



Dear All,

At the outset, we wish you, your families and your colleagues a very happy, healthy and successful 2022.

We are happy to bring you the October - December -2021 quarter issue of the WIN Newsletter. The quarter saw nearly full scale project activities by our partners, though, as of now, the rapid rise in the cases driven by the omicron variant is a cause of concern.

In the nutrition project at Sanand, we see a very promising beginning by aspiring women microentrepreneurs, as they began their product journey by producing snacks for Diwali, while nearly 40 field health workers underwent a rigorous 3 days training on the mother and child nutrition based on the "1st 1000 days" concept. Our partners Samerth, SMDT and Nikesh continue to play a stellar role in these initiatives.

In WatSan, our focus on agri-water data system, with the objective to provide advisory to marginal farmers, continues to deepen with more villages and farms being brought under the system, in Kutch and Dwarka districts by our partners Arid Communities and Technologies. We are now starting to extend the same to selected villages in Sabarkantha through Viksat.

We are also actively engaging with NGOs and other skilling service providers to utilize our [skillingtowin.org](http://skillingtowin.org) online platform, which we offer at no cost to them.

We continue our Science in Action Series in this issue, with 2 nutrition practitioner-scientists with deep expertise, sharing their views on nutrition challenges and approaches. We welcome more articles for our future issues.

The National Bio-Entrepreneurship Competition (NBEC) 2021 had its finale in Dec'21. This saw several outstanding winners, including the two who received WIN awards: (i) Humus Biosystems for WatSan and (ii) Haemac Healthcare for MCH. This issue covers them in brief.

With Warm Regards,

Paresh Vora  
Director India Operations



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## Latest Updates

We continue to address the critical challenges in the area of Maternal and child nutrition and launched our third project based on our multistakeholder approach with our NGO implementing partner Saath Livelihoods in slum areas of Ahmedabad covering appx. 30000 population, with additional support from SMDT for nutrition training.

The Nutrition project with Samerth Charitable launched in September 2021, is off to a promising start in mobilising, training and developing women entrepreneurs in the area of Sanand covering 5 villages. On the occasion of Diwali, as a part of training session, the project team had organised two days trial product developing sessions to prepare Diwali snacks, utilising the WIN supported mobile kitchen facility. The enthusiastic potential women entrepreneurs actively participated and made 11 snacks. The products were also sent to Nutrition Group CTARA, IIT Bombay for nutrition analysis.

Under the same project, with the support of Samerth Charitable Trust, Dr. Rupal Dalal and her team from SMDT conducted a 3 days of training

'Training of Trainers (ToT)' for 40 selected women (Asha workers, Public Health workers, some SHGs) to provide training on - nutrition for 1st 1000 days starting from conception, including mother's nutrition, new born nutrition by mother's feeding and subsequently additional food - up to about 2 years of age. The trainees will carry on their role as trainers and counsellors, particularly for mothers, and in general for the community, to bring greater awareness and adoption of practices for better nutrition and hygiene.

Looking at the high impact of this training for health workers, we plan two more training programs in (1) Vasna, Ahmedabad and (2) Khambhaliya, Dwarka district, in Feb-March'22.

The grand finale of National Bio Entrepreneurship Competition (NBEC) 2021, organized by C-CAMP on behalf of Department of Biotechnology was held on 18th Dec'21 and WIN Foundation award winners were (i) Vasanth Ramesh, Humus Biosystems for WatSan and (ii) Prasad Muddam & Akitha Kolloju, Haemac Healthcare for MCH.

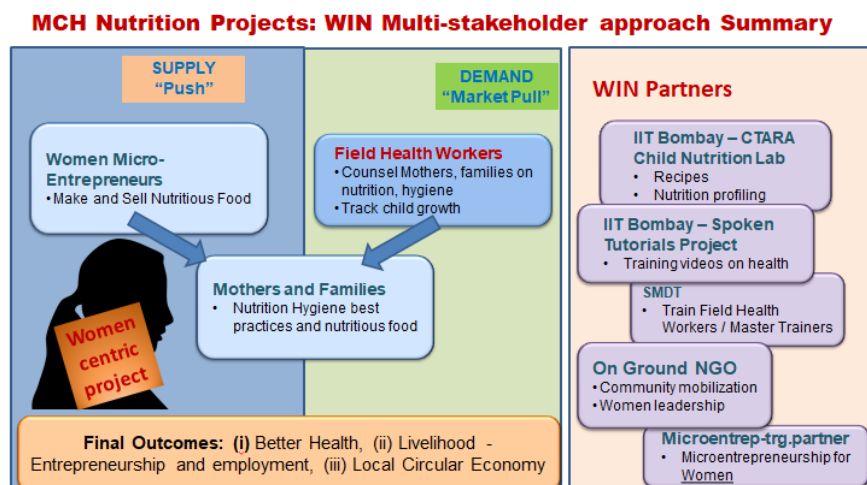
WIN Foundation has joined, as co-organizer with Maker Bhavan Foundation, in their Vishwakarma Award for Engineering Innovation 2022 contest. This year's annual thematic focus is "Water & Sanitation". Details are covered in this issue.

We continue to support innovative startups under our WIN Innovative Product Market Validation Program for innovative technologies. Under this we are introducing (I) weather station and soil moisture metres by Soilsens and (ii) Soil and Water testing kits by FFEM, in the tribal area of Sabarkantha district, Gujarat through our NGO partner Viksat. (<https://www.winfoundations.org/programs/>)

## Science in Action Series - 2

In this issue, we have articles from two accomplished research scientists in nutrition domain. Based on their on ground experience as well as research, they provide their practical insights and suggestions on challenges in tackling malnutrition in India.

WIN Foundation has initiated a "market creation at community level" approach for tackling malnutrition, using dual strategy of (i) Push (supply) by creating women microentrepreneurs to make and market nutritious products for community and (ii) Pull (demand) creation through training of field health workers on mother and child nutrition, who in turn will train and counsel mothers on good nutrition and hygiene practices.



WIN Foundation has also supported creation of the open source (font size) Spoken Tutorials for Health (<https://www.winfoundations.org/development-of-spoken-tutorials-on-health-for-health-information-dissemination/>), an IIT Bombay project, and Training of Field Health workers on the 1st 1000 days nutrition concept, by SMDT, with excellent results (<https://www.winfoundations.org/maternal-infant-and-young-child-nutrition-training-of-trainers-by-smdt/>). Dr. Dalal has trained well over 3000 field health workers with this. Now this training is also being launched on the national Nptel/Swayam platform: [https://onlinecourses.nptel.ac.in/noc22\\_bt01/preview](https://onlinecourses.nptel.ac.in/noc22_bt01/preview).

### ADDRESSING HEALTH AND NUTRITION - THE PERSONALIZED APPROACH TO WELLNESS

**Dr. Jamuna Prakash, Adjunct Professor, MLC University, Shillong.  
Former Professor, Food Science and Nutrition, Univ. of Mysore, Mysuru.**

Good health is the ultimate goal of every human being and good food is one of the gateways to achieve it. Here 'good food' refers to nutritionally balanced, safe and healthy meal and does not mean the taste quality of food per se. Despite being an agriculture dominant nation, India suffers with varying degrees of malnutrition, seen both in adults and children alike. While there are multiple avenues to deal with the issue, the WIN foundation is very rightly addressing it through their maternal and child health program of developing women entrepreneurship to promote healthy foods as well as promoting hygiene and sanitation in the community. These two issues are undoubtedly most important in addressing malnutrition in children and women.

The recent report of National Family Health Survey-5 points out both negative and positive aspects of health-related indicators. There has been a decline in neonatal, infant and child mortality rates, and the literacy rates have improved showing higher percentage of both men and women passing their school education. There are more women empowerment programs and gender equality schemes. However, on nutritional front, the scenario has been rather depressing. Iron deficiency anemia is showing a larger and wider spread, and the improvement in growth indicators of stunting, wasting and underweight have been exceedingly low. This calls for a higher investment and efforts for health and nutrition considering that consequences have a far-reaching effect spreading across the adulthood lowering productivity and work efficiency as well as a much higher risk of non-communicable diseases in undernourished children.

## **Creating lifecycle approach to nutrition through personalized interactions**

The experience in the field of nutrition has shown that one approach towards improving nutrition of the masses is through personalized interaction and counselling [apart from various ongoing programs]. This can be done using the already existing resources of health workers and the wellness centers, which will be operable in near future. The team of health workers comprising of doctors, nutritionists, and other paramedics on personalized one-to-one basis paving way for individual



Community mobilisation on nutrition



Health check-up surveys at Anganwadis

attention. These counselling sessions can be on monthly basis and can deal with health status and nutritional problems of children, women, men and elderly from a family. This would create a genuine lifecycle approach and will have a strong psychological impact on the family of caring. This would encourage them to follow the advice regarding healthy diets, desirable food preparation, special needs of children, elderly or any other diseased person in the family and hygiene as well.

While malnutrition in children is just one of the problems to tackle with, there are also numerous instances of lifestyle disorders across the community, which needs to be prevented or managed well. These counselling sessions would deal with all the health issues of family by way of advising them on all aspects of healthcare including self-management advice.

The process would require the following- A family health record to be maintained with the necessary details of all family members, for example the age, height and weight, blood pressure, general health, and medical condition along with the treatment history. A diet pattern can also be maintained based on which counselling can be done. The progress and adherence of the family regarding desirable food behavior and proper management of diseases can be monitored very well with this, and slight deviations will be observed early. This would also bring forth the group of elderly, who are often neglected by families, and they also can be provided with necessary comfort care.



Health awareness session at Anganwadis

### **The multi-sectoral approach towards health**

A point to be noted here is that health is an outcome of multiple factors and not diet alone. The counselling session will bring forth the non-nutritional issues which could be important for health such as availability of adequate potable water for drinking or for hygiene purposes, the pollution around the houses, the social issues of drinking, poverty, food taboos, superstitions, unemployment, school dropouts, etc. While the support center may not be able to solve all of them, it will create an understanding of the prevailing situation.



Water and Sanitation governance meeting with communities

The problem needs to be tackled with multiple angles and approaches. For example, one of the reasons for children not responding to various nutrition supplements in attaining normal growth status is frequent episodes of gastrointestinal and respiratory infections. Scientific evidence shows that repeated gastrointestinal infections shorten the intestinal villi thus reducing the absorption capacity, resulting in malabsorption syndrome which could be long lasting. A morbidity record maintained at the center would be helpful in knowing if a particular child falls sick frequently. Now, the next step apart from administering proper treatment to child will be of exploring the causes, is it because of low immunity, polluted water, unhygienic environs, or a repeated exposure to infections? An analysis would help to deal with the causes which may not be related to nutrition directly. Once these repeated episodes of infections are arrested, a child can attain the normal growth. Similarly, questions need to

be asked, if the mother or caretaker is adequately informed or educated, a personalized approach would certainly help these issues.

### **Unhealthy foods and emerging issue of overweight and obesity**

Let us now look at one more aspect of emerging health issue in women and children, that of overweight and obesity, obviously both linked to transitioning food behavior. A general perception of obesity is that it occurs in affluent society or urban areas. However, the trend is changing and so called unhealthy food is eaten across all regions, whether urban or rural. Many of our own surveys in rural areas show that 'fast foods' specifically sold by street vendors has gained popularity even in rural India. Undoubtedly, these are energy rich, fat rich sugary or fried foods with a very low content of fiber and essential vitamins and minerals [prepared mostly with refined wheat flour, hydrogenated fats, cheap oils, sugar and salt]. By far, sugar, refined flours and oils are the cheapest sources of calories and foods providing protective nutrients are expensive, [these include whole grams and dhals, milk and milk products, eggs, fish and animal foods, fruits and vegetables, nuts, etc.], hence it is easy to binge on foods which are cheap and satiate hunger, with no consideration for overall healthy nutrient density. This is indeed a very serious and complex issue to tackle as food laws cannot prohibit people from eating unhealthy foods!!! Though only advisories can be issued. Intake of such foods also increases the salt intake. While human beings are genetically programmed to like sweet taste, the taste of salt is adaptive, the more we eat, the more we like. And the taste threshold goes on increasing. This is very well exploited by food industry where a higher amount of added salt lures customer. Therefore, a deliberate attempt to lower salt is needed from all angles, though easier said than done. There has been a tremendous increase in online home delivery of catered foods across the country during pandemic, which has its own plus and minus points, increasing the convenience, creating employment, improving business, but also encouraging intake of unhealthy foods. The pandemic also affected the many welfare programs and school attendance of children increasing the rates of malnutrition, as children were deprived of regular mid-day meal on account of school closures. For some of the children mid-day school meal is the only substantial meal of the day and source of important nutrients.



Micro-nutrients awareness Mela at communities

So, the simple take home point towards improving malnutrition is an overall continuous effort from all the stakeholders involved to secure the future of our children. Malnutrition is a silent emergency, the voice of which is very loud, but cannot be heard, and we need to act before it is too late.

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**COMBATING MALNUTRITION THROUGH NUTRIENT DELIVERY TECHNIQUES**  
**Prof. Amit Arora, Associate Professor, CTARA, Indian Institute of Technology, Bombay**  
**Ms.Nisha Pujari, Research Scholar, CTARA, Indian Institute of Technology, Bombay**

**“The doctors of the future will no longer treat the human frame with drugs, but rather will cure and prevent disease with nutrition.” – Thomas Edison**

Good nutrition is an essential driver of sustainable development because it plays a critical role in brain development, generates broad-based economic growth, and signals the fulfilment of people’s rights to food and good health. Malnutrition refers to deficiencies, excesses, or imbalances in a person’s intake of energy and/or nutrients (WHO, 2019).

Micronutrients are essential elements required in small quantities throughout our life to orchestrate a range of physical and mental functions to maintain health. The consequences of their absence are severe and lead to micronutrient malnourishment (CDC, 2019). According to the national data for India (NFHS-5), the condition of wasting and micronutrient malnutrition has worsened in the last few years. The most widespread and recognized micronutrient deficiencies are of iron, zinc, vitamin A, iodine, vitamin D, and folate, often occurring concurrently in the sample population (Suchdev, 2017). As per NFHS 5, the percentage of total children aged 6-23 months receiving an adequate diet is very low (~11.3%). Anaemic children aged between 6 and 59 months have also gone up significantly from 58.6% to 67.1%. Likewise, 59 out of 100 women aged 15-19 years are anaemic.

Many strategies have been suggested to combat micronutrient deficiencies, such as exclusive breastfeeding for the first 6 months, controlling parasitic infections, food fortification, food diversification and nutritional supplementation. Food fortification is considered as a relevant and potent intervention by the authorities to reduce the burden of micronutrient deficiencies among children and mothers. It involves adding micronutrients to processed foods, which increases their concentration and thus fulfilling dietary requirements.



Health worker training on breastfeeding

The selection of nutrients is based on evidence of low intakes in a population and/or widespread nutrient deficiencies which vary between countries and populations. Fortification programs, therefore, need to be carefully designed to meet the nutrient needs of a given population. Food processing has enormous potential to both increase dietary-diversity and enhance concentrations of micronutrients in commonly consumed foods. Technologists and scientists are making efforts in employing food-to-food fortification, by adding micronutrient-dense foods to food recipes at household as well as commercial level to increase their micronutrient quality.

#### **Food-based strategies to combat micronutrient malnutrition**



Community mobilization on micronutrients

Evidence-based interventions for malnutrition have been well studied and can be categorized as nutrition-specific (address immediate causes, often at the individual level) or nutrition-sensitive (address underlying causes, often at the community level). Policy and programme makers incorporate food-based strategies such as dietary diversification, food fortification and supplementation, along with other additional measures on food safety, nutrition education and public health. These approaches should be regarded as complementary, with their relative importance depending on local conditions and local needs. Food-based strategies are discussed as follows:

##### **(i) Dietary Diversity**

Increasing dietary diversity is a preferred way of improving nutrition of a population because it has the potential to improve the simultaneous intake of many food constituents including micronutrients. Diverse diets have been reported to provide for vitamins and minerals that prevent ‘hidden hunger’ and micronutrient deficiency diseases (Dulal et al., 2017; Jones et al., 2014; Nithya & Bhavani, 2018; Rosenberg et al., 2018). Increasing dietary diversity means increasing consumption quantity and range of micronutrient-rich foods. In practice, this requires implementation-programmes to improve availability and consumption of different micronutrient-rich foods (such as animal products, fruits and vegetables) in adequate quantities, especially among those who are at risk or vulnerable to micronutrient malnutrition (Nithya & Bhavani, 2018). However, increasing dietary diversity on a sustained basis has its challenges. One being introduction of behavioural change through counselling about different foods and their nutritional benefits. Lack of resources for producing and purchasing higher quality foods can sometimes present a barrier to achieving greater dietary diversity, especially in the case of poorer populations (L. Allen et al., 2006).

##### **(ii) Supplementation**

Supplementation is the term used to describe the provision of relatively large doses of micronutrients, usually in the form of pills, capsules or syrups. Micronutrient supplements during pregnancy can act as a precautionary measure for reducing morbidity and mortality in infants and also in treating maternal complications during pregnancy (Lawn et al., 2014). In our country, supplementation programmes are run to provide iron and folic acid to pregnant women, and vitamin A to infants, children under 5 years of age and postpartum women. Recently, the Ministry of Health and Family Welfare (MoHFW) has launched the Weekly Iron and Folic Acid Supplementation Programme to meet the challenge of high prevalence and incidence of anaemia amongst adolescent girls and boys.



Training on micronutrients

Supplementation usually requires procurement of micronutrients in a relatively expensive pre-packaged form, an effective distribution system and a high degree of consumer compliance (L. Allen et al., 2006). Some adverse effects observed with high-dose supplements and logistical and human-resource constraints, may result into non-compliance and the long-term sustainability of such programmes. In such cases, mass fortification of staple foods becomes an important option to combat vitamin and mineral deficiencies. There are fewer concerns related to mass food fortification and it can be a complementary intervention to supplementation for efforts to decrease vitamin and mineral deficiencies (Peña-Rosas et al., 2019).

### (iii) Food fortification

Food fortification involves adding micronutrients to processed foods. It describes improvement of essential micronutrient content in foods to enhance the nutritional and health benefits with minimal risk to health. In many situations, this strategy can lead to relatively rapid improvements in the micronutrient status of a population, and at a reasonable cost, especially if advantage can be taken of existing technology and local distribution networks (L. Allen et al., 2006). There have been studies with single (Dean et al., 2020), dual (Jannasch et al., 2020), and multiple micronutrient fortification, including zinc, iron, copper, selenium, vitamin A, vitamin B complexes, vitamin C and vitamin E (Das et al., 2019). Minerals are fortified in their salt forms such as ferrous sulphate, ferrous gluconate, ferrous lactate, zinc oxide, zinc sulphate, zinc acetate, zinc chloride, calcium carbonate, calcium phosphate, tri-calcium citrate, calcium lactate, calcium lactate gluconate, calcium gluconate, etc. (Gharibzahedi & Jafari, 2017). Considering the regional diversity in terms of food availability, fortification should be done in a customized manner to ensure compliance. In addition fortificants should be low in cost with good absorption, and well accepted by the target population in terms of taste and organoleptic properties. In most cases, it is preferable to use food vehicles that are centrally processed, and to have the support of the food industry (Chadare et al., 2019). However, of these three methods (dietary diversity, food fortification and supplementation), programmes that deliver micronutrient supplements often see a quick improvement in the micronutrient status of the targeted population. Food fortification tends to have a less immediate but nevertheless a much wider and more sustained impact. Although increasing dietary diversity is generally regarded as the most desirable and sustainable option, it takes the longest to implement (L. Allen et al., 2006; Gharibzahedi & Jafari, 2017).

### Food-to-Food fortification

Food-to-food fortification is a technique of fortifying food products with one or more food ingredient(s), thus making a nutrient dense food. Incorporation of nutritious ingredients calls for modification in original food recipe, creating a new product with higher nutritional benefits. Such fortification techniques offer variety in taste and textures that are unique along with enhanced protein, vitamin, fibre and/or mineral contents and beneficial effects on its quality (Platel & Srinivasan, 2016). Cumin, moringa and sesame fortified bread and soy-butter, moringa and cumin fortified salty biscuits demonstrated improved total content and bio-accessible minerals. Its inclusion in food products could be a useful alternative or complement conventional fortification. This will help to improve the mineral status of deficient populations. Food-to-food fortification often uses locally available foods to enhance their nutrient intake of the population. This approach consists of selecting and associating foods in such a way so as to optimize the bioavailability of useful micronutrients to consumers.

### IIT Bombay's intervention

The Nutrition Groups at IIT Bombay emphasises on the development of food based nutrient-rich, safe, affordable and ready-to-use formulation. Achieving optimal nutrition through the intake of healthy foods has a capability to optimise the physiological functions of each human while ensuring maximum well-being. The key variable of this research is the presence of macro and micronutrients in sufficient quantity without compromising on quality parameters. Our research team at IIT Bombay is working on developing products with the capability to deliver the full range of micronutrients mostly through the natural product route, avoiding the chemical route. Our aim is also to create local capacity among women's SHGs or social start-ups for decentralized production with appropriate Quality Control and Quality Assurance protocols. Given the priority accorded to health and nutrition projects in CSR funding, support to the food products lab can go a long way in addressing the problem of hidden hunger among malnourished children and women and benefit the programme implementation in aspirational districts.



Nutrition lab at CTARA

Some of the products which have been developed in CTARA are –

#### (i) Egg equivalent Idli and nutrition bar



ChiNra- Developed Food Product Image

A completely vegetarian formulation was developed in the form of nutritious 'Idlis' and bars that can act as nutrition replacement provided by non-vegetarian foods such as eggs. The product's theoretical nutrient profiling shows that 2 units of Idli or 1 standard nutri-bar is sufficient to give equivalent nutrition to an Egg.

#### (ii) Magic add-on dry powder

This powder can be added to any given home-made recipes (e.g. Puree, daliya, Khichdi, dal-rice etc.) and as a result, the child will get a majority of the essential nutrients required for optimal growth and development. The major advantage here is gaining nutrient adequacy without changing the dietary habits or preferences. Financial calculations for the developed formulation (DF) suggest that affordability is achievable at mass product scale to achieve reasonable dissemination and ultimately greater impact on the children. Other examples include Healthy alternatives to commercially available Ready to Use Therapeutic Foods (RUTF).

### Challenges of food fortification

Theoretically the fortification techniques aim at efficient lowering of micronutrient malnutrition. These, however, still do not reflect in the micronutrient status of individuals based on reports. The following are some challenges faced during the choice and implementation of food fortification strategies:

#### a) Cost

There is a lack of simple and affordable technology that can use stable and bioavailable nutrients while maintaining the commonly preferred taste and appearance of foods. Increased food prices remain an issue affecting the food security and livelihoods of the needy. Despite various international aids, basic foods are still not accessible because they are unaffordable to vulnerable groups who often grow and process their own staple foods. Major challenges to local-scale fortification programs include the initial cost of the mixing equipment, the price of the premix, achieving and maintaining an adequate standard of quality control, and sustaining monitoring and distribution systems.

#### b) Concerns of absorption and bioavailability

Both the density and bioavailability of micronutrients in the diet are important for achieving optimal micronutrient status. Iron, zinc, and calcium can interact with each other to inhibit their respective absorption. For e.g. The ideal iron fortificant is highly soluble in water, similar to ferrous sulphate for the iron to be accessible for intestinal absorption. At the same time, the iron needs to be in a form that prevents it from interacting with dietary compounds that can induce undesirable organoleptic changes and reduce iron bioavailability by formation of insoluble complexes. Fat-soluble vitamins such as vitamin A and E are poorly dispersible in water, making it difficult to incorporate them in beverages and foods with high moisture content.

Obtaining higher concentrations of micronutrients from food alone, to meet high RDA for adolescent girls and pregnant women is challenging. Processing techniques may lower anti nutrients but at the same time it may increase risk of losses and degradation of minerals and vitamins, respectively.

### c) Toxicity

Toxicity may occur as a combined effect of more than one micronutrient. Increased instances of anaemia have been found in individuals with high levels of folate and low level of vitamin B12 (Rosenberg et al., 2018). Acute iron toxicity is usually seen in children with accidental ingestion of iron-containing syrups. Similarly, for zinc, folic acid, selenium there are available documents with either report on toxicity or regulation on the maximum limit (Food Safety and Standards Authority of India, 2019). Usual intakes below the upper limit have a low risk of adverse effects. Some nutrients do not have an upper limit because they are assumed to be safe at any level of intake (e.g., vitamin B12).

The goal of any national food fortification policy is to prevent nutritional deficiencies by bridging the gap between the requirement and availability of the nutrients. In exceptional cases of widespread and severe deficiencies, the fortification can be up to 100% of the RDA. In practice, the level of fortification is about 15 to 30 % of RDA (computed per 600 calories of the processed food) as per the regulations in India (ICMR, 2018). When these precautions are followed, food fortification carries a minimal risk of chronic toxicity.



### d) Anti-nutritional factors

Poor dietary diversity and dependence on cereal-based diets are common in low- and middle-income countries. Cereals, in addition to being poor sources of vitamins and minerals, also contain high quantities of other dietary compounds, such as phytates, which decrease the absorption of certain micronutrients, often called 'anti-nutrients' (Graham 2001). One of the most important concerns in the processing of mineral rich foods is formation of strong complexes between bivalence elements (e.g., Ca<sup>2+</sup>, Mg<sup>2+</sup>, Zn<sup>2+</sup>, Fe<sup>2+</sup>, Cu<sup>2+</sup>), and, phytate, oxalates, fiber, and compounds of tannin and lectin (Shubham et al., 2020). For instance, iron and zinc absorption is significantly inhibited by phytic acid, present in cereals and other grains; polyphenols, contained in red wine and chocolate; or calcium, abundant in dairy products (Peña-Rosas et al., 2019).

### Crop diversity and Nutrition security

To be able to reach the overarching goal of nutrition security through improved dietary diversity score of children and mothers, access to high quality and diverse raw materials has to be ensured. Crop diversity at affordable and scalable capacity would be central to food-to-food fortification strategy. India being one of the largest countries in the world has to ensure self-sufficiency in food. The government's initiatives to increase the production of rice, wheat, pulses, and other crops have brought India to a very secure condition in terms of calorie sufficiency as a whole. For example, rice alone contributes to 40% of total grain production in India followed by wheat (~34% contribution).

India is blessed with hundreds of highly nutritive indigenous crops which are popular in many regions. However, in the past six decades, India has witnessed a decrease in the area under such crops.

A classic example is production volume decline in variety of millets over the last few decades. Since there is no minimum support price for such crops, generation of demand for such crops based food products to improve regional nutrition security would help farmer in realising better prices. Of course, this would entail partnerships with local grassroots organisations to build a sustained momentum to establish a strong value chain. Safeguarding food and nutrition security through promotion of diverse crop production systems should be looked at by the policymakers more closely.

### Conclusion

Micronutrient malnutrition is a major impediment to socio-economic development. Vitamins and minerals have very different stability and bioavailability in the food matrix. Therefore, the development of a fortification technology that makes them bioavailable and more compatible with the food vehicle would be crucial. To quantify the size of the gap between usual intakes and requirements in a population group, the distribution of usual intakes by individuals in the population groups of concern (e.g., young children or women of reproductive age, low socioeconomic status) should be compared to the average requirement. A concerted effort is needed for the development of ready-to-consume food products rich in multiple micronutrients, addressing food accessibility and affordability issues, while enhancing bioavailability and forming efficient food synergies.

"Those who think they have no time for healthy eating, will sooner or later have to find time for illness." – Edward Stanley

REFERENCES : [CLICK HERE](#)

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The National Bio Entrepreneurship Competition (NBEC), organised by BREC - a joint initiative of BIRAC and C-CAMP, with Department of Biotechnology as the main sponsor, is a national platform to attract, identify, and nurture bio-entrepreneurs with path breaking ideas for societal impact.

C-CAMP launched NBEC 2021 on 16th August'21. WIN Foundation was again a category partner for NBEC 2021 for the domains of (1) Water and Sanitation and (2) Maternal and child health.




NBEC 2021 received overwhelming response with over 2500+ applications from 30 states and UTs of India. 300+ applications were shortlisted for regional qualifier pitching round (virtual) in November. The Jury members, from industry, academia, and investor community, shortlisted 72 business ideas for a virtual Boot Camp and Mentoring Program that was held between 1-3 December.

At the NBEC 2021 Grand Finale on 18th December, 2021, 17 Startups and 5 student innovators were given awards.

**WINNERS :**

1. Vasanth Ramesh, Humus Biosystems – Decentralized wastewater treatment system for public toilet complexes - won the WIN Foundation cash prize of 3 lakhs INR and Sangam VC investment opportunity of 350,000 USD in Water & Sanitation category

2. Prasad Muddam & Akitha Kolloju, Heamac Healthcare – An intelligent phototherapy device that can treat severe jaundice in neonates - won the WIN Foundation cash prize of 3 lakhs INR in the Maternal & Child Health category

<p><b>Watsan - Humus Biosystems</b></p>  <p>Vasanth Ramesh CEO and Designated partner</p>	<p>Robust, affordable and sustainable wastewater treatment systems especially to rural India (Modular, automated, robust wastewater treatment system)</p>
<p><b>MCH - Haemac Healthcare</b></p>   <p>Prasad Muddam CEO &amp; Chief Designer</p> <p>Akitha Kolloju CTO</p>	<p>nLite360™-An Intelligent Multiplanar Phototherapy device for Neonatal Jaundice</p>

**Press links**

- <https://timesofindia.indiatimes.com/city/bengaluru/17-startups-5-students-win-entrepreneurship-contest/articleshow/88379967.cms> [Times of India]
- <https://www.biovoicenews.com/nbec-2021-declares-the-names-of-17-startups-5-students-as-winners/> [Biovoice]

For more details, please visit <https://www.ccamp.res.in/node/2213>

**VISHWAKARMA PRIZE - 2022**



WIN Foundation joined Maker Bhavan Foundation as a co-organiser, in Maker Bhavan's Vishwakarma Award for Engineering Innovation 2022, a national contest. This year's theme for the contest is Water & Sanitation

The goal of Vishwakarma Prize is to create a hatchery for ambitious student innovators and tinkerers, from any discipline, interested in developing scalable technological solutions at the grassroots level that can radically boost the nation's economy.

Vishwakarma Prize is an exciting opportunity for students in Indian science and engineering colleges to form teams across engineering disciplines and programs and develop a working physical prototype with a fully demonstrated innovation. The teams will get mentoring from



domain experts including faculty at premier institutes, NGOs and Industry.

The Competition is open now. All shortlisted teams will have 4 months to build a prototype. During this period, the teams will be provided with funding and mentoring support and assessed to identify 10 finalists who will compete in finals for prizes, present to angel investors, file patents – all crucial steps in supporting their entrepreneurial journey into the real world. The teams will also be eligible to be considered for WIN Foundation Innovative Product Market validation scheme .

For more details please visit :

<https://www.winfoundations.org/vishwakarma-award-for-engineering-innovation/>

<https://makerbhavanfoundation.org/awards/>

Competition announcement brochure : [CLICK HERE](#)

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