 55% oil, proteins, minerals, erucic acid (Verma et al 2019) and oilcakes produced after crushing are high in protein and used as animal feed.

Reducing the Anti-nutrients

Anti-nutrients are natural or synthetic compounds that interfere with the absorption of nutrients. Lipase inhibitors (e.g., tetrahydrolipstatin) interfere with enzymes, such as lipases, which catalyze hydrolysis of some lipids and fats. Phytic acid in the legumes, nuts, and seeds grains, has a strong binding affinity for divalent cations like calcium, magnesium, iron, copper,



and zinc, preventing their absorption (Singh et al 2020). Reports are there where water soaking has reduced phytic acid content in groundnut (Verma et al 2019). Glucosinolates (e.g. mustard, although widely recognized for their medicinal value, also interfere with the uptake of iodine and flavonoids, and chelate metal ions (iron and zinc) thus reducing their absorption. Oxalic acid and oxalates, are present in many plants, particularly in spinach family, bind calcium to prevent its absorption. Many traditional preparation methods (e.g., fermentation) reduce antinutrients, such as phytic acid, increase the nutritional quality of plant foods.

Enhancing nutritional components

Removing undesirable food components is essential to their quality improvement. Food processing at small or large scale or even at house hold (e.g. soaking, cooking, fermentation, radiation, germination) can bring change in the nutritional status of foods. The combination of several of the above mentioned methods may be more effective in removing antinutrients than using a sole technique. One of the studies conducted at ICAR-DGR, Junagadh showed that roasting of groundnut kernels can increase resistant starch content. Many studies have shown that RS is a linear molecule of α -1,4-D-glucan, essentially derived from the retrograded amylose fraction, and has a relatively low molecular weight (1.2 10⁵ Da). Like dietary fibers, RS is not digested in the small intestine and thus, is fermented by habitat microflora of the colon to produce short chain fatty acids and thus promotes bowel health. RS is the fraction of starch which is not hydrolyzed to D-glucose by α -amylases, glucoamylase and sucrase-isomaltase in the small intestine within 120 min of being consumed, but is fermented in the colon. Benefits of RS include reduction of the glycemic index and cholesterol level. It was shown to be protective against colorectal cancer.

Biofortification

Alleviation of malnutrition has been known as one of the goal for achieving hunger-free world. It is recognized as Sustainable Development Goals-2 (SDG-2) out of 17 identified goals. The importance of nutritional and food security can be realized by the fact that out of 17 SDGs, 12 are related to nutrition signifying its value in health, education, employment and female empowerment sectors. SDG-2 is achievable if food diversification approach is followed in all senses or nutrients are added artificially in basic food products such as iodized salt (food fortification).

Both the approaches are not feasible for longer terms, where resources are not sustainable. Bio-fortification is an alternative where the nutritional quality of a crop is enhanced through genetic manipulation that includes both classical breeding and transgenic methods. Table 1 gives an insight about the popular biofortified crops of India. Biofortified crops hold great promise for health and wellbeing of increasing human population.

CONCLUSION

For achieving nutritional and food security, sustainable food systems are required through multiple strategies with better aiming and co-ordination between different programs and policies. In India, these strategies need to focus on improving diet diversification, reducing postharvest losses, bio-fortification of main/staple crops with its inclusion in safety net programs, women's empowerment and hygiene. In future, nutritional and food security initiatives will have to be adopted in keeping with changing livelihood patterns, climate change, and health-specific generic demands.

REFERENCES

1. FAO (2013). Food wastage footprint: Impacts on natural resources. Summary report. FAO, Rome.
2. S. W. Rizkalla, F. Bellisle and G. Slama (2002). Health benefits of low glycaemic index foods, such as pulses, in diabetic patients and healthy individuals. *British Journal of Nutrition*, 88, pp 255-262.
3. Singh S, AL Singh, MK Mahatma, AVerma, SK Bishi, V Chaudhari, CB Patel, LK Thawait & A Bharadava (2020) Phytic acid: An inevitable antinutrient in Groundnut. ICAR-Directorate of Groundnut Research, Junagadh, Gujarat. Folder, 4p.
4. The State of Food Security and Nutrition in the World (SOFI) Report, FAO, IFAD, UNICEF, WFP, WHO, 2020. <http://www.fao.org/3/ca9692en/online/ca9692en.html#>
5. Verma A, Sharma A, Rai PK, Kumar D (2019) Effect of microwave pre-treatment on quality parameters in Indian mustard. *J Food Sci Technol* Volume 56, pp4956-4965 (<https://doi.org/10.1007/s13197-019-03967-4>).
6. Verma A, Thawait LK, Singh S, Mahatma MK, Singh AL. 2019 <http://krishi.icar.gov.in/jspui/handle/123456789/36869>
7. Yadava DK, Hossain F, Mohapatra T. Nutritional security through crop biofortification in India: Status & future prospects. *Indian J Med Res.* 2018 Nov; 148(5):621-631. doi: 10.4103/ijmr.IJMR_1893_18.

About the Conference Chairman



CONFERENCE CHAIRMAN

Dr. S.P. Singh, born in Village Jevri, Post Rajbun, District Meerut (U.P.), in 1970 and Graduated in Agriculture with Honors from G.M.V., Rampur Maniheran, Saharanpur (U.P.). He did his Post Graduation in Agricultural Botany, Institute of Advance Studies, Meerut University Campus, Meerut and Doctorate in the same discipline (Ag. Bot.) from C.S.J.M. University, Kanpur. Presently, he is working as Scientist (Plant Breeding) at C.S.A. University of Agriculture and Technology, Zonal Agriculture Research Station, Kalai, Aligarh (U.P.). Dr. Singh is a fellow of SRDA, and member of many other professional Societies, having **21** years of experience in Research and Extension Education Works. **He authored many books** such as Plant Breeding, Agriculture at a Glance, Hand Book of Agriculture (Hindi), Crop Physiology (Hindi & English), College Botany, Environmental Science & Agroecology, Concepts of Ecology etc. He is well recognized Scientist and having more than **300** publications in reputed National and International Journals. Dr. S.P. Singh is also **Editor-in-Chief, Progressive Research-An International Journal & Frontiers in Crop Improvement** (both Journals are NAAS recognized), **Secretary**, Society for Scientific Development in Agriculture & Technology and also **Chief Managing Director**, Astha Foundation, Meerut, working in the field of Science & Education.

He has been awarded as Best Editor and Writer Award-2006, Young Scientist Award-2007, Dr. M.S. Swaminathan Young Scientist Award-2009, Distinguished Scientist Award-2014, Scientific Initiator Award-2014 from Directorate of Rice Research, Hyderabad, Science Leader Award-2015 From RVSKVV, Gwalior, Outstanding Scientist in Agriculture Award-2016, Outstanding Achievement Award-2016, Excellence in Research Award-2017, Innovative Scientist of the Year Award-2017 Outstanding Scientist in Agriculture Award-2018 Before this International conference, Dr. S.P. Singh has already organized five conference at different corner of country, first conference was National symposium on “Achieving Millennium Development Goal : Problems & Prospects” at Bundelkhand University, Jhansi (UP) during October 25-26, 2009 under the umbrella of SSDAT, Meerut, Dr. Singh has been acted as an Organizing Secretary. The second was National conference on Emerging Problems and Recent Advances in Applied Sciences : Basic to molecular Approaches (**EPRAAS-2014**) during February 08-09, 2014 at Ch. Charan Singh University, Meerut (UP) again by SSDAT, Meerut in which Dr. S.P. Singh has played his role as an Organizing Chairman. The Third, Conference was Organized by SSDAT, Meerut and Astha Foundation, Meerut at Directorate of Rice Research, Hyderabad on Emerging Challenges and opportunities in Biotic and Abiotic Stress Management (**ECOBASM-2014**) during December 13-14, 2014. Fourth Conference organized by Astha Foundation, Meerut & SSDAT, Meerut at RVSKVV, Gwalior on Global Research Initiatives for Sustainable Agriculture & Allied Sciences (**GRISAAS-2015**). Fifth Conference was jointly organized by SSDAT, Meerut & Astha Foundation, Meerut at PJTSAU, Rajendranagar, Hyderabad, Telangana State on Innovative and Current Advances in Agriculture & Allied Sciences (**ICAAAS-2016**) during December 10-11, 2016. Sixth Conference organized by Astha Foundation, Meerut in collaboration with SSDAT, Meerut, MPUAT, Udaipur; CSAUAT, Kanpur; UAS, Raichur at MPUAT, Udaipur, Rajasthan on Global Research Initiatives for Sustainable Agriculture & Allied Sciences (**GRISAAS-2017**). Seventh Conference organized by Astha Foundation, Meerut in collaboration with SSDAT, Meerut, CSAUAT, Kanpur; IGKV, Raipur; BAU, Sabour; MPKV, Rahuri; RARI, Durgapura, Jaipur; Global Research Initiatives for Sustainable Agriculture & Allied Sciences (**GRISAAS-2018**). Eight Conference organized by Astha Foundation, Meerut in collaboration with SSDAT, Meerut, CSAUAT, Kanpur; IGKV, Raipur; BAU, Sabour; MPKV, Rahuri; UAHS, Shivamogga, Global Research Initiatives for Sustainable Agriculture & Allied Sciences (**GRISAAS-2019**). Ninth Conference organized by SSDAT, Meerut in collaboration with Astha Foundation, Meerut, Innovative and Current Advances in Agriculture & Allied Sciences (**ICAAAS-2020**) at Bangkok, Thailand.

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