FOOD SAFETY AND STANDARDS AUTHORITY OF INDIA

Inspiring Trust, Assuring Safe & Nutritious Food

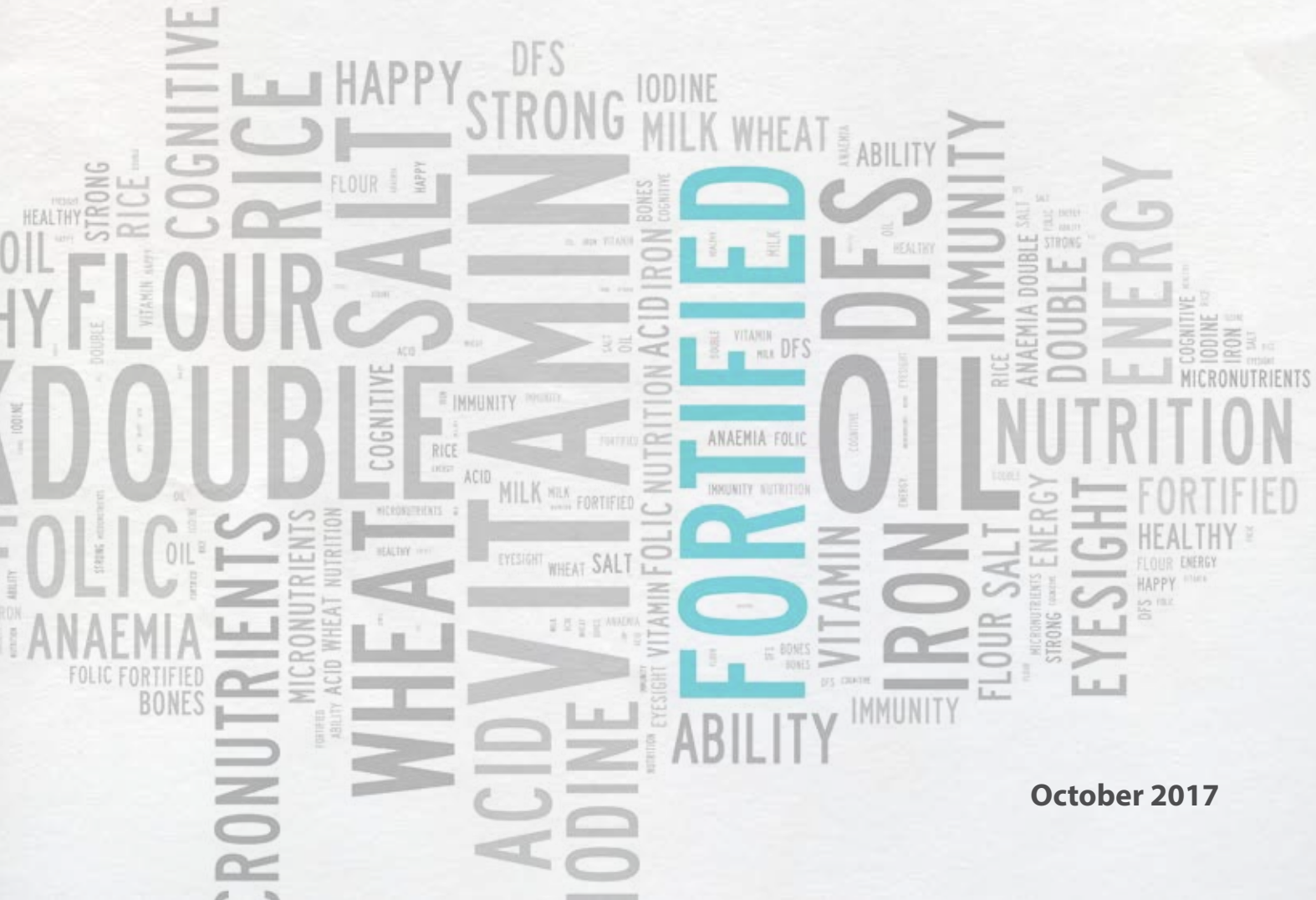
Ministry of Health and Family Welfare, Government of India

FORTIFIED
SAMPOORNA POSHAN
SWASTH JEEVAN

Food Fortification Resource Centre

LARGE SCALE FOOD FORTIFICATION IN INDIA

The Journey So Far and Road Ahead



October 2017

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- Food Fortification Resource Centre Team

Foreword

The Food Safety and Standards Authority of India, in collaboration with various stakeholders, has been working towards fulfilling its mandate of ensuring the availability of safe and wholesome food to meet the health and nutritional needs of the country. Food Fortification is one such cost effective strategy that helps in improving the health and nutritional status of the most vulnerable sections of our society especially, of our children and mothers.

I am extremely appreciative of all the proactive work done by the scientific community, food industry, development partners, States/UTs and the FFRC team for making various fortified products available in the open market. I am thankful to Central line Ministries/ Departments and State Governments for adopting fortification in the government safety net programmes like ICDS, MDM and PDS.

I hope that this booklet will help all programme managers, district implementers and stakeholders in furthering their efforts to upscale implementation of food fortification.

Ashish Bahuguna
Chairperson

Preface

Improving the nutrition scenario of India is a key challenge. The National Nutrition Strategy, released by the Government recently, recommends a comprehensive approach towards micronutrient malnutrition, and lists food fortification as a key intervention to address Iron Deficiency Anaemia, Vitamin A Deficiency, Iodine Deficiency Disorder and Zinc Deficiency.

The Food Safety and Standards Authority of India (FSSAI) released the standards of fortification for five staples, unveiled the +F logo for consumer awareness and identification of fortified products in October 2016. The journey this past one year to tackle the rising concern of vitamin and mineral deficiencies in India has led to achieving significant results in a very short period of time.

The support and commitment of all stakeholders, primarily the line ministries, experts in tandem with the food industry has been significant in enabling an environment to address this public health issue nationally. Directives from the key central ministries, like Ministry of Women and Child Development and Department of School Education & Literacy in mandating use of Fortified Edible Oil, Double Fortified Salt and Fortified Wheat Flour in ICDS and MDM respectively, has been an encouraging step towards adoption of fortification by the States/UTs. However, more work is needed towards inclusion of other fortified staple commodities like Fortified Rice and Fortified Milk in the integration of fortification into all of the government safety net programmes to ensure better health and nutrition for all our citizens.

By aligning efforts, and the supply and demand of fortified products, major achievement is seen in the open market availability of fortified products within the short span of a few months. New fortified variants from leading food businesses are being launched every month, and together with the support of the scientific and medical community have all contributed to building a 'Can Do' environment for the widespread adoption of fortification.

The next phase involves wide consumer outreach to build awareness and sensitise people to the need and importance of fortification. I am confident that we will soon have a Healthier India, where every citizen will have access to safe, nutritious and wholesome food.

Pawan Agarwal
CEO FSSAI

Testimonials

C. K. Mishra
Secretary , Ministry of Health and Family Welfare

I congratulate FSSAI and hope they would be able to bring out national program to reach out with this fortification and give micronutrients to all people in the country particularly the poor and marginalized who need it. Fortification of rice, oil and milk which they have taken up will go a long way in providing micronutrients to the population which needs it most.

Dr. Soumya Swaminathan
Director General, ICMR

"We have evidence which tells us that fortification of staple foods is safe, efficacious, cost-efficient, easy to implement and can reach the most vulnerable. It is time to fast track our progress and move in a direction where fortified food is available and easy to access by all. "

Dr. B. Sesikeran
Former Director, National Institute of Nutrition

Vitamin mineral deficiencies are widely prevalent in the Indian population. When technology for ensuring community benefit is available, affordable and scalable, it is a crime to let a single child be born with physical or mental disability arising due to vitamin or mineral deficiency. Food fortification is the need of the hour and is the opportunity that should not be missed rather fully harnessed.

Dr. Longvah
Director, National Institute of Nutrition

Salt is the most convenient vehicle to deliver iron to the people. Technology of double fortified salt is very simple.

Fortification of oil and fortification of milk with vitamin A and vitamin D is going a long way to address micronutrient malnutrition.

Dr. Chandrakant S Pandav
President Association of Indian Coalition for Control of Iodine Deficiency Disorders (ICCIDD)

"In the field of nutrition, as in politics, the task is to do what is possible without forgetting to do what is necessary. For control of micronutrient deficiency, it is necessary to focus attention on public health measures, dietary diversification, supplementation and fortification. Believing is seeing. Only when we truly believe that it is possible to do something, then we begin to look for ways to do it. Food fortification is possible. If not now, when? If not here, where? If not we, who?"

Dr. Ambrish Mithal
Chairperson, Division of Endocrinology and Diabetes, Medanta

Micronutrient deficiencies are our hidden enemies. Some of these nutrients (eg Vitamin D) do not occur in natural foods. In a country like India, where much of the urban population is seriously deficient in Vitamin D, milk and oil fortification is a simple and easy method to combat this problem. Fortification is an idea whose time has come – the sooner we adopt it, the better it is for our people.

Dr. Rajan Sankar
Program Director, Nutrition, Tata Trusts

Vitamins and mineral deficiencies cause huge damage. They contribute substantially to the burden of disease and they affect the cognitive development of children and therefore, their ability to learn and become productive citizens.

The launch of the logo is an important tool in communicating the message of fortification and also assisting the consumer in recognizing the foods that are fortified.

Tarun Vij
Director Country Programs, GAIN – Global Alliance for Improved Nutrition

"Nourishing the New India will require making the food system deliver healthier diets. FSSAI is transforming India's nutrition landscape by positive action aimed at raising the demand for and affordability of healthy diets, and enabling businesses to do positive things for nutrition. By working with state governments, food businesses, development partners and the scientific community to scale-up large scale food fortification across India, FSSAI is demonstrating leadership and inspiring trust"

Neeraj Jain
India Country Program Leader, PATH

"PATH is honored to be working with FSSAI in its efforts to improve the nutrition of millions of Indians across the country. FSSAI has been the leader in setting standards for food safety and is now taking on a leadership role in food fortification as well. PATH has been privileged to work with the authority to help establish standards in food fortification and enable access to fortified food for millions of children. We value the spirit of collaboration shown by FSSAI towards addressing the complex nutritional challenges faced by the country. We hope that FSSAI continues to achieve many more milestones and helps India become a healthier country"

Abbreviations

AIIMS	All India Institute of Medical Sciences
AWC	Anganwadi Centres
BCC	Behaviour Change Communication
CII	Chamber of Indian Commerce
DFM	Decentralized Food Model
DFS	Double Fortified Salt
FAQs	Frequently Asked Questions
FBO	Food Business Organizations
FCI	Food Corporation of India
FFRC	Food Fortification Resource Centre
FICCI	Federation of Indian Chambers of Commerce and Industry
FLRS	Food Licencing and Registration System
FPS	Fair Price Shops
FSSAI	Food Safety and Standards Authority of India
FWF	Fortified Wheat Flour
GHS	Global Health Strategies
GMP	Good Manufacturing Practices
GRFMA	Gujarat Roller Flour Mills Association
GST	Goods and Services Tax
HCM	Hot Cooked Meal
ICDS	Integrated Child Development Services
IDD	Iodine Deficiency Disorders
INR	Indian Rupees
IPOP	Integrated Programme for Older Persons
JPAL	The Abdul Latif Jameel Poverty Action Lab
LFM	Local Food Model
LLPD	Lakhs Litres Per Day
M&E	Monitoring and Evaluation
MDM	Mid-Day Meal
MFPP	Micronized Ferric Pyrophosphate
MHRD	Ministry of Human Resource Development
MMT	Million Metric Tonnes
MS	Morning Snack

MWCD	Ministry of Women and Child Development
NABL	National Accreditation Board for Testing and Caliberation Laboratories
NFHS	National Family Health Survey
NFSA	National Food Security Act
NIN	National Institute of Nutrition
NSS	National Sample Survey
RDA	Recommended Dietary Allowance
SHG	Self-Help Group
SN	Supplementary Nutrition
THR	Take Home Ration
TOT	Training of trainers
TPDS	Targeted Public Distribution System
TWD	Tribal Welfare Department
USD	United States Dollars
WFP	World Food Programme

Contents

Executive Summary

1. A large share of India's population suffers from a high incidence of vitamin and mineral deficiencies. Over 70 percent people in India are still consuming less than half of their Recommended Dietary Allowance (RDA) of micronutrients. One third of the two billion people globally that suffer from vitamin and micronutrient deficiencies are in India. This "hidden hunger" affects all sections of India's population–urban and rural, rich and poor, old and young–with women and children most at risk.

2. Anaemia continues to be a cause of concern. National Family Health Survey (NFHS) 4, 2015-16 showed that 58.4 percent of children in the ages of 6 to 59 months are anaemic, 35.7 percent of children under 5 years are underweight, 53 percent of women in the reproductive age group (15 to 49 years) and 22.7 percent of men in the same age group are anaemic (<13.0 g/dl). The contrast is shocking–in USA, anaemia among preschool children is 3.1 percent and in India, it is 58.4 percent.

3. One of the most effective, scalable, affordable, and sustainable ways to address micronutrient deficiencies is fortification of staple foods. Food Fortification refers to adding small amounts of vital micronutrients to foods. It complements diet diversification to help complete a person's daily nutritional needs. It fills the gap in nutrition in an easy manner without any change in taste, texture, or flavour of food, minimizing the requirement of behavioural change.

4. Fortification of foods started almost a century ago in 1918. This has led to near eradication of goitre, rickets, beriberi, and pellagra in many countries. Over 130 countries mandated iodised salt, 80 countries have mandated cereal grain (wheat, rice, or maize) fortification and many countries are fortifying milk and edible oils.

5. Historically, India's focus has been on addressing Iodine, Vitamin A and Iron deficiencies as Indian diets are commonly deficient in these micronutrients. In India, fortification of Vanaspati with Vitamin A since 1953, and mandatory fortification of salt with iodine since 1962 have been public health successes. However, there has been no program to fortify at scale since then.

6. Taking the lead on this, the Food Safety and Standards Authority of India (FSSAI) rallied stakeholders across government, industry, food businesses, development partners, scientists, and academia to come together at a National Summit on Food Fortification in October, 2016. The formulation of standards on fortification of food in key staples like oil, salt, milk, wheat flour and rice, and the launch of the logo for fortified foods, has created a rallying point for the industry to adopt fortification, placing it firmly on the national agenda. Voluntary fortification has begun for 5 staples – wheat flour, edible oil, double fortified salt, milk, and rice. Standards for fortified processed foods are under consideration with the Food Authority and will be placed for public comments.

7. FSSAI has setup the 'Food Fortification Resource Centre' (FFRC) as a nodal point to provide required support to stakeholders. FFRC engages and aligns all stakeholders to build consensus including key government ministries and departments, technical specialists, development partners, food businesses, industry partners, scientists and academia, civil society and consumers. It provides technical and implementation support with respect to technology, premix, equipment procurement, as well as creates awareness among consumers on good nutrition, food safety and fortification.

FSSAI has also launched an online portal for knowledge sharing. A comprehensive tool kit including technical handbooks, training manuals, FAQs, list of accredited premix suppliers and equipment manufacturers, list of NABL accredited labs for testing of micronutrients and standardised tender documents have also been developed and are available on the FFRC website.

8. FFRC's key goal is to align supply and demand for fortified food in the market, ensure that food businesses start offering fortified variants of their products, and ensure that consumers find fortified foods easily and at affordable prices. Significant progress has been made for both open market availability and adoption of fortified staples in the government programs at the national and state level. Early adopters of fortification were recognized at FSSAI's National Summit on "Transforming the Food Safety and Nutrition Landscape" in May 2017. Open market supply of all 5 fortified staples – oil, milk, double fortified salt, wheat flour and rice - is now assured, and is growing month on month. Safety net programs - both MDM and ICDS - have mandated the use of fortified wheat flour, oil and double fortified salt nationally, ensuring that the most vulnerable sections of society receive appropriate and timely nutrition.

9. To ensure quality assurance, extensive scaling up and training of laboratory personnel is being undertaken. Regulatory staff is being trained across states in partnership with food safety commissioners. State level landscape analysis is being carried out in a systematic manner, and a dashboard has been developed to track rollout of fortification across the country. Development partners have been mapped for ground level support and FSSAI/FFRC has reached out to all state/UT governments to appoint a nodal officer to coordinate fortification efforts. Large scale consumer awareness campaigns are being developed and civil society organisations being engaged as partners for dissemination of behaviour change communication.

10. Needs of particularly vulnerable sections of society, like tea garden workers, are being directly addressed. India is the second largest tea producer in the world. The tea industry is India's second largest employer (and largest private sector employer) with over 3.5 million people (over a million in Assam alone); most of them women. More than 17.5 million people benefit from food rations provided by the tea companies or the government. Since rations are a part of the wages of tea garden workers, providing fortified foods as part of these rations is a direct and effective way to reach a large number of people and improve their nutritional status. A consultation by FSSAI, in partnership with the Indian Tea Board brought together the Indian Tea Association and other tea associations along with their members for a discussion on how implement this model at the earliest.

11. FSSAI is working closely with industry to ensure wide availability of fortified staples to the public at large, in the shortest possible time. A detailed landscape analysis shows that -
    - The total domestic consumption of edible oil in India is 21.7 MMT per annum, of which 60 percent is used as an ingredient in the food processing industry, and 3-5% is still in the unorganised sector. The fortifiable quantity of edible oil in the country is 8.64 MMT annually, of which 2.48 MMT is already being fortified as per FSSAI Standards.
    - Of the total annual milk production of 155 MMT (4100 Lakh Litres Per Day) of milk, only 25 percent is in the organized sector (800 LLPD), of which 380 LLPD is fortifiable (across both private and cooperative dairies). This includes toned, double toned, standardized, and skim milk. Currently 3.85 LLPD (10%) of this is being fortified as per FSSAI Standards, and is growing month on month.

- Total availability of wheat for domestic consumption is approximately 102 MMT of which 30 percent of the market is organized. Branded packaged wheat flour is 5 percent of the total market, accounted for by 5 leading national players.
- Nearly, 32 MMT of rice is distributed annually through public funded programmes nationwide, which is recommended for fortification. 65% of the Indian population consumes rice.
- Annual salt production in India is 264 lakh tons of which 23.5 percent (62 lakh tons) is used for edible purpose.

12. As recently as July and August 2017, both the Ministry of Women and Child Development and the Ministry of Human Resource Development have mandated the use of fortified wheat flour, oil and double fortified salt in the Integrated Child Development Scheme (ICDS) and Mid Day Meal Scheme (MDM) respectively, giving a great push to large scale food fortification. Through these schemes, over 250 million beneficiaries including pregnant and lactating mothers and children upto the age of 13 can be reached directly. There is no more compelling argument for fortification than the nutritional needs and health of these children. Additionally, the Ministry of Food and Civil Supplies has recommended distribution of fortified wheat flour in States where wheat flour is distributed instead of wheat grain, and has also recommended the distribution of fortified edible oil. PDS covers approximately 65% of the population and is hence an important channel for implementing both wheat flour and rice fortification. Adoption of fortified staples will become easier and more accessible once they are widely available at fair price shops across the country.

13. Given that large segments of our wheat, rice, milk and salt industries are still in the unorganised sector, it is recommended that fortification of staples to be sold and consumed through open market channels be kept voluntary. The organised market and leading brands have responded very favourably to FSSAI's call to action to come together to address this very important but silent public health issue. With supply now available in the market for all 5 fortified foods, it is important to reach out to consumers and build awareness on fortification, the +F logo and sensitise consumers to the need to adopt fortified food in their daily lives. A joint marketing campaign is being coordinated by FSSAI in partnership with food industries. Further, behaviour change communication programs will be done with development partners as well as Civil Society Organisations at a grassroots level.

14. Summary of Recommendations and the Way Forward:
    a. The cost of fortification of wheat flour and rice, for MDM and ICDS reaching 221 million beneficiaries is only INR 123 crores annually.
    b. By extending this benefit to the beneficiaries of welfare institutions and adolescent girls covered under SABLA, the annual cost of fortification would be approximately INR 143 crores.
    c. The benefits of the Food Fortification i.e. providing essential micronutrients to the most vulnerable sections of the society in a cost effective, scalable and sustainable way is through mandatory fortification of food articles that are supplied through government run nutrition programmes namely PDS, ICDS, MDM, SABLA and other welfare schemes. All the five staples i.e. Wheat flour, Rice, Milk, Oil and DFS to be considered for mandatory fortification for distribution through ICDS, MDM, SABLA and other welfare schemes in a staggered manner. In PDS, it is recommended that wheat flour be provided instead of wheat grain across all States.

d. Fortification of the staple should be done at source to minimise logistics and other related costs. FFRC can provide this handholding support including support for revision of tenders, technical support for implementation, sourcing of quality premix etc.

e. Further, large scale fortification is achievable in the organised market for packaged products, for sale in the open market. Apart from product launches by the food industry, this can be undertaken by State Governments directly, eg Madhya Pradesh Government has mandated that all packaged oil and milk in the State is to be fortified and this has been put up to the Cabinet for approval. Further, it is important that GST rates may be made favourable for packaged and branded fortified foods vis a vis unbranded products.

f. Increasing consumer demand is key to achieving fortification at scale and successful health outcomes. For this consumer awareness, marketing and behaviour change communication is essential and must be given priority.

Fortification: Implementation Roadmap

FSSAI Role	Set Standards, Create Logo
	Setup a dedicated Hub: Food Fortification Resource Centre
Alignment	Alignment & Advocacy – Industry & Zonal Consultations
	Nudge & Facilitate - Both Open Market and State Governments
Ensuring Supply	Ensuring open market availability
	Linking Govt Safety Net Programs to Fortified Supplies
Creating Demand	Building Consumer Awareness
	Joint Marketing Campaigns
Training	For Food Safety Officers
	For Labs
Enforcement	Compliance with Standards
	Monitoring & Evaluation

Strategy Going Forward – The 3 C's

Convergence Across all relevant Central Ministries, State Governments, NITI Aayog and other partners on policy recommendations

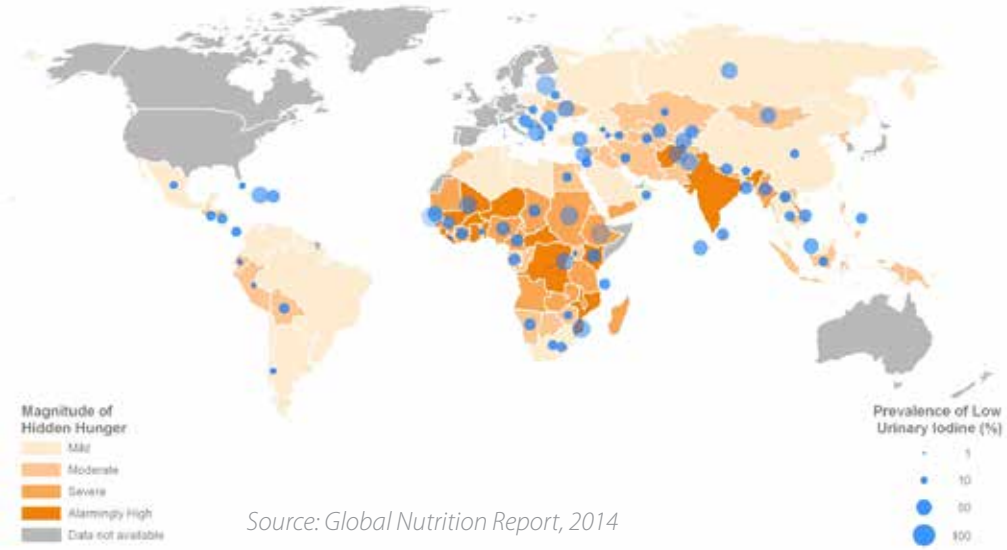
Collaboration With all Development Partners, FBOs, States and other Stakeholders for implementation

Communication Building Consumer Awareness and Nudging Behavioural Change through national and grassroots level outreach

1 Introduction

CHAPTER 1
Introduction

India is #97 out of 118 countries on Global Hunger Index, 2016. Over 70 percent of India's population still consumes less than 50 percent of RDA for micronutrients. One third of about two billion people who are suffering from vitamin and micronutrient deficiencies globally, are in India. India has a very high incidence of micronutrient deficiency diseases like anaemia, vitamin A deficiency, iodine deficiency disorder etc. as Indian diets are commonly deficient in the following micronutrients - iron, iodine, vitamin A, folate/folic acid, vitamin B12, and vitamin D.



Source: Global Nutrition Report, 2014

UNDER-NUTRITION

Global Hunger Index 2016: India is **#97** out of 118 countries

MICRONUTRIENT MALNUTRITION

Over **70%** of the Indian population still consumes **less than 50%** of the RDA for micronutrients

OVER-NUTRITION OVERWEIGHT & OBESITY

30 million Indians are obese. India and China have **15%** of obese people in the world.

CHILDREN

58.4% of children (6 – 59 months) are anaemic

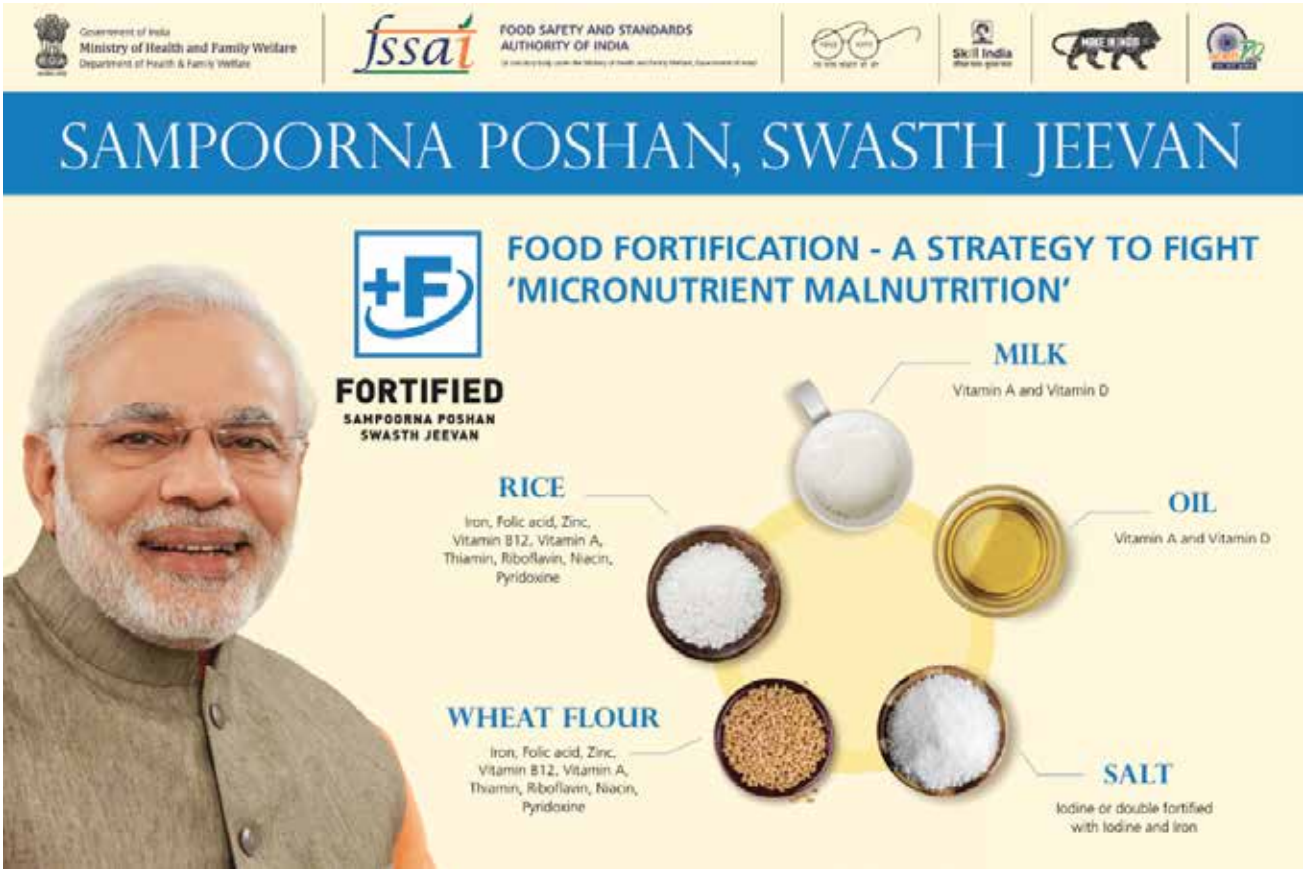
35.7% of children under 5 are underweight

WOMEN

53% of women in the reproductive age (15 – 49 years) group are anaemic

MEN

22.7% of Men age 15-49 years are anaemic (<13.0 g/dl)



Food Fortification: 5 Chosen Staples

Historically, India's focus has been on addressing iodine, vitamin A and iron deficiencies. While there has been substantial improvement in Iodine Deficiency Disorders (IDD), and in severe vitamin A deficiency, anaemia still continues to be a serious cause for concern. National Family Health Survey (NFHS) 4, 2015-16 showed that 58.4 percent of children in the ages of 6 to 59 months are anaemic, 35.7 percent of children under 5 years are underweight, 53 percent of women in the reproductive age group (15 to 49 years) and 22.7 percent of men in the same age group are anaemic (<13.0 g/dl). The contrast is shocking – in USA, anaemia among preschool children is 3.1 percent and in India, it is 58.4 percent.

Food Fortification, as a complementary strategy to diet diversification and supplementation, fills the gap in nutritional needs in a cost effective and scalable manner and is a proven solution to micronutrient malnutrition.

2 Food Fortification: Global Evidence and Practices

CHAPTER 2

Food Fortification: Global Evidence and Practices

Across the globe, food fortification has been used safely and effectively to prevent vitamin and mineral deficiencies for more than a century. In 2008, the Copenhagen Consensus, a panel of Nobel laureates determined that providing micronutrients in the form of Iodized Salt, Vitamin A capsules and iron fortified flour for 80% of the world's malnourished would cost USD 347 million a year. This investment would yield USD 5 billion from avoided deaths, improved earnings and reduced health care spending. Subsequent rounds of the Copenhagen Consensus have continued to re-iterate the importance of fortification as an effective intervention that positively contributes to human development[1].

Milk

Mandatory milk fortification legislation was first introduced in 1935. Currently, there are 14 countries that have mandated milk fortification. 11 of the 14 countries fortify milk with both Vitamin A and D. Costa Rica is additionally fortifying with iron and folic acid. China and Canada are adding calcium, in addition to Vitamin A and D.

A recent research studied the effects of fortified milk on morbidity in young children in north India. The results showed that regular intake of fortified milk resulted in 18% lower incidence of diarrhea, 26% lower incidence of pneumonia, 7% fewer days with high fever and 15% fewer days sick with severe illness[2].

Edible Oil

Mandatory oil fortification legislation was first introduced in 1965. 27 countries have mandated oil fortification, since then. All 27 countries fortify with Vitamin A (range 6-55 mg/kg) and/or (range .075-1 mg/kg).

Vitamin A is a fat soluble vitamin. After the introduction of Vitamin A fortified margarine in Denmark at the end of 1917, the number of cases of xeropthalmia (abnormal dryness of the conjunctiva and cornea of the eye) reported at a Copenhagen Hospital fell by more than 90% and by 1918 the condition had disappeared. Studies before and after the fortification of margarine in Newfoundland in 1944 report that the percent of subjects with serum vitamin A below 20 ug/dl declined from 48% to 2% over 4 years. More recently, a shelf stable margarine in the Philippines was fortified with vitamin A. After consuming the margarine for six months, the baseline prevalence of children with serum retinol levels below 20 ug/dl fell from 25.6% to 10.1%[3]. The biological value of vitamin A fortified oil has been reported in two

1 S Horton, Alderman, Rivera. (2008)Copenhagen Consensus Challenge Paper- Hunger and Malnutrition. In Copenhagen Consensus Paper

2 Sunil Sazawal et. al. Effects of fortified milk on morbidity in young children in north India: community based, randomised, double masked placebo controlled trial, BMJ. 2007 Jan 20; 334(7585): 140. Source http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1779825/

3 A Case Report on the Fortification of Margarine with Vitamin A, Florentino Solon, in Food Fortification to End Micronutrient Malnutrition, MI, 1998

studies - Favaro, et al and Dutra de Oliveira, et al[4] demonstrated that soybean oil with vitamin A in the form of retinal palmitate is well absorbed in humans given fortified oil along with a rice-based diet. Significant increases in plasma retinol were reported.

Rice

Though rice fortification began in the 1940s, mandatory rice fortification legislation was first introduced in 1952. Since, then six countries have mandated fortification of rice.

In a study conducted by St. John's in Karnataka on the impact of multiple micronutrient-fortified rice on school children with 6 months intervention period with a high concentration of iron (12.5 mg) and a lower concentration of iron (6.25 mg) with multiple micronutrients (vitamin A, thiamine, niacin, vitamin B-6, vitamin B-12, folate, iron and zinc) found increase in haemoglobin concentrations , plasma vitamin B-12, and decrease in homocysteine levels in both groups that received fortified rice but not in the control group. A study conducted on school children (36-66 months) participating in ICDS services showed that khichdi locally fortified with an encapsulated ferrous fumarate and vitamin A premix was efficacious in improving iron status and reducing the prevalence of anemia, iron deficiency, and iron deficiency anemia in West Bengal preschool children[5]. Additionally, the World Food Programme conducted a study in the Gajapati district in Odisha, which demonstrated a 20% reduction in the prevalence of anaemia in the 6-14 year old age group in Gajapati, bringing anaemia prevalence down from 65% to 45%. Of this 20% decrease in prevalence during the project time period (2012- 2015), 6% of the reduction was found to be attributable to the consumption of fortified rice in the midday meals[6]. Abdul Latif Jameel Poverty Action Lab (J-PAL) has an ongoing study in Tamil Nadu to measure the impact of rice fortification on nutrition outcomes. PATH is leading an ongoing study in Karnataka to measure the impact of fortified rice on nutritional outcomes among school children.

Double Fortified Salt

Salt iodization was introduced in the early 1920s in both Switzerland and the United States of America and has since expanded progressively all over the world to the extent that iodized salt is now used in most countries. Mandatory salt fortification legislation was first introduced in 1949. Since then, 130 countries have mandated salt fortification. One hundred and thirty countries fortify salt with iodine and four fortify salt with both iodine and fluoride.

Double Fortified Salt (DFS) resulted in significant improvements in indicators of iron deficiency anemia such as hemoglobin, ferritin, soluble transferrin receptor and body iron after nine months in a randomized controlled double-blind study of women tea pickers[7]. In another randomized double blind controlled trial of school children in Southern India[8] . Both these studies provide evidence that DFS is efficacious in improving iron status. A single blind controlled efficacy trial in tribal areas of East Godavari district,

4 Dutra-de-Oliveira, J.E. Effect of heat treatment during cooking on the biological value of vitamin A fortified soybean oil in human. International Journal of Food Science & Nutrition. 45 (3): 203-207 (1994).

5 Varma JL et al, Community-level micronutrient fortification of a food supplement in India: a controlled trial in preschool children aged 36-66 months. Am J Clin Nutr 2007:85;1127-33

6 World Food Programme, (2016), WFP Experience on Rice Fortification in the Gajapati District of Odisha

7 Haas, J. D., Rahn, M., Venkatramanan, S., Marquis, G. S., Wenger, M. J., Murray-Kolb, L. E., Wesley, A.S. & Reinhart, G. A. (2014). Double-Fortified Salt Is Efficacious in Improving Indicators of Iron Deficiency in Female Indian Tea Pickers. The Journal of Nutrition, 144(6), 957–964.

8 Andersson M, Thankachan P, Muthayya S, Goud RB, Kurpad AV, Hurrell RF, Zimmermann MB. (2008). Dual fortification of salt with iodine and iron: a randomized, double-blind, controlled trial of micronized ferric pyrophosphate and encapsulated ferrous fumarate in southern India. American Journal of Clinical Nutrition, 88(5):1378–1387.

Andhra Pradesh and a double blind controlled trial in residential schools in Hyderabad, carried out by NIN have also demonstrated a significant reduction in anaemia in the population that was provided with DFS[9]. International evidence also shows DFS reduces anaemia.[10,11]

Wheat Flour

Mandatory wheat flour fortification was first introduced in 1942. Eighty-five countries have since mandated the same. In India, wheat flour fortification started in Darjeeling district of West Bengal in 2000 as pilot project and, later on, PDS expanded almost in all districts of the state in different phases and continues till date except Kolkata city. Initially it was supported by Micronutrient Initiative (MI) and, later on, by the State Government. A study on the impact of fortified wheat flour on anaemia prevalence in the Darjeeling found a decrease in anaemia levels in three key groups: adolescent girls, pregnant and lactating women and school-age children[12].

In another study, a randomized, double-blind, controlled, school feeding trial was set up for 6- to 15-y-old iron depleted children in Bangalore and Pune. The study tested the hypothesis that NaFeEDTA-fortified, whole-wheat flour reduces iron deficiency (ID) and improves body iron stores (BIS) and cognitive performance in Indian children. The study found that in sensory tests, NaFeEDTA-fortified flour could not be differentiated from unfortified flour. NaFeEDTA-fortified wheat flour markedly improved BIS and reduced ID in iron-depleted children. It was recommended for wider use in national school feeding programs[13].

World Health Organization and Centers for Disease Control have an ongoing study in Ambala district of Haryana to test the impact of fortified wheat flour on anaemia levels.

For bibliography see **Annexure 1**.

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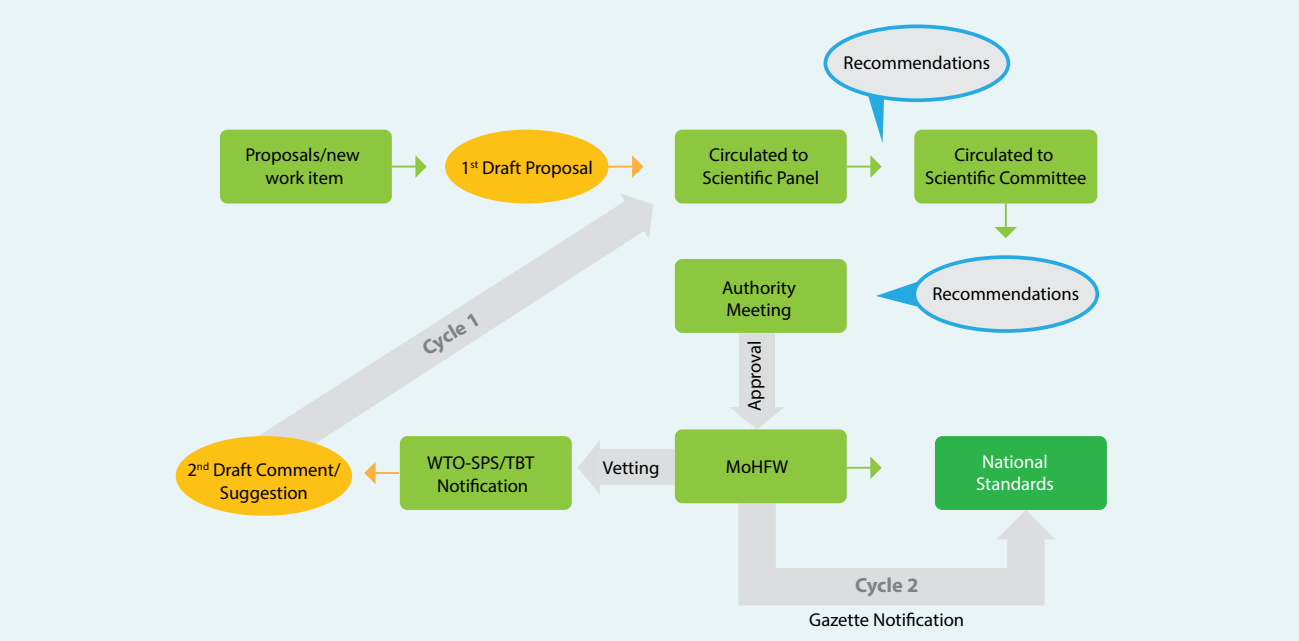
3 Standards

CHAPTER 3
Standards

The standards for fortification lay the basis for the industry to fortify their products as per the guidelines and scientific data. The process of standard setting is given below:



Process of Standard Setting

Launch of standards on food fortification in October 2016

Scientific Panel

The foremost responsibility of FSSAI includes the development of 'Science Based Food Standards' for articles of food and food products, and to regulate their manufacture, storage, distribution, sale and import, and to ensure availability of safe and wholesome food for human consumption. To further its mandate, the Authority is assisted and advised by scientific panels, scientific committees, and the Central Advisory Committee (CAC). The Food Safety Standards (Fortification of Foods) Regulation, 2016 is at **Annexure 2**.

There are a total of 17 Scientific Panels, of which 8 have been established recently with a clear objective of providing expert advice in specific fields. A scientific panel is constituted that provides scientific inputs, for setting food standards based on risk assessment. The Scientific Panel on Nutrition and Fortification is placed at **Annexure 3**.

Fortification Logo (+F)

FSSAI had issued the standards for fortification of five staples, namely, wheat flour, rice, milk, oil, and double fortified salt. In order to promote and differentiate between regular products and fortified products, a "+F" logo has been developed by FSSAI for the FBOs to use on the packs of the products that they are fortifying. This will help increase consumer awareness and assist consumers in making healthier food choices.

The square around the +F represents completeness. The plus sign is about adding extra nutrition via vitamins and minerals to the daily nutrition requirements. The ring illustrates the ring of good health, protection for an active and healthy life.

Launch of the +F logo in October 2016.

The +F logo can be used by the FBOs by filling a simple form on the FFRC website which will help them in sharing information about the products that they are fortifying so that the consumers can be made aware of the product availability. The form is linked to the Food Licencing and Registration System (FLRS) of FSSAI to capture and authenticate the FBO.

Label Claims

The Food Authority has brought out the following nutrition claims that may be used for fortified food articles produced as per Food Safety Standards (Fortification of Foods) Regulation, 2016.

S. No	Nutrients	Claims
1	Vitamin A	Helps against Night blindness;
2	Vitamin D	Supports strong bones;
3	Vitamin B12	Important for maintaining normal functioning of Nervous system and blood formation;
4	Folate & Folic acid	Important for foetal development and blood formation;
5	Iron	Fights Anemia;
6	Iodine	Required for normal growth, thyroid and brain func-tion;
7	Zinc	Supports a healthy immune system;
8	Thiamine	Required for normal nerve and heart function;
9	Riboflavin	Necessary to release the energy from food;
10	Niacin	Necessary to release the energy from food;
11	Pyridoxine	Necessary to release the energy from food.

4 Fortification by Food Category

CHAPTER 4
Fortification by Food Category

A toolkit has been created for scaling up food fortification across India. Please refer to **Annexure 4**. Open market availability of fortified staples is shown in **Annexure 5A**

4.1 Fortification of Rice

Rice is the staple food for 65 percent of India's population. Hence, fortification of rice can address micronutrient malnutrition caused by lack of Iron, folic acid, zinc, and B Vitamins in the diet. Nearly 33.7 million MT of rice is distributed annually through public funded programmes nationwide. Fortified rice can, reach 740 million vulnerable people in India, especially women and children. The cost of fortification is nominal (30 - 40 paise/kg which can be lowered further with economies of scale. Globally, rice fortification began in the 1940's. Since then, 86 countries have mandated fortification of at least one industrially milled grain–wheat flour, maize, or rice. Six countries have mandated rice fortification.

Blending machine installed in Odisha by WFP

Progress so far

In order to strengthen the supply and demand, FSSAI has been engaging with the rice industry to fortify rice. Five national consultations were held across India to build consensus on fortification of food. A follow-up consultation was held to nudge and encourage key rice industry players to fortify rice. DCP India Pvt. Ltd and LT Foods Pvt. Ltd have launched rice in the open market recently. Adani Wilmer, Pattabi Agro, K.K.R group (Nirapara) have also committed to start fortification of rice in the open market.

Currently, there are three manufacturers producing fortified rice kernels (FRK)–the micronutrient premix for rice fortification- and four more are likely to start soon.

Fortified Rice Available in Open Market

States like Karnataka and Odisha have started fortification of rice through pilots in their MDM programmes. These states have made provisions for scaling up. Government of Karnataka will be introducing fortified rice in additional four districts of the state through a decentralized model, which will reach 10 lakh children in addition to the 5 lakh children being reached currently. Other states and UTs like Gujarat, Haryana, Tripura, Maharashtra, Chandigarh, and Dadra Nagar and Haveli are in the pipeline (See **Annexure 5**).

Challenges and Way Forward

The key challenges are:

- Supply chain logistics for providing fortified rice in the safety net programmes, especially TPDS, needs to be addressed at a state level.
- Revision of the financial norms to absorb the incremental cost of fortification, so that states are able to include fortified rice in the safety net programmes.
- Alignment of supply and demand is needed. Production of FRK needs to be scaled up. FRK producers are willing to invest in the capital cost once demand for fortified rice is assured.
- The industry is fragmented, with few organized players, which proves to be a challenge in fortifying at scale.

It is recommended that rice fortification may not be made mandatory for open market supply as the industry is largely unorganized. However, it is recommended that fortified rice be made mandatory in MDM and ICDS within one year and in PDS over the next two years. Fortification should be done at the miller level.

Rice Fortification Pilot in Dhenkanal, Odisha in school Mid-Day Meals – World Food Programme

Anaemia prevalence in Dhenkanal among school children aged 5-9 years is 76.2 percent and 64.6 percent among children aged 10-17 years. The government's MDM programme offers a window of opportunity to reach out to school-going children with nutritionally enhanced meals through fortification, and is complementary to other nutrition.

The World Food Programme (WFP) collaborated with the Government of Odisha to pilot a two year fortification programme in Dhenkanal to reach approximately 129,485 school children through MDM programme across 835 schools in four blocks. Fortified rice is blended with regular rice, cooked on-site and provided to the school children (1840 MTs of fortified rice provided). The other four blocks with 887 schools are receiving multi micronutrient powder, which is added in measured amounts to the cooked and cooled curry dishes served in the schools. Training was imparted to teachers and cook cum helpers in all schools of the district.

Stories from the field

"We are lucky to have this programme in our school. The children are more active and attentive in class. They tell us that the rice at home is not as good as that served in school."

Rabindra Kumar Mudiyalu, Head master, Gandhi Memorial School, Gajapati

"I eat food in school every day. I get special rice, soya, eggs, and dal. The special rice has iron in it and it's good for me. I like the rice, it tastes nice, and it's different from the rice I eat at home. At home the rice is tough. In school it's sweet and soft. It will make me stronger. I think this rice should be given in all the districts of Odisha. Why only Gajapati? I want all children to get this rice so they too can become strong."

Deepak Kumar Patro, Class 7 student, Mohana, Gajapati

Rice Fortification in Gajapati district, Odisha in school Mid-Day Meals

Anaemia prevalence in Dhenkanal among school children aged 5-9 years is 76.2 percent and 64.6 percent among children aged 10-17 years. The government's MDM programme offers a window of opportunity to reach out to school-going children with nutritionally enhanced meals through fortification, and is complementary to other nutrition.

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Stories from the field

"Fortified rice was readily accepted by school children, who enjoy eating it. The trainings have helped us improve our cooking practices like the introduction of water-tight method of cooking rice. This not only preserves nutrients, but also consumes less fuel while cooking. The aim of this project is clear to us, we now look forward to assessing the impact of this pilot."

Ajay Kumar Patra, Block Education Officer, Kamakshyanagar

"I am a national level wrestler. I have represented my school in many competitions. I know it is important to eat nutritious food. Now-a-days I am eating curry at school which has a special powder in it. This powder is good for my health, and will make me stronger. I want to continue to win wrestling tournaments, and when I grow up I want to become a strong police man."

Anil Moharan, Siminai Upper Primary School

Government of Karnataka in partnership with the Akshaya Patra Foundation and PATH, has introduced a comprehensive nutrition programme in Karnataka government schools. Akshaya Patra is one of the largest Indian non-profit organizations, serving midday meals to 1.6 million children across the country. Through its centralized automated kitchens, Akshaya Patra cooks and serves fresh meals to the schools while maintaining high standards of quality and food safety.

Through this programme, midday meals containing rice, fortified with iron, vitamin A, and vitamin B complex, reach 450,000 children in 2,538 government schools every day. At the same time, students receive nutrition education and health-enhancing behaviours focused on hand washing, using toilets, and keeping their environment clean. These messages are taught through games, rhymes, and group activities.

Beyond improving nutrition and health-enhancing behaviors, this approach is proving to be an innovative strategy to reach the community, generating the importance of good nutrition and health by incorporating children as agents of change. The programme has been well-received by the teachers and students alike.

Stories from the field

"Each afternoon when the midday meal comes, I wash my hands and eat my food." I told my mother and sister about hygiene practices. I motivated many others in my neighbourhood to practice hygiene."

Soubhagya Akki, Student

"Children are showing an interest in hygiene practices like hand washing, through small messages and rhymes. The nutrition and health education is really helpful."

Ms. A. N. Koshti, teacher

With a focus on rice fortification in India, PATH facilitated pilots to distribute fortified rice in various states, including Andhra Pradesh in 2010 and Rajasthan in 2011, which reached 185,000 children. In 2010, PATH facilitated a pilot in Andhra Pradesh to determine technical and operational feasibility of integrating fortified rice in the midday meal scheme. Under this pilot, 61,000 children were fed fortified rice. The pilot was successful as the fortified kernels were able to withstand Indian conditions of transport, cooking, and usage with no change in taste, colour, odour, homogeneity, or nutrient composition. Fortified rice was accepted well by the children. It was concluded that distribution of fortified rice through centralized kitchens could be easily integrated, making it feasible for large-scale adaptation.

PATH is working with Akshaya Patra, a not-for-profit organisation implementing the Mid Day Meal Scheme in government schools in Karnataka, benefitting around 450,000 children every day by integrating fortified rice into the meals. In terms of the reach of safety net programs, this is the largest rice fortification initiative to date. The effort is coupled with other complementary activities, such as imparting nutrition and hygiene education among students to encourage healthy behaviours. Based on the success of the program, PATH along with the Food Fortification Resource Centre (FFRC) has been providing technical support to the Government of Karnataka to introduce fortified rice in an additional four districts of the state through a decentralized model, which will reach an additional 10 lakh children. It is also supporting integration of fortified rice in school meal program in Gujarat, Chandigarh, Delhi, Haryana, Goa, and Assam.

Success Stories

LT Foods Supports Nutrition through Rice Fortification

LT Foods is a manufacturer and marketer of leading basmati rice brands like Daawat, Devaaya and Heritage.

LT Foods is proud to support the agenda of FSSAI to address the malaise of malnutrition and under-nutrition resulting in stunted growth in children and loss of productivity and earning capacity in adults. LT Foods has thus installed capacity to produce high quality fortified rice and kernels which assuredly delivers the required levels of the key nutrients lacking in Indian's diets.

LT Foods is now supplying this rice to various state governments under their programmes like mid-day meals and others constituting the safety net programmes. LT Foods is also introducing fortified rice under its brands in the open market. The objective is to make available fortified rice in its more regularly consumed variants so that consumers can get the additional nutrition on a daily basis. LT Foods is starting with a focused launch in Western India in 2017. LT Foods will leverage its distribution network to make these variants eventually available nationally,

DCP Foods Pvt Ltd

Asbah understands the need of the hour and brings to you 'Asbah Power Rice' with Power of 8 nutrients such as Vitamin A, B1, B6, B3, B12, Zinc, Iron, Folic Acid. Asbha's Power Rice, as the name suggests, is a power house of nutrients, essential minerals and vitamins. The Asbah Power Rice will help meet the daily nutrition requirements and give everyone an easy access to a healthy and active life as recommended by health experts.

Women, of all ages, particularly in India, are highly prone to face such deficiencies. Power Rice is fortified with 8 nutrients including iron, folic acid, vitamin B12, etc. 'Power Rice' is not only a treat for your taste buds but also total supplement of essential nutrients. These multi-nutrients are also beneficial for controlling hypertension, diabetes and depression. Asbah acts as a barrier between women's health and the threats to their immune system.

Today, following its vision, Asbah stands tall with women across the globe as the World's First Social Brand in the Food Category. In today's fast paced life we seldom have time to control quality of the food products we consume, but can exercise control on what we eat. While our children fuss over food and tend to skip it, it is all the more important to give them food which gives wholesome health benefits – Asbah to the rescue!

4.2 Fortification of Wheat Flour

With high per capita consumption staple food in India, wheat flour is an appropriate vehicle to fortify with iron, folic acid, zinc, and the B Vitamins as per FSSAI standards, to address micronutrient deficiencies and reach a large segment of the population. Per capita average consumption of wheat is 4.3 kg in rural India and 4 kg in urban India. The incremental cost of fortifying wheat flour is 7 to 8 paise per kg.

Globally, wheat flour fortification was introduced in 1942 and since then 85 countries have mandated it. India's first wheat flour fortification programme started in Darjeeling in 2000, and expanded throughout the state through the PDS system. A research study on the impact of fortified wheat flour Darjeeling found a decrease in anaemia levels in three key groups: adolescent girls, pregnant and lactating women, and school-age children.

Total availability of wheat for domestic consumption is 101.65 MMT. About 15 percent of the annual production of wheat is converted into wheat products. The market is largely dominated by local chakki mills. Only 30 percent of the market is organized, the rest comprises of small scale chakkis. Branded packaged atta is approximately 5 percent of the total atta market and is largely dominated by 5 major national players and more than 500 regional brands in India. There are approximately 1,500 roller flour mills, 1,472 commercial chakki mills, and 376,803 local chakkis in the country.

Centralised cooking of wheat chapatis

Progress so far

FSSAI has organized several meetings and consultations with stakeholders to build consensus around wheat flour fortification, including five zonal-multi-stakeholder consultations at the state government level, a key stakeholder meeting on 13th February, 2017 and a consultation with the Roller Flour Millers Federation on 5thApril, 2017 to encourage millers to adopt fortification of local brands. Early adopters of wheat flour fortification were recognized at the National Summit on 16th May, 2017.

The top FBOs in packaged wheat flour have initiated fortification as per FSSR, along with several roller flour millers. These include ITC (Ashirwaad), General Mills (Pillsbury), Patanjali Atta, HUL (Annapurna), Harmony Foods (Harmony Gold), and Nav Bharat (Vitamin Plus) (See **Annexure 7**).

Fortified Wheat Flour in the Market

Challenges and Road Ahead

The key challenges are:

- Currently, most states provide wheat grain and not wheat flour in PDS. Wheat flour has limited shelf-life of 2 to 4 months, therefore, supply chain and storage infrastructure will require strengthening.
- The wheat flour industry is highly fragmented and is largely dominated by local small scale chakkis. Outreach for fortification and quality control at the local chakki level is difficult. Additionally, one-time capital cost of a blender required for fortification is a deterrent for small and medium producers.
- Currently, unpackaged atta is placed under the nil slab in GST, while branded, packaged atta attracts a 5 percent GST rate. This anomaly discourages wheat flour millers and chakkis to produce packaged atta.

Keeping the above challenges in mind, recommendations include:

- Packaged branded atta be brought under mandatory fortification within six months. The anomaly of GST rate differential should be removed.
- Given the fragmented industry structure, it does not seem feasible to universalize fortification of unbranded unpackaged atta through open market channels.

- Mandatory fortification of wheat flour may be introduced in all the safety net programmes – ICDS, MDM, and PDS in phases two years. However, for PDS, a policy re-look will be required to supply wheat flour, with the consequent implications on conversion cost and logistical issues.

Wheat Flour Fortification in Madhya Pradesh by World Food Programme

A pilot project was undertaken for village level wheat flour fortification (with iron and folic acid) to reduce the prevalence of anaemia amongst the Sahariya tribal community in Madhya Pradesh, and to create of a replicable model for village level flour fortification. World Food Programme and the Tribal Welfare Department, (TWD), Government of Madhya Pradesh, entered into a strategic partnership in January 2009 over a two year period to fortify the wheat flour at the village flour mills. 162,000 beneficiaries in the Sahariyas community in the districts of Shivpuri, Guna, and Sheopur (428 villages, 177 tribal hostels) were covered. A total of 19591.58 MT of wheat flour was fortified. Support for fortification was focused on the village level local mills (atta chakkis). The village millers were registered and trained on fortification of wheat flour, and were provided with iron and folic acid pre-blend and dosage scoops. Rigorous training was imparted to the millers on all aspects. Significant reduction in prevalence of anaemia was recorded through a baseline and end line evaluation of the project.

Wheat Flour Fortification by TATA Trusts

As a 6 month pilot project, TATA Trusts outsourced wheat milling to a private miller to produce fortified milled wheat. The fortified wheat atta is available in 3 kg packets and supplied to 13 ration shops or fair price shops in urban slums of Mumbai.

Wheat Flour Fortification through Roller Flour Millers in Gujarat by Nutrition International

Nutrition International provided technical support to the Gujarat Roller Flour Millers Association (GRFMA) for introduction and sale of fortified wheat flour in the commercial market. This technical support included conducting industry assessment to understand the capacity of roller flour millers to produce FWF and its distribution channel, support in setting up a laboratory for GRFMA for testing and monitoring quality of FWF, training and building the capacity of supervisors of roller flour millers on GMP and quality assurance in wheat flour fortification and developing a BCC strategy and communication materials for introduction of the FWF in the market.

A total of 38 Roller Flour Millers and large scale chakkis were reached and 43,000 MTs of FWF was produced in the first six months of 2017 in the state as a result of these efforts.

Wheat Flour Fortification through PDS in Madhya Pradesh

Micronutrient Initiative

Nutrition International provided technical support to GoMP for introduction of wheat flour fortification through chakki model in Vidisha District. Technical support included mapping of chakki owners in the district of Vidisha, developing BCC strategy and communication materials, conducting baseline and end line evaluation study for assessing the impact of the intervention and training and capacity building of district and block officials, PDS shop owners, chakki owners and warehouse in-charges on wheat flour fortification.

Mapped 1401 chakki owners in Vidisha, out of which training was imparted to 972 chakki owners on wheat flour fortification.

Wheat Flour Fortification in Haryana by Food Fortification Initiative

Food Fortification Initiative
Enhancing Grains for Healthier Lives

FFI, the US Center for Disease Control and Prevention (CDC), and World Health Organisation (WHO), in collaboration with National Health Mission, Government of Haryana and Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh, initiated a pilot demonstration project in rural areas of two sub districts (Narayangarh and Barara) in Ambala. The project began in 2015 and is scheduled to be implemented in three phases over a period of five years. The purpose of the Haryana demonstration project is to assess the feasibility, sustainability, and health impact of fortifying wheat flour using India's existing open market and government welfare programmes in Ambala.

In Phase-I, a cross-sectional household survey determined household consumption of wheat products and collected blood samples among 856 non-pregnant women aged 18 to49 years. The preliminary results show high prevalence of iron deficiency anaemia and B12. The pilot also included birth defects surveillance, a community needs assessment, and a supply chain analysis to assess the structure and capacity of wheat flour mills in Haryana. Based on the supply-chain analysis, an implementation strategy for wheat flour and rice fortification was developed for the state and demonstration project under the overall leadership of the state Chief Minister.

In Phase II, wheat flour and rice fortification will be implemented in PDS, ICDS, MDM, and open market channels. In fact, ICDS had already started fortification in its two panjiri plants based at Gharaunda (Karnal) and near round circle 4 and5 (Gurugram) in 2016. Wheat flour and other ingredients used for ICDS foods would be fortified soon. Nearly one lakh PDS beneficiaries are likely to receive fortified wheat flour from September 2017 in two sub-districts (Narayangarh and Barara) of Ambala. Packed fortified wheat flour would be distributed through 74 PDS ration shops in these two blocks. Elementary Education Department also proposed to start fortification of wheat flour and rice for MDM soon. FFI and its other partners are closely working with all these departments for implementation of fortification programmes. Phase-III of the demonstration project will assess the impact of this fortification programmes.

Wheat Flour Fortification Pilot in PDS in Navi Mumbai

Food Fortification Initiative
Enhancing Grains for Healthier Lives

FFI also collaborated with Tata Trusts for a supply-chain analysis of a pilot wheat flour fortification project which was initiated with Food and Civil Supplies Department, Government of Maharashtra, in Navi Mumbai. Almost 10000 beneficiaries of Navi Mumbai had been targeted for distribution of fortified wheat flour through PDS. All the additional costs would be borne by the Tata Trusts for this pilot project. For the initial one month, fortified wheat flourwas distributed free of cost in that locality and the project was expected to continue for six months or more to study the acceptance of the consumers. Based on the success, it would be expanded in other places in Maharashtra.

Success Stories

General Mills Success story on Wheat flour fortification

General Mills is one of the largest and most reputed food companies in the world. For 150 years, General Mills has been serving the world by making food people love. They have been present in India for over two decades. Being one of the first pioneers in the Packaged Atta Business under Pillsbury brand since 1997,General Mills is highly committed towards food fortification and driving the wheat flour fortification.

As part of their Corporate Social Responsibility, they have collaborated extensively with Tata Trusts since 2016 on Wheat Flour Fortification Pilot Program in the Maharashtra region. They have also been fortifying our Pillsbury Chakki Fresh Atta with Iron and Vitamin A since 2016 for Philippines and Kuwait.

General Mills have further scaled up our wheat flour fortification endeavours as per the new guidelines issued by FSSAI by fortifying their entire lead variant i.e. Pillsbury Chakki Fresh Atta which contributes to 90% of their total volumes. Pillsbury continues to be one of the key players in the Atta market with 20 years of heritage and has PAN India presence.

Pillsbury Fortified Wheat flour will be available in the first market by early August and in other key markets by December end.

Patanjali

The Vision of the Param Pujya Swami Ramdev ji Maharaj, the renowned Yoga Guru and Param Pujya Acharya Balkrishna ji, made the concept into writing through formation of the Company (PATANJALI AYURVED LIMITED)." Patanjali has partnered with FSSAI on this process of fortification. Fortification of staple foods such as wheat flour and edible oil by adding essential vitamins and minerals has emerged as a simple and cost-effective strategy to address micronutrient malnutrition.

They are going to start the fortification tentatively by September 2017 for Atta. Packaging development Trails of machines & equipment are under process, & fortified atta will be launched PAN India.For Wheat Flour estimated volume is 2.0-2.5 lakh Ton/annum and key focus is on Iron, Folic acid & Vit B12 as per FSSAI guidelines.

4.3 Fortification of Edible Oil

Edible oil is considered an appropriate vehicle for fortification to address vitamin A and D deficiency in our population. Per capita consumption of edible oil is 12 to 18 kg per annum per person and has mass penetration (>98%) across all population groups. FSSAI has released the standards for fortification of edible il. As per the FSSAI standards, edible oil can be fortified with vitamin A and D. The incremental cost to fortify edible oil is around 10 paise per kg.

Globally, oil fortification was first introduced in 1965 with 27 countries mandating it since then. Vitamin A and/or vitamin D are used for the fortification of oil, being fat soluble vitamins. Studies have shown that serum retinol levels (vitamin A) below 20 ug/dl declined drastically post fortification.

Total domestic consumption of edible oil in India is 21.7 MMT which includes 12.73 MMT of imported edible oils. About 40 percent of the oil is directly consumed; the remaining 60 percent is for institutional purposes i.e. for bakery, catering, and producing other processed foods. Of the total, 35 to 38 percent is accounted for by the organized sector and sold in packs of 15 kg or less, leaving only 3 to 5 percent in the unorganized, small scale sector. Over 80 percent of organized retail in the edible oil sector is dominated by top national players.

Progress so far

FSSAI had a series of consultations on promoting and scaling up edible oil fortification with industry partners and key stakeholders to build consensus around fortification. A toolkit was developed for the industry to facilitate edible oil fortification. This includes a technical handbook, training manual, FAQs, a list of accredited premix suppliers, and a list of NABL accredited labs for testing micronutrients in fortified edible oil.

About 40 percent of the top national players who produce approximately 2.3 MMT have already initiated fortification, and the rest are in the process of initiating the same. Companies currently fortifying edible oil are: ADM Agro (Brands: Parampara, Health Fit), Mother Dairy (Brands: Dhara, Lokdhara), Cargill (Brands:

Fortified Edible Oil in the market

Sweekar, Nature Fresh, Gemini, and Shubh), Adani Wilmar (Brands: Fortune, King, Aadhar, Bullet, Raag, Gold, and Alpha), AAK Kamani (Brands: Jawan, Komal, Klassic), and Marico (Brand: Saffola) etc. Bunge (Brands: Dalda, Ginni, Lotus), Kalessuwari (Brands: Gold Winner) and B.L Agro (Bail Kolhu, Krishan) (See **Annexure 5**).

Challenges and Road Ahead

About 60 percent of edible oil is sold to the food processing industry where fortification should be encouraged but need not mandated, as it is used as an ingredient for production of other processed food items. Virgin, extra virgin, and cold pressed oils may be exempted from fortification, since these are specialty niche products and not for mass consumption. The unorganized sector comprising 3 to 5 percent of the market may be encouraged to adopt fortification voluntarily, but mandatory fortification may be imposed after two years.

Edible oil is an ideal staple for fortification with near universal penetration. It is recommended that all edible oil sold in packaged form for consumption at household level should be mandatorily fortified within a six month time frame.

Large Scale Food Fortification by GAIN

GAIN's large scale food fortification projects in Rajasthan and Madhya Pradesh since 2011 spanned fortification of wheat flour, edible oil, milk, and lentils, reaching large and vulnerable sections of the population, through commercial channels and public funded programmes such as PDSICDS, and MDM. These initiatives have had a ripple effect on several state governments including West Bengal, Delhi, Haryana, Karnataka, and Jammu & Kashmir.

GAIN is currently implementing scale up of **edible oil fortification** across eight Indian States: Rajasthan, Gujarat, Maharashtra, Madhya Pradesh, Haryana, Punjab, Andhra Pradesh, and Telangana and proposes expanding this footprint to additional states in order to effectively reach over 300 million people with fortified staples over the next four years.

Edible Oil Fortification by TATA trusts

The India Nutrition Initiative - TINI (a TATA Trusts initiative) in partnership with GAIN is working on edible oil fortification with vitamin A and D in 8 states (Punjab, Haryana, Rajasthan, Madhya Pradesh, Maharashtra, Gujarat, Andhra Pradesh and Telangana). Out of the total 14 Million MT annually in organized market, 7 million is handled by top 10 brands. With support from FFRC and

FSSAI about 40 percent (3 million MT) is already fortified and the rest would get fortified in the coming 6 to 8 months. Over the next 2 years, Tata Trusts would focus on the remaining 7 million MT which is handled by small and medium players.

Key activities of the project include landscape analysis, policy advocacy for oil fortification standards, training and capacity building of industries, support in quality assurance, and monitoring and supervision support.

Tata Trusts closely working with Global Health Strategies (GHS) for advocacy at national level for mandatory edible oil fortification. The purpose of the project is to create a conducive environment for legislation in favour of oil fortification with vitamin A and D. Mr Shashi Tharoor, MP, has been identified to lead the advocacy group at the national level. Tata Trusts has supported FFRC to develop a communication campaign for national edible oil fortification.

Success Stories

Adani Wilmar: The recent step to include Fortification in our products signifies our constant endeavor to live up to our promise of 'A Healthy Growing Nation'. We began fortifying the edible oils right from May 2017. We fortified with Vitamin A & D as per the government regulations and primarily aimed to cover our celebrated range of Fortune refined edible oils such as Cottonseed, Soybean, Sunflower, Rice Bran, Groundnut and later also in our other brands such as Aadhar, Kings, Fryola, Raag Gold and Alpha in the SKUs up to 15 L/ Kg. We cater around 30 million households nationwide per month. Moreover, we have already started heavy promotional activities on various platforms informing our consumers about Fortification & resultant benefits.

ADM: ADM started fortifying edible oils with Vitamin A & D in 2011 with one of its variant. In 2016, another variant was added taking the range of fortified products to about 75% of its packed oils sales. Since 1st May 2017, 100% of the packed refined oils range is fortified with the current level of requirements of Vitamin A&D. Our distribution of packed refined oils is limited to few states in West, South & parts of north India reaching to about 100 million people.

Cargill India: For more than 150 years since inception, Cargill is committed to feeding the world in a responsible way. It is passionate about its goal to be the global leader in "nourishing people". In India, cooking oil use is nearly universal with 99% penetration in Indian households. Fortifying oil with essential vitamins A, D and E creates the opportunity to reach all income groups with minimal changes in eating habits. Cargill India serves more than 25 million households with a host of brands including Gemini, Nature Fresh, Leonardo Olive Oil, Sweekar, Rath and Sunflower Vanaspati. It was the first company in edible oil industry which has fortified its refined edible oils in 2008 with Vitamin A, D & E, starting with its brand Gemini Cooking Oils and later in Nature Fresh Actilite Cooking Oils and Sweekar Sunflower Oil. It has been playing an active role in promoting the need for fortification and educating the customers through its packaging, promotions, engagement and all other initiatives.

Mother Dairy: Dhara began its journey with the vision to provide the best Quality & Nutrition through its edible oil. The entire range of Dhara variants, the cheapest oil at one end and the most expensive oil at the other end of the price spectrum, are fortified with Vitamin A and Vitamin D. These include Dhara Filtered range of Oils like Mustard and Groundnut to Refined Oils like Soybean , Sunflower, Rice bran and flagship Dhara variant Refined Vegetable Oil providing the choicest of Oils to consumers. Fortification in Dhara branded oils were adopted almost a decade ago by the organisation. Dhara has a distribution bandwidth extending from Jammu to Port Blair, serving to every small and big towns and villages other than the Tier 1 and Tier 2 cities. From the extremes of the North Eastern States to Bihar and Uttar Pradesh, Dhara pans out its reach to every consumer. With India hitting the charts of Infants and children malnutrition, Fortified Oil being one of the 5 basic staples with 99% household penetration, Dhara provides nutrition to the last mile with its cheapest variant being available . Apart from ensuring availability of fortified oil to all parts of India, there has been consumer awareness on importance of fortification and nutrition of oil, through various ongoing marketing activities. We at Dhara will continue to engage with various government initiatives to combat the burden of malnutrition.

4.4 Fortification of Milk

In India, there has been a rapid rise in aggregate consumption of milk, growing from 178 grams per day in 1990-91 to 337 grams per day by 2015-16. This sustained growth in availability of milk and milk products for a growing population offers an excellent vehicle to address the vitamin A and D deficiencies through fortification.

Mandatory milk fortification legislation was first introduced in 1935. Currently, there are 14 countries that have mandated milk fortification. 11 of the 14 countries fortify milk with both vitamin A and D.

Total milk production in India for 2015-16 was 155.5 million MT. The dairy industry in India is still predominantly unorganized with only 25 percent of milk routed through organized channels (cooperatives and private dairies). Private players account for approximately 55 percent of the organized market and 45 percent is procured by cooperatives. Fortification of milk is extremely affordable and cost effective, costing less than 2 paise per litre. Dairy industry is equipped to fortify milk and does not require extra expenditure. Of the total annual milk production, approximately 9 percent is fortifiable – an easily achievable target.

Progress so far

FSSAI has organized several meetings and consultations with various stakeholders to build consensus around milk fortification, a key stakeholder meeting on scaling up of milk fortification held on 9th Feb 2017, and a meeting with the micronutrient premix manufacturers held on 30th March, 2017 to ensure availability of micronutrients and premixes and to freeze the price band of premixes.

Fortified Milk available in open market

Mother Dairy, Saras (Rajasthan Cooperative Dairy), and Kwality Dairy have taken the lead and voluntarily started fortification of milk. State cooperatives like Vita (Haryana), Verka (Punjab), Medha (Jharkhand), Purabi (West Assam), and private dairies like Creamline Dairy have also started fortification. Other key players like Sanchi (MP), Aavin (Tamil Nadu), Nandini (Karnataka), Nestle, and VRS Foods will launch fortified milk in the open market within the next few months. Sanchi (MP) has also committed to provide fortified milk powder to students of government

schools. TATA Trusts is working on a large scale milk fortification initiative in collaboration with NDDB and World Bank to reach 250 million people in 2 years (See **Annexure 5**).

Challenges and Road Ahead

Through voluntary fortification over the next two years, 60 percent of the organized market milk is expected to be fortified, which is consumed mostly by urban and peri-urban population. Fortification is a challenge for unorganized market (75 percent) as it is widely scattered.

Though the leading milk player, Amul (has a 25 percent share of the organized market) has fortified its tetrapak /UH /flavoured milk variants, it has still not adopted large scale fortification for its pouch milk variants. All concerns raised by Amul have been duly responded to by the scientific panel of FSSAI.

It is recommended that fortification of packaged milk can be made mandatory, to be implemented within six months. Unpackaged milk may be exempt from mandatory fortification.

Milk Fortification by TATA Trusts

TATA TRUSTS

Tata Trusts in partnership with FFRC, World Bank, and NDDB plans to achieve 50 percent fortification of this milk by 2019 and 80 percent by 2021. Milk fortification does not lead to changes in taste, color, or any sensory change and has high acceptance among the population. Fortifying all the milk that is processed and sold by the organized sector can help reach close to 350 million people.

Currently, the cooperatives in Jharkhand, Rajasthan, Haryana, Punjab, and Assam have adopted fortification of milk and private dairies like Creamline, Kwality, Namaste India etc. have also introduced fortified milk.

Tata Trusts in partnership with World Bank and NDDB called for all 22 cooperative federations on 5th September in Anand. This is being followed up by a meeting of the Private dairies in partnership with FFRC. The objective of this meeting is to sensitize them about milk fortification.

Key activities being done under this programme are development of quality protocols, training, quality lab upgradation, testing monitoring and evaluation support, social media marketing and communication support for consumer awareness.

Success Stories

Haryana Dairy Development Cooperative

Micronutrient malnutrition in India is a serious public health issue affecting large section of population, impacting physical and mental growth. In order to overcome the deficiency of Vitamin A and D, Haryana Dairy Development Cooperative has started fortification of Toned milk and Double Toned Milk under the brand name “Vita” in the month of March, 2016. Haryana, one of the top milk producing states, whereas Haryana Dairy Development Cooperative contributes by processing 3 lakh litres of milk per day and fortifying 1.05 lakh litres of milk per day. Many of the states like Haryana, Chandigarh, Himachal Pradesh, Delhi and some parts of Rajasthan are benefitted by fortified milk “Vita”. Hence, Haryana Dairy Development Cooperative created the product and forged a path to success.

West Assam Milk Producer's Cooperative Union Ltd.

To eradicate micronutrient malnutrition and to support the nation-wide fortification initiative of FSSAI and Tata Trust, the West Assam Milk Producers Cooperative Union Limited (WAMUL), commonly known as "Purabi" is fortifying "Smart Milk" (Toned Milk) with Vitamins A & D. Now, the fortified milk of Purabi is available in a new blue pack with the "+F" logo of FSSAI. With more and more quality and health conscious consumers preferring packed pasteurized milk, Purabi has crossed daily average sales of over 20,000 litres of fortified milk in the markets of Guwahati and other towns. Fortified milk of "Purabi" Dairy has started to skyrocket in popularity with some promotional activities.

Mother Dairy

Mother Dairy is credited to be the only brand which has been supplying Vitamin A fortified token milk since 1984 in a branded format. It joined hands with NDDB to fortify due to high deficiency levels seen among consumers and strived to continue with this since then. However, fortification of Polypack milk has been initiated for January 2017.

Today, Vitamin A & D deficiency in India is a concerning issue related to vision, bone health and other health problems. Such deficiencies are also linked to today's lifestyle, with very limited exposure to sun. Hence, with the release of FSSAI standards, Mother Dairy has taken a pioneering step and fortified Toned Milk, Double Toned Milk and Skimmed Milk with Vitamin A & D. A perfect choice for consumers to address their daily micronutrient needs, since the total contribution made by Mother Dairy is approximately 18 LLPD. Its fortified milk is marketed with "F+ logo" at various states like Delhi, Punjab, Lucknow, Hyderabad, Mumbai, Chennai etc. under the brand name "Mother Dairy" and hence, covering large population of India.

Jharkhand State Cooperative Milk Producers Federation Ltd.

Micronutrient deficiency is the serious concern for India that has both health and economic consequences. To address malnutrition deficiencies, milk fortification with Vitamin A and D is initiated by FSSAI. With the support of Tata Trust, milk fortification has already been taken up in Jharkhand Dairy Cooperative. Fortified Toned Milk with "+F" logo is marketed in the state "Jharkhand" itself under the brand name "Medha". Along with milk industry, Jharkhand Dairy Cooperative got the recognition for early adopters of fortification. The total contribution for reaching out population is approximately 15000 litres per day. This is in line with the endeavor of being present in all open markets across nation.

Creamline Dairy

Milk is an important part of the family diet in India, however, majority of Indians are known to be Vitamin D deficient. Creamline Dairy Products Limited is one of the milk industry, has launched "Enrich D" under its brand "JERSEY", homogenized and pasteurized milk fortified with Vitamin D. The company has a strong processing capacity of 10 lakh litres of milk daily. It has a strong presence in South India and parts in Maharashtra. The launch of "Enrich D" will enable "Fortification – a national agenda" to expand its footprint and ensconce its presence in South India.

4.5 Double Fortified Salt (DFS)

Daily consumption of salt is 7 to 9g/person, and is consumed by everybody. Therefore, it is an excellent vehicle to deliver micronutrients to the entire population. Fortification of salt with iodine since 1962 has been one of the most successful public health programmes in India and has significantly reduced goitre and iodine deficiency disorders.

Fortification of iodised salt with iron, as double fortified salt (DFS), is a complementary strategy to address widespread anaemia in the country. At the programmatic level, India could be a world leader in implementing DFS. Through government safety net programmes, DFS has the potential to reach 150 to180 million of the most vulnerable sections of the population.

Annual salt production in India is 264 lakh tons, of which 62 lakh tons is used for edible purpose. There are about 11,800 salt producers in India, spread over 8 states. About 95 percent are small scale manufacturers who produce about 40 percent of the total salt and 80 percent of raw salt used for the production of refined/upgraded quality edible salt.

Incremental cost of DFS production from iodised salt is INR 2 to 4/kg, which is likely to reduce at scale. Incremental cost per person per day is only 2 to 4 paise.

Progress so far

FSSAI has released the standards for fortification of salt with iron and iodine (150 micrograms at retail level) and enlisted two formulations- Ferrous Sulphate (FS) with stabilizer Sodium Hexametaphosphate (SHMP) to prevent reaction between iodine and iron and Ferrous Fumarate encapsulated by soya stearin (EFF) to prevent interaction between iodine and iron.

FSSAI has organised meetings with FBOs for large scale fortification of salt and technical aspects on DFS with all stakeholders – on 3rd Feb 2017, 7th April and 9th May, 2017.

As of now, 20 states are supplying DFS in MDM programmes. Ministry of Women and Child Development, Ministry of Human Resource Development have mandated the use DFS under ICDS and MDM Since 10th July 2017 and 2nd August 2017 respectively (See **Annexure 5**).

Double Fortified Salt in Open Market

Challenges and Road Ahead

Production of DFS can be scaled up with time to reach every household over the next 3 – 5 years. To encourage mainstream adoption of DFS, large-scale public awareness campaigns about the benefits and proper use of DFS is required.

Adoption of DFS has been made mandatory in MDM and ICDS. It is recommended that DFS also be made mandatory in other schemes for beneficiaries of welfare institutions, SABLA etc., and be made widely available through fair price shops nationwide.

Introduction of DFS in Madhya Pradesh by Nutrition International (NI)

Micronutrient Initiative

NI provided technical support to the Government of Madhya Pradesh in introducing DFS through PDS in 89 tribal blocks of 20 districts of Madhya Pradesh, including assisting the state government in developing tender documents for the procurement of DFS, developing design and layout for the DFS salt packets, development of DFS technical training module, conducting TOT at the state and district levels officials, warehouse in-charge, and FPS shop owners and quality controllers, and development and roll out of behavioural change communication strategy and communication material.

The state government has also decided to introduce DFS through ICDS and MDM in 51 districts of Madhya Pradesh.

Double Fortified Salt Evaluation Study by GAIN

gain

GAIN conducted a cross-sectional state-wide survey to examine nutritional indicators and their determinants in preschool-aged children and women of reproductive age in Uttar Pradesh. Simultaneously, this survey will serve as a baseline to a double fortified salt programme in the state.

Success Stories

DFS – Success Story @ Tata Trusts

Nutrition is one of the key focus areas for Tata Trusts. DFS, is one of the important fortification delivery vehicle providing essential Iron to reduce the prevalence of Iron deficiency Anaemia. Tata Trusts has been at the forefront of spreading the awareness and availability of Double Fortified Salt (DFS) throughout government net programs.

Akshayapatra Kitchen

Tata Trusts has successfully replaced iodised salt with Double Fortified Salt (DFS) in almost all the kitchens across India. This follows the efforts of the FSSAI and the Govt. of India mandating the use of DFS in mid-day meal scheme. DFS is added in every meal provided to the 16.5 Lakhs children every day across 10,500 schools

Tripura

With the assistance of the Tata Trusts, the Govt. of Tripura has on Oct 2016 initiated the supply and distribution of DFS to MDM, ICDS, Tribal hostels and Govt hospitals an all 8 districts across the state. Tata Trusts is closely working with the Govt. proposing the initiation of DFS in the PDS system. DFS is supplied to all 9911 Anganwadi Centres under the ICDS scheme and 6348 schools and hostels run by the Tribal Welfare department- catering to approximately 9.5 lakh infants, children, adolescent girls and pregnant and lactating women.

Uttar Pradesh

a) DFS was introduced in the state as a pilot for 10 districts, benefitting 10,000 villages, 8500 FPS stores and 46 lakhs beneficiaries. About 18000 MT DFS was supplied during this pilot

b) In order to empower the women and educate them Tata Trusts is working closely with the SHG managed by Rajiv Gandhi Charitable Trust, targeting rural households to adapt DFS by incentivizing women self-help groups to sell DFS, while at the same time, creating awareness about the benefit of DFS. Through this pilot initiative, we have touched 66,500 families and a scale up has been planned to touch 2.5 lakhs families.

Tamil Nadu

Tata Trusts provided assistance to Tamil Nadu Salt Corporation (TNSC), Tamil Nadu for setting up a new salt refinery with installed capacity of 3500 Metric Tonnes (MT) per month. The entire production of iodised salt is expected to be converted into DFS by the end of the Dec 2019.

Jharkhand

With the assistance of Tata Trusts, Jharkhand has initiated distribution of DFS to the PDS system entire state on Sept'2017 benefitting 32 million across 24 districts

TATA SALT: Tata Salt Plus

With this step, Tata Salt wants to make the nation healthier and Iron Strong. Its vision is now 'Desh Ki Sehat, Desh Ka Namak'. All you need to do is add a spoonful* of Tata Salt Plus to your everyday food. (*10 gms of Tata Salt Plus). To address the serious concern of anaemia, Tata Salt undertook extensive research spanning two decades and developed a new formulation with the National Institute of Nutrition, Hyderabad. After testing for the highest standards of quality, Tata Salt Plus has been introduced as India's first iron fortified iodised salt that provides up to 50% of Recommended Daily Allowance of Iron.

4.6 Fortification of Processed Food

Packaged foods offer convenience while being cost effective, and in order to make them more nutritious. The food authority has drafted the standards for fortification of processed foods. The standards include fortification of cereal and cereal products like breakfast cereals, pasta and noodles, and bakery wares like bread, biscuits, rusks, buns with added iron, folic acid, and Vitamin B 12 (in addition they may be fortified with zinc, vitamin A, riboflavin, niacin,and pyridoxine). In addition to these fruit juices shall be fortified with Vitamin C.

These particular categories have been chosen as there is increased trend of consuming breakfast cereals, breads, buns etc. on a regular basis and across different strata of society, in place of traditional foods. Due to urbanization, and the food chain becoming longer, consumers today are further away from farms than ever before, and a lot of traditional foods are now being replaced by processed foods because of convenience. Fortification of processed foods will help in increasing the nutritional quality of these products as well as help in improving the nutritional status of the population at large.

5 Fortification in Government Programmes

CHAPTER 5

Fortification in Government Programmes

Current status of inclusion of fortified staples in states government programmes is placed in **Annexure 5B**.

5.1 Fortification in Mid-Day Meal Scheme

Directives from the key central ministries, like Ministry of Women and Child Development and Department of School Education & Literacy in mandating use of Fortified Edible Oil, Double Fortified Salt and Fortified Wheat Flour in ICDS and MDM respectively, has been an encouraging step towards adoption of fortification by the States/UTs. A listing of the relevant directives is placed at **Annexure 6**. It is hoped that inclusion of other fortified staple commodities like Fortified Rice and Fortified Milk will also be considered, and fortification will be integrated into all of the government safety net programmes to ensure better health and nutrition for all our citizens.

मध्याह्न भोजन योजना
Mid Day Meal Scheme

The Mid Day Meal (MDM) Scheme aims at improving nutritional levels among children studying in government, local body, and government-aided schools up to 8th class. As per norms, primary school children are provided 100 grams of grains (rice or wheat flour) daily and upper primary school children are provided 150 grams of grains daily, as part of a hot cooked meal served at school. The government allocates 2.16 million MT of food grains (wheat and rice) to feed 118.5 million children every year.

Food Corporation of India (FCI) procures rice and wheat from farmers and allots it to Targeted Public Distribution System (TPDS) and other schemes like MDM. Grains once received by the FCI are packed and transported from the procurement state to regional FCI warehouses around the country.

For MDM, Ministry of Human Resource Development (MHRD) allots grain to each state based on the average coverage/consumption of the first three quarters of the previous year and the number of working days. MDM Directorate at the state level, and the district MDM authority liaise with the FCI and state bodies such as the SFC to ensure delivery of grains to schools.

The grains are lifted at the block level and distributed to all the schools within that block, either by a TPDS dealer or a contractor.

As per the supply chain outlined above:

- Rice can be fortified at two stages: Either when the grain is milled before being delivered to FCI godowns or at the centralized kitchen level before delivered to schools.

- Wheat flour can be fortified after it is delivered to the school or the centralized kitchen and sent for milling. School and centralised kitchens receive wheat grain and send it to a miller to be conveted to wheat flour, which is the ideal point for fortification.

Progress so far

A recent directive has been issued for the use of Double Fortified Salt, fortified wheat flour and fortified edible oil in the MDM scheme (**Annexure 6A**). Twenty states are providing DFS through MDM. This includes Tamil Nadu and Tripura, among others. Maharashtra is providing fortified wheat flour in three districts and Haryana has introduced fortified wheat flour and rice in Ambala. Fortified rice is currently being provided in 2 districts of Odisha. Karnataka started serving fortified rice in MDM since October 2016 in 3 districts. They will be extending to 4 additional districts. Rajasthan is providing fortified oil. States like Dadra & Nagar Haveli, Chattisgarh, Haryana, Delhi, Andhra Pradesh, Kerala, Gujarat, and Karnataka are interested in introducing fortified rice and/or fortified wheat flour in MDM through Akshay Patra centralised kitchens.

Children consuming midday meal at school provided through MDM Scheme *(Source: Akhaya Patra)*

Challenges and Road Ahead

The challenges are:

- It will help if fortification is done centrally at FCI so that fortified staples can be procured directly, and costs reduced due to economies of scale.
- Tendering through centralized kitchens needs revision to incorporate inclusion of the fortified commodities.

5.2 Fortification in Integrated Child Development Services (ICDS)

Supplementary Nutrition (SN) supplied under ICDS Scheme is of two types for different beneficiaries, i.e., Take Home Ration (THR) for pregnant women, lactating mothers, and children in the age group of 6 months to 3 years; hot cooked meal for children in the age group of 3 to 6 years. SN served to the beneficiaries is to be prepared as per the National Food Security Act, 2013 which provides food security to the people.

The responsibility for implementation of SNP lies with the respective state/UTs. Wheat, rice, and coarse grains for preparation of nutrition for the beneficiaries are to be provided by the national government as per the rates mentioned in Schedule I of NFSA.

ICDS follows a decentralized food model (DFM) a.k.a Local Food Model (LFM) for procurement and distribution of SNP which differs from state to state. Cereals (wheat and rice) are procured from FCI, delivered to Fair Price Shops (FPIs) or then transported to the Self-Help Group (SHG)/producer for production of THR and/or HCM. The THR is prepared, packed, and then dispatched to the AWCs. For HCM and MS, perishable products are bought from the open market and then used to cook and feed the children, which can be used as a point of intervention of fortification in ICDS. The current cost of financial norms per beneficiary per day have been revised recently and is INR 8 for children (6 months to 72 months), INR 12 for severely malnourished children (6 months to 72 months), INR 9.50 for PLM and Rs. 9.50 for adolescent girls (11-14 years out of school). Different recipes based on rice and wheat in different permutation and combinations are provided for MS and HCM for beneficiaries in most states. Khichri and kheer is the most commonly cooked HCM across 19 States/UTs.

Beneficiaries of ICDS

Progress so far

A recent directive has been issued for the use of Double Fortified Salt, fortified wheat flour and fortified edible oil in ICDS (**Annexure 6B**).

- In Haryana, through their civil supplies department, fortified wheat flour is being provided in ICDS in 2 blocks of Ambala. Haryana already provides DFS since 2012 and recently Tripura has started the provision of DFS through PDS.
- Other states in the pipeline to start fortification are Kerala (fortified rice in 2 districts), Delhi (entire state, all commodities), Dadra& Nagar Haveli (rice fortification, entire state), Chhattisgarh (rice fortification) and Andhra Pradesh (Godavari district) are now looking at including fortified products in ICDS on a pilot basis.

Challenges and Road Ahead

DFS was introduced under SNP and directives were issued once in 2011, but procurement of DFS has become a major challenge due to non-availability of the same in open market as the states have decentralized procurement for this commodity.

As rice is procured from FCI, it will help if the fortification is done at FCI. For the same, PDS needs to issue a directive to fortify staples at the procurement level.

A revision in the financial norms has been done which now can absorb the incremental cost of fortification, which is about 10-12 paise per beneficiary per meal, however States now need to proactively include fortified staple commodities in ICDS.

5.3 Fortification in Public Distribution System

Public Distribution System (PDS) is the key channel of the government's food security system in India, reaching 67 percent of the population and implemented through the Ministry of Consumer Affairs, Food & Public Distribution, Department of Food & Public Distribution. The present food basket of PDS includes wheat, rice, sugar, and kerosene. Many states/UTs also permit sale of food items such as pulses, edible oils, iodized salt, spices, etc. through PDS outlets. Under NFSA 2013, beneficiaries are classified as AAY or PHH (Priority Households /Non AAY) and get rice at INR 3 per kg, and wheat at INR 2 per kg. AAY beneficiaries are entitled to 35 kg per family per month; PHH beneficiaries are entitled to 5 kg per person per month.

PDS beneficiaries procuring rations

Coverage under NFSA is 81.34 crore beneficiaries and reaches 75 percent of the rural population and 50 percent of the urban population of India, which includes 2.5 crore AAY Households. Total requirement of food grains under NFSA is 614 lakh MT, which includes 549 lakh MT for PDS and 65 lakh MT for other welfare schemes.

FCI procures grain (wheat and rice) from farmers, and transports it to central warehouses, from where it is transported to state warehouses as per state wise allocations. The state then distributes grains across FPS. Rice, once procured from farmers, is first milled and then sent to central warehouses, from where it follows the above supply chain.

As per the supply chain outlined above:

- Rice fortification can be done by FCI centrally at the milling stage and then received at the central warehouses for improved logistics and economies of scale.
- For wheat flour, fortification can be done at the state godown level where states tender the millers to convert wheat grain into wheat flour.

Progress so far

A directive has been issued by the Department of Food and Public Distribution, advising all the states to give wheat flour/fortified wheat flour in place of wheat grains to the beneficiaries (**Annexure 6C**).

- **Fortified wheat flour:** Maharashtra, Haryana, West Bengal, and Andaman and Nicobar Islands, are providing fortified wheat flour through PDS, covering specific districts. Kerala and Rajasthan have committed to start supply of fortified wheat flour through PDS from July 2017. Sikkim and Himachal Pradesh are in the pipeline.
- **Fortified rice:** Haryana is introducing fortified rice in select districts. Dadra & Nagar Haveli, Chhattisgarh, Delhi, and Odisha are interested in introducing fortified rice through PDS.
- **Fortified oil:** Gujarat, Himachal Pradesh, Karnataka, Rajasthan are providing fortified oil through the PDS/FPS.
- **Double fortified salt:** MP, Tamil Nadu, UP, Rajasthan, and Telangana are in the process of initiating sale of DFS through PDS / FPS. Chhattisgarh, Karnataka and Jharkhand are planning to reintroduce DFS.

Challenges and Road Ahead

The key challenges are outlined below:

- As rice and wheat grains are procured from FCI, it is imperative to involve FCI at the initial stages to ensure supply chain efficiency.
- Converting wheat grain to fortified wheat flour has incremental conversion cost of about INR 2 per kg which is to be either borne by the state or passed on to the consumer. There needs to be revision of the cost norms and subsidy allocations for the state.
- Wheat flour in PDS has limited shelf-life of 2 to 4 months; therefore, supply chain has to be robust.

5.4 Other Schemes

SABLA: A Scheme for Adolescent Girls

SABLA is a centrally sponsored scheme for all-round development of 11 to 18 years old adolescent girls. The scheme has a special focus on all out-of-school adolescent girls and is implemented using ICDS. The Anganwadi Centres (AWCs) are the focal point for the delivery of the services for 205 districts selected from all state governments/UTs, covering 1 crore beneficiaries.

The nutrition component of the scheme aims at improving the health and nutritional status of these girls by provision of supplementary nutrition in the form of both THR and HCM.

Inclusion of fortified staple foods here would be an ideal intervention to address micronutrient malnutrition at the right stage, i.e., among adolescent girls before they go on to be mothers.

Beneficiaries of the SABLA Scheme

Welfare Institutions and Hostels

A bouquet of schemes is provided under the Ministry of Social Justice to address the basic needs of the underprivileged and the elderly. These include welfare institutions taking care of the elderly under the Integrated Programme for Older Persons (IPOP) Scheme which was implemented in 1992. The main objective of the scheme is to improve the quality of life of older persons by providing basic amenities like shelter, food, medical care, and entertainment opportunities and by encouraging productive and active ageing. Along with this, many hostels catering to backward classes also get their rations from PDS through FCI. Fortification of wheat flour and rice at the central level so that reaches these groups will help improve their nutritional status immensely.

Tea Plantation Workers

India is the second largest tea producer in the world. India is also the world's largest consumer of black tea with the domestic market consuming 911 million kg of tea during 2013-14. Tea production is led by Assam (304.40 thousand hectares) (about half of the tea produced in India is in Assam), West Bengal (140.44 thousand hectares), Tamil Nadu (69.62 thousand hectares), and Kerala (35.01 thousand hectares). Production of tea reached 1,233.14 million kg in 2015-16. Around 1,008.56 million kg was produced in east India and 224.58 million kg was produced in south India.

According to estimates, the tea industry is India's second largest employer (and largest private sector employer in India) and employs over 3.5 million people (over a million in Assam alone) across nearly 1,686 estates and 157,504 small holdings; most of them women. Tea garden workers receive rations as part of their wages from tea companies or the government. Estimating an average family size of 5 people, that means more than 17.5 million people benefit from food rations provided by the tea companies/government. Labour rights of plantation workers are governed by the Plantations Labour Act, 1951. The Tea Board implements several welfare schemes for plantation workers and their families.

In Assam, there is a very high prevalence of malnutrition among children aged between 6 months to 5 years. About 36 percent are stunted, 23 percent are wasted and 30 percent are underweight. Over 36 percent children under five years, 46 percent women and 25 percent men suffer from anaemia. Diets are not diversified and are low in fruits and vegetables, which are good sources of micronutrients (vitamins and minerals), that are required for growth, development, and immunity. Tea garden workers are among the most vulnerable sections of society with severe malnutrition.

Tea plantation workers

This makes fortified rations (wheat flour and rice) an ideal vehicle to improve the nutrition status of this large and vulnerable group of people. In West Bengal, tea garden workers are already being reached through fortified wheat flour provided through PDS. The West Bengal government is now evaluating fortification of rice within PDS as well.

In Assam, rice is the staple diet and should be fortified. If mandated for PDS and the government nutrition programmes, it would go a long way in improving the poor nutritional status of the state and tea garden workers in particular.

A consultation held in Assam on July 21, 2017 with approximately 50 tea garden managers received a very positive response, with each one convinced and committed to take up fortification at the earliest.

6 Implementation

CHAPTER 6

Implementation

The Food Fortification Resource Centre (FFRC) has been setup as a nodal point within FSSAI to engage with and align all stakeholders to build consensus on fortification including key government ministries and departments, technical specialists, development partners, food businesses, industry partners, scientists and academia, civil society and consumers. The alignment and advocacy outreach has been wide and deep - a list of key consultations and meetings held is placed at **Annexure 7**. A Joint Declaration from all key stakeholders signed in October 2016 is placed at **Annexure 8**.

FFRC provides technical and implementation support with respect to technology, premix, equipment procurement, as well as creates awareness among consumers on good nutrition, food safety and fortification. FFRC also has an online portal for knowledge sharing. A comprehensive tool kit including technical handbooks, training manuals, FAQs, list of accredited premix suppliers and equipment manufacturers, list of NABL accredited labs for testing of micronutrients and standardised tender documents have also been developed and are available on the FFRC website.

FFRC's key goal is to align supply and demand for fortified food in the market, ensure that food businesses start offering fortified variants of their products, and ensure that consumers find fortified foods easily and at affordable prices. It is enabling open market supply by facilitating food business organisations (FBOs) to introduce fortified variants, and facilitating States for inclusion of fortified staples in Government Nutrition Programs – MDM, ICDS & PDS. Significant progress has been made for both open market availability and adoption of fortified staples in the government programs at the national and state level. Open market supply of all 5 fortified staples – oil, milk, double fortified salt, wheat flour and rice - is now assured, and is growing month on month. Safety net programs - both MDM and ICDS - have mandated the use of fortified wheat flour, oil and double fortified salt nationally, ensuring that the most vulnerable sections of society receive appropriate and timely nutrition. Select media coverage showcasing the adoption and awareness building around fortification is placed at **Annexure 9**.

The Food Fortification Resource Centre team is a young and dynamic group drawn from varied industry and technical backgrounds. The team has a designated coordinator for each fortified commodity, each safety net program, and responsibility as a coordinator for each State, ensuring 360 degree coverage and attention. The team's contact details are placed at **Annexure 10**.

FFRC's approach is to motivate, nudge and facilitate all stakeholders to adopt food fortification towards a Healthier India, where every citizen has access to safe, nutritious and wholesome food.

Online Application and Link to Food Licencing and Registration System

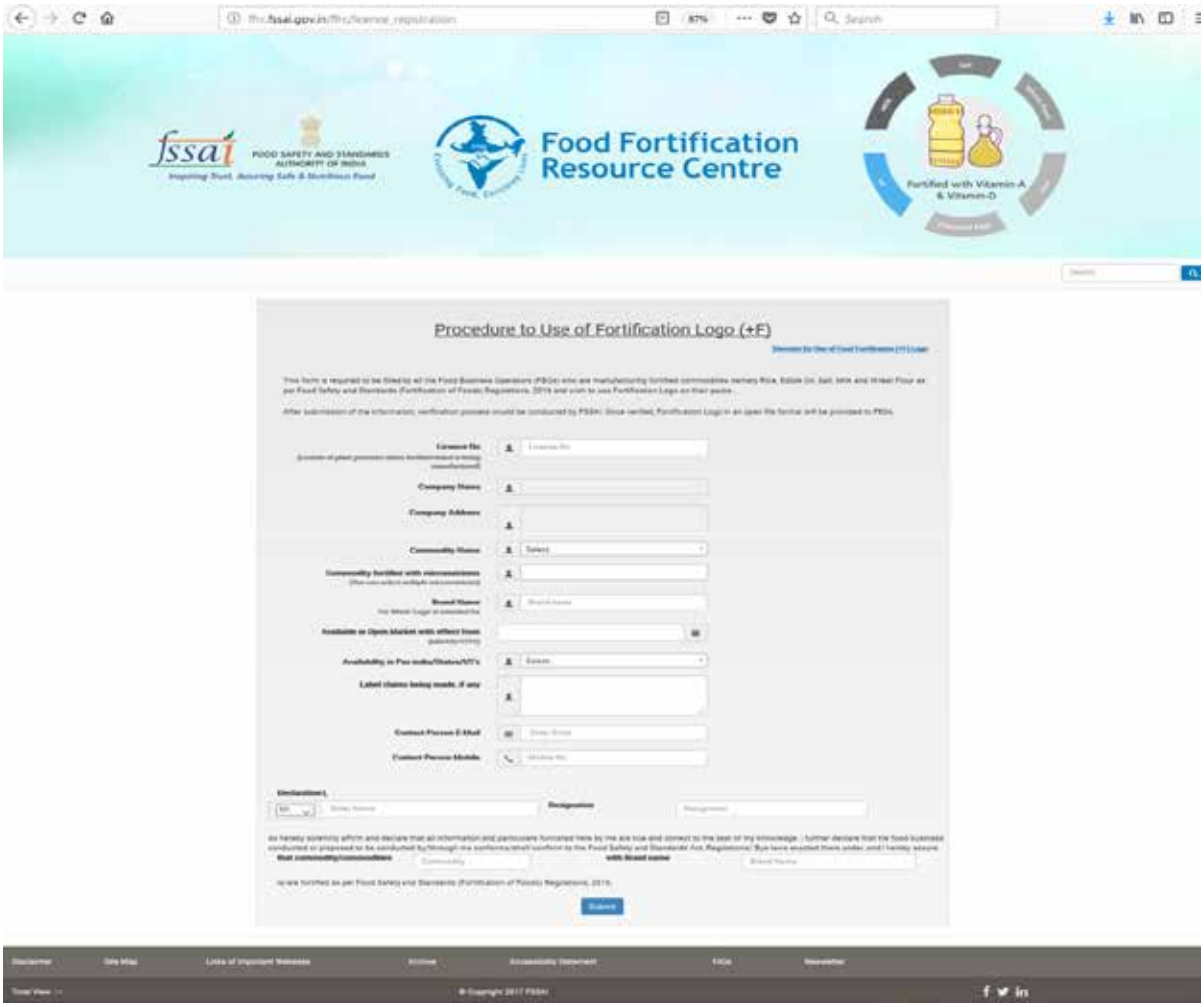
FSSAI has created the Food Licencing and Registration System (FLRS) as an online platform to facilitate Food Business Operators (FBOs) in India to apply for their licence/registration certificate, and track their applications during the course of processing.

A FSSAI licence or registration is mandatory for all food businesses in the country.

While there is no new licence that is required for the introduction of fortified products, FBOs do need to inform FSSAI of their new products that are being fortified as per FSSAI standards.

To be able to use the +F logo, the FBO has to comply to the standards, as well as register online through the FLRS and complete a simple form giving the details of the products being fortified, date of introduction in the market, and where it will be available.

Once they update this information, it will be verified by FSSAI, and then the logo will be made available to them for use.



FFRC Form for use of +F logo.

Landscape Analysis and Dashboard

To estimate the impact of implementation of fortification, it is important to have a landscape analysis of the specific food industry. Currently, FFRC has started working on the landscape analysis of the edible oil industry in different states of India which includes number of oil millers, plant capacity, production capacity, the name of oil variants, and brands which are fortified and non-fortified along with their outreach. From this data, it is possible to understand the comprehensive picture of the industry and then nudge them to initiate fortification. Landscape analysis for other select commodities will be taken as well.

An online reporting dashboard has also been created. This will track the total industry size, the quantum which is fortifiable, and the growth in availability of fortified commodity work every quarter. This will be useful to get a complete picture of total production and fortified tonnage in the country at a specific period of time to create a sustainable system to monitor and evaluate fortification once it's implemented successfully.

Partnerships

To promote fortification across India in a sustainable manner, FFRC is partnering with stakeholders across sectors, each of whom plays an important role in eliminating micronutrient malnutrition in the country.

Key Government Ministries and Departments **(Annexure 11B)**

Apart from FSSAI's parent Ministry of Health and Family Welfare, FFRC works closely with the 3 line ministries directly responsible for the safety net programs i.e Minstry of Women & Child Development (ICDS), Ministry of Human Resource Development (MDM Scheme) and Ministry of Consumer Affairs (PDS). The Ministry of Food Processing Industries has also taken up the mandate of food fortification and rallied industry and other stakeholders around it.

Various other government departments are also stakeholders in this mission, including the following:-

- Department of Food and Public Distribution
- Department of School Education
- Department of Health Research
- Department of Industrial Policy and Promotion
- Department of Animal Husbandry, Dairying, and Fisheries
- Department of Biotechnology

Food Business Operators (FBO) and Industry Associations

FFRC works with FBOs to ensure supply of fortified staples through open market channels. A number of FBO partners like Mother Dairy and Cargill, in addition to being the early movers in fortifying milk and edible respectively, have also provided invaluable resources to support FFRC.

Industry associations like the Chamber of Indian Commerce (CII) and FICCI have provided an important platform to bring together FBOs and host large-scale consultations on staple food fortification.

Development Partners **(Annexure B)**

The Food Fortification Resource Centre has been setup in partnership with TATA Trusts. Global Alliance for Improved Nutrition (GAIN), PATH and World Food Programme (WFP) are the key development partners working on the ground for capacity building and technical support for fortification of oil, milk, wheat flour and rice. Bill and Melinda Gates Foundation (BMGF) supports nutrition led initiatives through funding and technical assistance to various development partners. The World Bank has recently finalised a partnership with FSSAI for technical assistance with the overall goal of contributing to address India's malnutrition challenges and support FSSAI to integrate nutrition with food safety. Other development partners like Clinton Health Access Initiative (CHAI), Coalition for Food and Nutrition Security, Food Fortification Initiative (FFI), Iodine Global Network (IGN), Micronutrient Initiative (MI), United Nations Children's Fund (UNICEF) and World Health Organization (WHO) work alongside each other on different aspects of nutrition across the spectrum. Many of these organisations have come together under the Poshtik umbrella to bring in renewed focus on fortification and its subsequent integration in various food based safety nets through high level advocacy.

Civil Society Organisations

FSSAI engages with civil society organisations including consumer organizations, NGOs and corporate foundations as mobilization and delivery partners for mass awareness for social and behavioural change on food safety and nutrition. A complete communication kit with content is provided by FSSAI to the CSOs who provide the last mile outreach for message dissemination, awareness and consumer engagement. This partnership allows a matching of NGOs with CSR programs of Corporates as well.

Scientists and Academia

Various leading institutions partner with FSSAI on fortification for research, evidence, technology and indepth analysis including the National Institute of Nutrition (NIN), AIIMS, Indian Dietetics Association, Nutrition Society of India and various Medical Colleges, Home Science Colleges, Nutrition Colleges, Food Technology Colleges. Experts are also selected as members to FSSAI's Scientific Panels and Committees.

7 Financial Implications

CHAPTER 7

Financial Implications

Overall Financial Implications

The cost of fortification of wheat flour and rice, for MDM and ICDS reaching 221 million beneficiaries is only **INR 123** crores annually.

By extending this benefit to the beneficiaries of welfare institutions and adolescent girls covered under SABLA, the annual cost of fortification would be approximately INR **143 crores**.

This should ideally be done at the miller level before it reaches the FCI godowns.

Cost of Fortification per MT (Rs.)

	SCHEME	2016 Offtake Quantity in '000 MT	Cost of Fortification per MT (Rs. Crores)
RICE	MDM	1922	86.49
	ICDS	599	26.96
	Sub-Total	3043	**113.45**
WHEAT	MDM	372.56	2.98
	ICDS	794.33	6.35
	Sub-Total	1166.89	**9.34**

Total Annual Cost in Rs. Crores	**122.78**

Statewise offtake of rice and wheat across various schemes for 2016-17 is shown in **Annexure 12**.

	SCHEME	2016 Offtake Quantity in '000 MT	Cost of Fortification per MT (Rs. Crores)
RICE	MDM	1922	86.49
	ICDS	599	26.96
	SABLA	36	1.62
	WELFARE INST	375	16.88
	Sub-Total	2932	**131.94**
WHEAT	MDM	372.56	2.98
	ICDS	794.33	6.35
	SABLA	108.78	0.87
	WELFARE INST	58.28	0.47
	Sub-Total	1333.95	**10.67**

Total Annual Cost in Rs. Crores	**142.61**

Impact on Inflation – A study

The Context

Fortification being one of the most cost effective strategies to improve the nutritional quotient of the population, the government has been contemplating inclusion of fortified foods in the safety net programmes. FSSAI had commissioned the Institute of Economic Growth (IEG) to conduct a study in order to understand the impact of mandatory fortification in wheat flour, edible oil, and double fortified salt on inflation. This report provides the findings of the study conducted by IEG.

Through this study, an estimate of the total impact on inflation, if fortification of salt, wheat flour and edible oil is made mandatory, was calculated. The methodology used to arrive at the results has been explained below.

The Methodology

Using the data on consumption for wheat flour, edible oil, and salt, collected from two rounds of the National Sample Survey (NSS), an estimate of the quantum of each micronutrient required for mandatory fortification of salt (iodine and iron), edible oil (vitamins A and D), and wheat flour (iron, folic acid, vitamin B12) as per the FSSAI standards is calculated.

Further, projection of the rate of annual increase in the demand for each micronutrient in correspondence with the increase in the domestic demand/consumption of salt, edible oil, and wheat flour, is estimated.

The supply and demand mismatch for each micronutrient is assessed using the information on the present levels of domestic installed capacity and prices of various micronutrients/fortificants. An estimated timeline by which the domestic industry would be able to install the requisite capacity for production of the assessed amount of micronutrients/fortificants for the fortification of salt, oil, and packaged wheat flour is also projected.

Finally, as per the main objective of the study, estimation of the impact of inflation of the revised retail prices of mandatorily fortified salt, oil, and wheat flour, with the projected increase in price for the next five years is calculated.

Results

Increase in demand for micronutrients: The main findings suggest that the quantity of food item to be fortified, which varies significantly, determines the total expected demand for each micronutrient. Between 2016 and 2022, total demand for micronutrients for salt is expected to increase by 1.08 per cent annually, total demand for micronutrients used for wheat flour fortification is expected to increase by 1.09 per cent annually, and total demand for edible oil micronutrients is expected to increase by 1.12 per cent annually over the same period.

Increase in retail price of commodities: It is estimated that due to fortification there will be an increase of 0.15 percent in the retail price of edible oil. For wheat flour, when three basic micronutrients (iron, folic acid, and vitamin B12) are used, retail price is expected to increase by 0.29 per cent. Both the commodities will have very minuscule increase in price. For salt, retail price will increase by 9 percent over the current level of price if double fortification of salt is made mandatory. Moreover, due to very low weight of salt in the commodity consumption basket, the impact will be negligible.

The report arrives at the conclusion that there is a marginal increase in retail prices of the selected food items due to fortification; hence there will be no significant impact on inflation. The study calculated less than 0.10 percent impact on inflation because of fortification.

GST Recommendations

Food Fortification has been identified as a cost effective intervention to address micronutrient deficiencies globally. Large scale fortification of key staples – wheat flour, rice, milk, oil, and double fortified salt is gaining momentum in the country after the fortification standards were released by FSSAI, a logo launched, and setup of FFRC.

An essential part of fortification is the micronutrient premix which is blended with the commodity and used to enrich the commodity as per the standards. In this regard, FSSAI has written to the Ministry of Finance requesting a waiver on duties and taxes on fortificants and premixes.

FSSAI has been holding discussions with FBOs on adopting food fortification as an industry norm. Though the cost of fortificants and their premixes is very low, ranging from INR 50 to INR 120per metric ton, these premixes invite an effective tax of 27.7 percent. Moreover, the quantity of staples that are fortified are large, hence, the total outlay will be a barrier to achieve large scale fortification. In addition, the FBOs also need to make capital investment in machinery, testing of supplies for quality control, and staff training to ensure production of fortified foods that are quality assured to national standards. Taxation on micronutrients and premixes has been identified as a barrier by the FBOs, on account of incremental cost for premix required for large scale fortification.

As per the recent classification under GST, premixes have been kept under 18 percent slab. Premixes and fortificants need to be brought to the zero GST slab to further accelerate large scale fortification efforts. A detailed proposal in this regard requesting exemption under GST has been prepared.

Key finding from this analysis suggests that the aggregate impact would be incremental cost of approximately INR 650 crores once all five staples are fortified. This will take a few years to reach, and initially the cost impact would be only a part of this, say 25 percent a year over 4 years, reducing the annual cost burden. While INR 650 crores is not a very large sum for the public exchequer in terms of revenue, the waiver would have a huge positive impact on industry, and would encourage FBOs to take up large scale fortification voluntarily.

It would also make fortified products available at affordable prices to consumers. Tax exemption on micronutrient premixes would motivate the food industry to adopt food fortification as an 'Industry-norm"; maximize production efficiency to absorb the cost of fortification; and neutralise any price increase that the FBOs would otherwise pass on to consumers on account of food fortification. This would also encourage state governments to cost-efficiently mainstream fortified foods into the public funded programmes such as the expanded PDS under National Food Safety Act (NFSA), ICDS and MDM and benefit vulnerable populations.

All measures that can help change the nutrition landscape in the country must be undertaken on priority. Exemption under GST is an important and proactive step towards achieving that result.

8 Monitoring and Evaluation

CHAPTER 8

Monitoring and Evaluation

The main objectives and monitoring and evaluation (M&E) plan for staple food fortification in India have been split along three timeframes - short-term, medium-term and long-term. For each timeframe, FFRC is forging partnerships with different agencies to develop a M&E framework.

The key activities in each timeframe that FFRC and partner organizations will undertake are outlined below:

Short-Term

In the short-term, the objective of project is to ensure availability of supply of fortified staples, both in the open market and through government schemes. Second objective in the short-term is also to conduct regulatory monitoring to ensure compliance with the standards set by FSSAI.

Open Market Activities:

- Organizing industry consultations to nudge food businesses and sensitize them to the need for fortification.
- Prepare technical handbooks on fortification for food businesses.
- Undertake capacity -building and training for food businesses to adopt fortification standards and start supplying in the open market.

Measurement Mechanism:

- Increased availability of fortified staples will be measured through an end of the month report on supply submitted by food businesses to FFRC.

Inclusion in Government Programmes:

- States have been mobilised for adoption of fortified staples in the government programmes through a systematic outreach program.
- Technical support to government agencies who want to start providing fortified staples.
- Assisting state governments develop proposals, tenders, and costing plans for procurement of fortified staples for their programmes.

Measurement Mechanism:

- A robust reporting and monitoring mechanism needs to be developed to track progress in states, in the three government programs. Additionally, food safety officers will be trained on testing methodologies to ensure compliance with standards, both in the open market and through government programs.

Medium-Term

In the medium-term, the objective of the project is to increase consumer awareness around the benefits and availability of fortified foods and also kick start a shift in consumer behaviour toward fortified foods.

Consumer Awareness Activities:

- Building a communication strategy around food fortification with the help of development and industry partners.
- Integrating fortification communication into other nationwide campaigns such as Safe and Nutritious Food etc.

Measurement Mechanism:

- Surveys and focus group discussions with a random sample of consumers, across the country and across demographics.

Long-Term

In the long-term, the objective is to change health outcomes in the country by way of improved numbers on micronutrient malnutrition in the NFHS-5 indicators. A baseline set of indicators on micronutrient malnutrition already exists in the NFHS-4 dataset, which was published in 2015-2016. The primary and long-term objective of "Mission Fortification" is to observe a marked improvement in the NFHS-5 indicators, which will be published in 2020-2021. Additionally, FFRC is forging partnerships with policy research organizations to carry out randomized-controlled trials on the efficacy of fortification on health outcomes.

Health Outcomes Activities:

- Ensuring sustained momentum around fortification over the next few years.
- Doing periodic reports on health outcomes with development partners.

Measurement Mechanism:

- A series of reports, randomized-controlled trials and case studies will be compiled. NFHS-5 dataset will be the primary measurement mechanism.

9 Capacity Building at FSSAI

CHAPTER 9

Capacity Building at FSSAI

9.1 Testing and Test Methods

FSSAI has developed a manual for quantitative analysis of fortificants in foods to be fortified. This includes methods for estimation of vitamin A, D, B12, zinc, iron, folic acid, niacin, thiamine, pyridoxine, and riboflavin. Test methods mentioned in the manual are validated/ standardized by the scientific panel but are still in draft stage. These tests will be finalized once their reproducibility with precision is confirmed. Mother Dairy has worked on the method for estimation of vitamin A in milk with more than 90 percent recovery and reproducibility.

9.2 Training of Regulatory Staff

FFRC has developed a training manual for Food Safety Officers to help them understand food fortification standards and regulation. This manual covers the role of FSOs with respect to fortification which includes checking premix handling and storage conditions, packaging and labelling requirements, licensing and registration for fortified rice kernels, and product sampling techniques. Process and technology involved in food fortification of different commodities is also made clear to the FSOs. This will be useful to create an enabling environment in the food industry in alignment with keeping a check on the level of fortification.

10 Communication Outreach & Joint Marketing Campaign

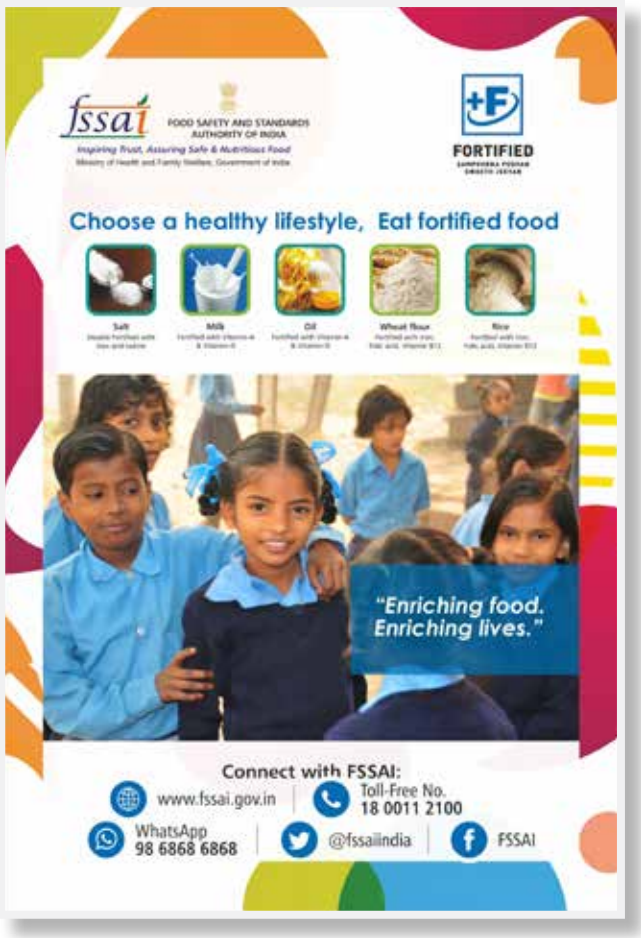
CHAPTER 10

Communication Outreach & Joint Marketing Campaign

Communication Outreach

With supply now available in the market, it is important to reach out to consumers and build awareness on fortification, the +F logo and the health befits of difference vitamins and minerals.


fssai
FOOD SAFETY AND STANDARDS AUTHORITY OF INDIA
Inspiring Trust, Assuring Safe & Nutritious Food
FORTIFIED
I choose a healthy lifestyle,
I eat fortified food
Salt
Milk
Oil
Wheat flour
Rice
"This food provides me vital micronutrients that help to prevent blindness, maternal death, birth defects, miscarriage, and cognitive & developmental delays."
Connect with FSSAI:
www.fssai.gov.in
Toll-Free No. 18 0011 2100
WhatsApp 98 6868 6868
@fssaiindia
FSSAI


fssai
FOOD SAFETY AND STANDARDS AUTHORITY OF INDIA
Inspiring Trust, Assuring Safe & Nutritious Food
FORTIFIED
Choose a healthy lifestyle, Eat fortified food
Salt
Milk
Oil
Wheat flour
Rice
"Enriching food. Enriching lives."
Connect with FSSAI:
www.fssai.gov.in
Toll-Free No. 18 0011 2100
WhatsApp 98 6868 6868
@fssaiindia
FSSAI


Food Fortification Resource Centre
www.ffrc.fssai.gov.in
fssai
FOOD SAFETY AND STANDARDS AUTHORITY OF INDIA
Inspiring Trust, Assuring Safe & Nutritious Food
Safe & Nutritious Food
A Shared Responsibility
www.snfportal.in
Double Fortified with Iron and Iodine
Salt
Fortified with Vitamin-A & Vitamin-D
Milk
Fortified with Iron, Folic acid, Vitamin B12
Wheat flour
FORTIFIED
SAMPOORNA POSHAN SWASTH JEEVAN
Fortified with Vitamin-A & Vitamin-D
Oil
Fortified with Iron, Folic acid, Vitamin B12
Processed food


Food Fortification Resource Centre
fssai
Fortified Food provides vital micronutrients that can prevent Anaemia, Miscarriage, Birth defects and Maternal Death
Eat fortified food, Look for the +F logo on fortified food products

Joint Marketing Campaign

With supply now available in the market, it is important to reach out to consumers and build awareness on fortification, the +F logo and promote the brands that have taken the lead.

FSSAI is working with development partners and corporates to develop and launch a nationwide joint marketing campaign. This campaign will be led by FSSAI, bringing the credibility, authenticity and trust of the government, with financial contributions from the industry and premix suppliers.

The campaign would be implemented in phases, as follows –

Phase 1	Exclusive Government / FSSAI communication. With financial resources pooled from across key producers, and covering high impact media vehicles including social media, short films, print ads and radio spots.
Phase 2	Same communication campaign with space for corporate branding and communication (at company cost).
Phase 3	All communications of brands to carry fortified logo, and communication as per brand guidelines.

The Phase I campaign would be run in two parts –

1) Pehchan i.e. Identification	where the concept of fortification would be introduced and the identity of + F logo would be established and
2) Farz i.e. Responsibility	where all key stakeholders – consumers, shopkeepers, producers, take the responsibility of using only fortified oil for the health of their family / consumers.

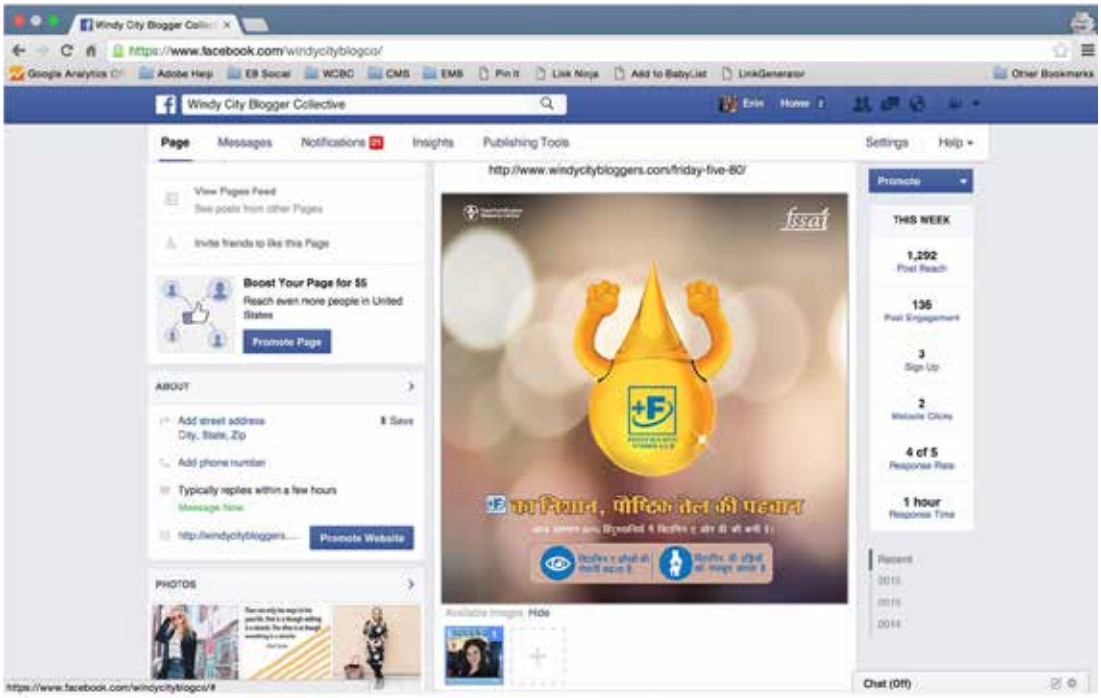
A comprehensive media outreach campaign covering print media, social media, digital media, TV ads, radio spots, outdoor media, cinema and mall radio etc. has been developed for a nationwide campaign.

Innovative ways would be used to reach the last mile consumer in rural areas. PR outreach needs to the incorporated as well as CSO engagement. Doctors and nutritionists also need to be engaged in the awareness outreach and behaviour change communication.

Some indicative creatives are being shared here. These are not final and are for representation purposes only:

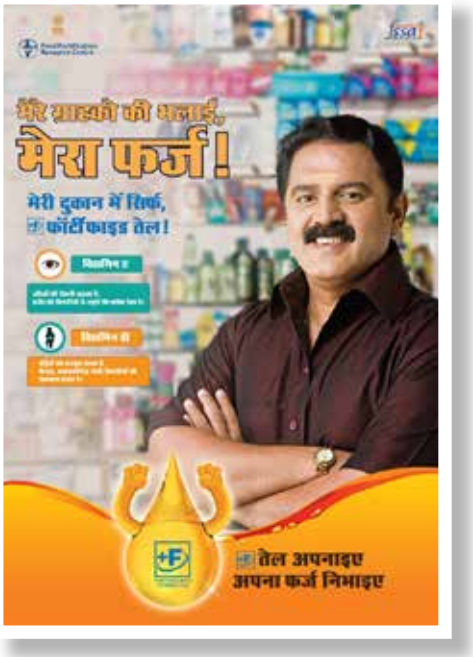
Poster

Social Media:



(Sample creatives)

Billboards / Hoarding:



(Sample creatives)

(Sample creatives)

Annexures

ANNEXURE 1:

Global Evidence: Bibliography

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ANNEXURE 2:

Fortification Standards*

*As Approved by Food Authority

[To be published in the Gazette of India, Extraordinary, Part III, Section 4]

Government of India
Ministry of Health and Family Welfare

Food Safety and Standards Authority of India
Notification
Preamble will be added by Regulations Division.

REGULATIONS

CHAPTER 1: GENERAL

1. Short Title and commencement.

1. These regulations may be called the Food Safety and Standards (Fortification of Foods) Regulations, 20...
2. They shall come into force on the date of their publication in the Official Gazette.

2. Definitions.

1. In these regulations, unless the context otherwise requires: -
   a. "Act" means the Food Safety and Standards Act, 2006 (34 of 2006);
   b. "atta" means atta as defined in Regulation 2.4.1.1 of the Food Safety and standards (Food Products Standards and Food Additives) Regulations, 2011;
   c. "fortification" means deliberately increasing the content of essential micronutrients in a food so as to improve the nutritional quality of food and to provide public health benefit with minimal risk to health;
   d. "fortificant" means a substance added to food to provide micronutrients but does not include nutraceuticals or foods for Special Dietary Uses;
   e. "fortified food" means food that has undergone the process of fortification as per the provisions of these Regulations;
   f. "Government-funded programme" means any programme, policy, scheme or other provision under which food is sold, distributed or otherwise made available to the public by the Central or State Governments;

g. "maida" means maida as defined in Regulation 2.4.2.1 of the Food Safety and Standards (Food Products Standards and Food Additives) Regulations, 2011;
h. "micronutrients" means essential dietary nutrients including vitamins, minerals or trace elements that are required in very small quantities and are vital to development, disease prevention and wellbeing of human beings;
i. "milk" includes milk and its variants as listed under Regulation 1.2. of the Food Safety and Standards (Food Product Standards and Food Additives) Regulations, 2011;
j. "oils" includes edible oils, vegetable oils, refined edible hydrogenated oils and their variants as listed under Regulation 2.2 of the Food Safety and Standards (Food Product Standards and Food Additives) Regulations, 2011;
k. "quality assurance" means the systematic measures applied and steps taken by manufacturers and packers of fortified food throughout the manufacturing or packing process to ensure that the finished food complies with the provisions of the Act and regulations and standards specified thereunder;
l. "rice" means rice as defined in Regulation 2.4.6.5 of the Food Safety and Standards (Food Products Standards and Food Additives) Regulations, 2011;
m. "salt" means edible common salt as defined in Regulation 2.9.30 of the Food Safety and Standards (Food Product Standards and Food Additives) Regulations, 2011;
n. "staple foods" means articles of food intended for mass consumption on a daily basis and include rice, wheat, wheat flour, atta, maida, oil, salt, milk, and such other articles of food as may be designated staple foods under these regulations;
o. "wheat" means wheat as defined in Regulation 2.4.6.2 of the Food Safety and Standards (Food Products Standards and Food Additives) Regulations, 2011;
2. All other words and expressions used, not defined in these regulations shall have the meanings assigned to them in the Act, rules or regulations thereunder.

Chapter 2: Standards on Fortification

3. General principles.

1. Micronutrients may be appropriately added to foods for the purpose of contributing to any of the following as mentioned under Schedule-I:
   b. Preventing or reducing the risk of, or correcting, a demonstrated deficiency of one or more micronutrients in the population or specific population group;
   c. reducing the risk of, or correcting, inadequate nutritional status of one or more micronutrients in the population or specific population group;
   d. meeting requirements or recommended intake of one or more micronutrients;
   e. maintaining or improving health;
   f. maintaining or improving the nutritional quality of foods.
2. When fortification of a food is made mandatory, it shall be based on severity and extent of public health need as demonstrated by generally accepted scientific evidence.
3. The Food Authority may from time to time, specify mandatory fortification of any food article specified under these regulations on its own in consultation with the stakeholders or on the directions of the Government of India.

4. Wherever "Iron (As Fe)" is used as a source of nutrient, heme iron shall not be used in any form in any article of food.

4. Compliance with Standards on Micronutrient Content in Fortified Food.-

1. Any manufacturer who fortifies any food shall ensure that the level of micronutrient in such fortified food does not fall below the minimum level specified in the schedule- I.

Chapter 3: General Obligations

5. Quality Assurance.

1. Every manufacturer and packer of fortified food shall make an undertaking on quality assurance and submit evidence of steps taken in this regard to the Food Authority or such other authority that the Food Authority may designate.
2. The undertaking shall be done twice a year on quality assurance that shall include, the following, namely:-
   a. certification by a food laboratory notified by the Food Safety and Standards Authority of India that the fortified food is in compliance with the provisions of the Act and regulations and standards specified therein;
   b. up-to-date record keeping and continuous inventory of fortificants used in the manufacturing or packing process, including the source from where the fortificant was procured;
   c. appropriate monitoring procedures at different stages of manufacturing or packing process;
   d. random testing of fortificants and fortified food;
   e. regular audit of technical equipment and processes; and
   f. such good manufacturing practices, as may be specified by the Food Authority from time to time.
   g. Provisions for the reference of the purity criteria of Micronutrients, generally accepted by pharmacopoeias, namely, Indian Pharmacopoeia, British Pharmacopoeia, Food Chemical Codex, Joint Food and Agriculture Organization or World Health Organization Expert Committee on Food Additives or CODEX Alimentarius may be adopted by food Business operators.

6. Compliance with the generally applicable provisions of the Act, Regulations and Standards.

All fortified food, whether voluntarily fortified or required to undergo mandatory fortification shall be manufactured, packed, labeled, handled, distributed and sold, whether for profit or under a Government-funded programme, only in compliance with the standards specified under the provisions of the Act and regulations made thereunder.

7. Packaging and Labeling Requirements.

1. All fortified food shall be packaged in a manner that takes into consideration the nature of the fortificant added and its effect on the shelf life of such food.

2. Every package of fortified food shall carry the words "fortified with ..... (name of the fortificant)" and the logo, as specified in Schedule-II of these Regulation, on the label. It may also carry a tag line "Sampoorna Poshan Swasth Jeevan" All other provisions under the Food Safety and Standards (Packaging and Labeling) Regulations, 2011, shall also apply to the fortified foods.
3. Every package of food, fortified with Iron shall carry a statement. *"People with Thalassemia may take under medical supervision".*
4. All manufacturers and packers of fortified food complying with the provisions of the Act and rules or regulations made thereunder on fortified food shall be permitted to make a nutrition claim in relation to an article of fortified food under regulation 2.2.2(3) of the Food Safety and Standards (Packaging and Labeling) Regulations, 2011.

8. Promotion of Fortified Food.

1. With a view to promote wholesome food in the country, the Food Authority shall take steps to encourage the production, manufacture, distribution, sale and consumption of fortified food including fortification through conventional breeding/ hybridization, in cooperation with concerned government departments
2. Without prejudice to the generality of sub-regulation (1), the Food Authority shall endeavor to:
   a. advise and promote the use of fortified food in Government-funded programmes on distribution of food;
   b. organise public awareness, education and advocacy campaigns on nutrition and fortified food;
   c. conduct technical assistance programmes and provide technical expertise to small manufacturers to enable them to undertake fortification;
   d. equip laboratories and research institutions notified under the Act to conduct the nutrient analysis of fortified food; and
   e. identify and recommend to the Central and State Governments, financial incentives, subsidies and loans to be provided to manufacturers and packers to encourage them to undertake fortification.

9. Consolidation of regulations and standards on fortified food.

The provisions of these regulations shall supersede standards on fortification of food set out in any regulations, orders, or guidelines issued under the Act thereunder save as regards regulations on nutraceuticals and foods for Special Dietary Uses.

10. Provisions of the Infant Milk Substitutes, Feeding Bottles and Infant Foods (Regulation of Production, Supply and Distribution) Act, 1992 to prevail.

Nothing in these regulations shall affect the provisions of the Infant Milk Substitutes, Feeding Bottles and Infant Foods (Regulation of Production, Supply and Distribution) Act, 1992 (41 of 1992) or any rules, regulations or orders framed thereunder.

SCHEDULE-I

STANDARDS FOR FORTIFICATION OF FOODS

(See sub-regulation (1) of Regulation 4)

1 1)Iodized salt (when fortified with Iodine)

2) Iron fortified iodized Salt (Double Fortified Salt) when fortified with Iron and Iodine Salt shall be fortified with Iodine[1] and may also be fortified with iron in combination[2] with iodine, at the level given in the table below:

S.No.	Component	Level of nutrients	Source of Nutrients
1.	**Iodine content**		
	(a) Manufacture level (b) Distribution channel including retail level	Not less than 30 parts per million on dry weight basis Not less than 15 part per million on dry weight basis.	Potassium Iodate
2.	Iron content (as Fe)	850-1100 parts per million	Ferrous sulphate or Ferrous Fumarate

2. Fortified Oil: Vegetable Oil shall be fortified with the following micronutrients, at the level given in the table below:

S. No.	Nutrient	Level of nutrient	Source of nutrient
1.	Vitamin A	6 µg RE - 9.9 µg RE per gm of oil	Retinyl acetate or Retinyl palmitate
2.	Vitamin D	0.11 µg– 0.16 µg per gm of oil.	*Cholecalciferol or *Ergocalciferol (*Only from Plant Source)

Note: Vitamin A (retinol): 1 IU= 0.3 µg RE (Retinol Equivalent); Vitamin D (Cholecalciferol or Ergocalciferol): 1 IU= 0.025 µg

1) The total matter insoluble in water where an anticaking agent has been added shall not exceed 2.2 per cent. and Sodium Chloride content on dry basis shall not be less than 97.0 per cent. by weight. As mentioned under sub-regulation 2.9.30.2 of the Food Safety and Standards (Food Product Standards and Food Additives) Regulations, 2011.
2) Double fortified salt may contain Hydroxypropyl Methyl Cellulose, Titanium dioxide full Hydrogenated Soybean oil and Sodium Hexametaphosphate (all food grade) and anticaking agent not more than 2.0 per cent. On dry weight basis and the water insoluble matter wherein anticaking agent is used shall not exceed 2.2 per cent.

3. Fortified Milk

Toned, double toned, skimmed milk or standardized milk shall be fortified with the following micronutrients, at the level given in the table below:

S. No.	Nutrients	Level of nutrient per litre of toned/ double toned/skimmed milk/ Standardized Milk	Source of nutrient
1.	Vitamin A	270 µg RE - 450 µg RE	Retinyl acetate or Retinyl palmitate
2.	Vitamin D	5 µg -7.5 µg	*Cholecalciferol or *Ergocalciferol (*Only from Plant source)

Note: Vitamin A (retinol): 1 IU= 0.3 µg RE (Retinol Equivalent); Vitamin D (Cholecalciferol or Ergocalciferol): 1 IU= 0.025 µg

4. Fortified Vanaspati

Vanaspati shall be fortified with the following micronutrient at the level given in the table below:

S.No.	Nutrient	Level of nutrient
1.	Vitamin A (Source: Retinyl acetate or Retinyl-Palmitate)	Not less than 7.5 µg RE per gram at the time of packing. Should test positive when tested with Antimony Trichloride (Carr-Price Reagent) as per IS:5886-1970
2	Vitamin D *Cholecalciferol or*Ergocalciferol (*Only from Plant source)	0.11 µg -0.16 µg per gm of vanaspati

Note: Vitamin A (retinol): 1 IU= 0.3 µg RE (Retinol Equivalent); Vitamin D (Cholecalciferol or Ergocalciferol): 1 IU= 0.025 µg

5. Fortified Atta

Atta, when fortified, shall contain added iron, folic acid and Vitamin B-12 at the level given in the table below:

S.No.	Nutrient	Level of Fortification (per Kg)
1.	Iron- Ferrous citrate or Ferrous lactate or Ferrous sulphate or Ferric pyrophosphate or electrolytic iron or Ferrous fumarate or Ferrous BisGlycinate; Sodium Iron (III) Ethylene diamine tetra Acetate Trihydrate (Sodium feredetate-Na Fe EDTA);	28 mg- 42.5 mg * 14 mg- 21.25 mg
2.	Folic acid	75 µg- 125 µg
3.	Vitamin B12-cyanocobalamine or hydroxycobalamine;	0.75 µg- 1.25 µg

*Note: * added at a higher level to account for less bioavailability*

In addition, atta may also be fortified with following micronutrients, singly or in combination, at the level in the table below:

S.No.	Nutrient	Level of Fortification (per Kg)
1.	Zinc-Zinc Sulphate	10 mg- 15 mg
2.	Vitamin A-Retinyl acetate or RetinylPalmitate,;	500 µg RE- 750 µg RE
3.	Thiamine (Vitamin B1)- Thiamine hydrochloride or Thiamine mononitrate;	1 mg- 1.5 mg
4.	Riboflavin (Vitamin B2)- Riboflavin or Riboflavin 5'-phosphate sodium ;	1.25 mg- 1.75 mg
5.	Niacin(Vitamin B3) -Nicotinamide or Nicotinic acid;	12.5 mg- 20 mg
6.	Pyridoxine(Vitamin B6)-Pyridoxine hydrochloride;	1.5 mg- 2.5 mg

6. Fortified Maida

Maida, when fortified, shall contain added iron, folic acid and Vitamin B-12 at the level given in the table below:

S.No.	Nutrient	Level of Fortification (per Kg)
1.	Iron- (a)Ferrous citrate or Ferrous lactate or Ferrous sulphate or Ferric pyrophosphate or electrolytic iron or Ferrous fumarate or Ferrous BisGlycinate; (b) Sodium Iron (III) Ethylene diamine tetra Acetate Trihydrate (Sodium feredetate -Na Fe EDTA);	28 mg- 42.5 mg * 14 mg- 21.25 mg
2.	Folic acid	75 µg- 125 µg
3.	Vitamin B12-cyanocobalamine or hydroxycobalamine;	0.75 µg- 1.25 µg

*Note: *added at a higher level to account for less bioavailability*

In addition, maida may also be fortified with following micronutrients, singly or in combination, at the level given in the table below:

S.No.	Nutrient	Level of Fortification (per Kg)
1.	Zinc-Zinc Sulphate	10 mg- 15 mg
2.	Vitamin A-Retinyl acetate or RetinylPalmitate,;	500 µg RE- 750 µg RE
3.	Thiamine (Vitamin B1)- Thiamine hydrochloride or Thiamine mononitrate;	1 mg- 1.5 mg
4.	Riboflavin (Vitamin B2)- Riboflavin or Riboflavin 5'-phosphate sodium ;	1.25 mg- 1.75 mg
5.	Niacin(Vitamin B3) -Nicotinamide or Nicotinic acid;	12.5 mg- 20 mg
6.	Pyridoxine(Vitamin B6)-Pyridoxine hydrochloride;	1.5 mg- 2.5 mg

7. Fortified Raw Rice

Rice, when fortified, shall contain added iron, folic acid and Vitamin B-12 at the level given in the table below:

S.No.	Nutrient	Level of Fortification per Kg
1.	Iron- (a)Ferric pyrophosphate (b) Sodium Iron (III) Ethylene diamine tetra Acetate Trihydrate (Sodium feredetate -Na Fe EDTA);	28 mg- 42.5 mg * 14 mg- 21.25 mg
2.	Folic acid-Folic acid;	75 µg- 125 µg
3.	Vitamin B12- cyanocobalamine or hydroxycobalamine;	0.75 µg- 1.25 µg

*Note: *added at a higher level to account for less bioavailability*

In addition, rice may also be fortified with following micronutrients, singly or in combination, at the level given in the table below:

S.No.	Nutrient	Level of Fortification (per Kg)
1.	Zinc-Zinc Oxide	10 mg- 15 mg
2.	Vitamin A- RetinylPalmitate;	500 µg RE- 750 µg RE
3.	Thiamine (Vitamin B1)- Thiamine hydrochloride or Thiamine mononitrate;	1 mg- 1.5 mg
4.	Riboflavin (Vitamin B2)- Riboflavin or Riboflavin 5'-phosphate sodium;	1.25 mg- 1.75 mg
5.	Niacin(Vitamin B3)-Nicotinamide or Nicotinic acid;	12.5 mg- 20 mg
6.	Pyridoxine(Vitamin B6)-Pyridoxine hydrochloride;	1.5 mg- 2.5 mg

SCHEDULE-II

File No. Stds/Logo-MD/FF/FSSAI-2016

Food Safety and Standards Authority of India

(A Statutory Authority established under the Food Safety & Standards Act, 2006)

(Standards Division)

FDA Bhawan, Kotla Road, New Delhi-110 002.

The August, 2017

Subject: Direction under Section 16 (5) of Food Safety and Standards Act, 2006 regarding operationalisation of logo for fortified food under Food Safety and Standards (Fortification of Foods) Regulations, 2017.

1. Reference is drawn to the direction issued vide Order No. 11/03/Reg/Fortification/2014 (pt. I) dated 19th May, 2017 regarding operationalisation of standards for fortification of food.
2. Several representations have been received regarding use of fortification logo as specified in Schedule-II of Food Safety and Standards (Fortification of Foods) Regulations, 2017 or as given on ffrc.fssai.gov.in.
3. It is hereby clarified that the +F logo shall be displayed on the Fortified Food Labels as given in the Schedule-II of Food Safety and Standards (Fortification of Foods) Regulations, 2017, together with the statement "**Fortified with……..** (name of the fortificant)".
4. The statement **"SAMPOORNA POSHAN SWASTHA JEEVAN"** is optional and may also be given under the logo, as indicated below:

Fortified with.....

Mandatory

SAMPOORNA POSHAN
SWASTHA JEEVAN

Optional

5. This issues with the approval of the Competent Authority in exercise of the power vested under section 16(5) of the Food Safety and Standards Act, 2006.

(S.K Yadav)
Director (Regulatory Compliance)

To

1. All Food Safety Commissioner.
2. All Authorised Officer, FSSAI.
3. All Central Designated Offices of FSSAI.

Copy for information to:

1. PPS to Chairperson, FSSAI
2. PS to CEO, FSSAI
3. All Directors, FSSAI

ANNEXURE 3:

Scientific Panel

File No. 1-34/SC/SP/2016-FSSAI-AC

Food Safety and Standards Authority of India

(A Statutory Authority under the Ministry of Health & Family Welfare, Govt. of India)

(Standards Division)

FDA Bhawan, Kotla Road, New Delhi – 110002

Dated, the 9th February, 2017

OFFICE MEMORANDUM

Subject: Constitution of a new Scientific Panel on Fortified and Enriched Food - reg.

1. In exercise of the powers vested in it under Section 13 of the Food Safety and Standards Act, 2006, the Food Authority, during its 22nd Authority meeting held on 20th December, 2016 has approved the establishment of a new Scientific Panel on Fortified and Enriched Food. The term of this Scientific Panel will be for a period of three years from 3rd February, 2017 to 2nd February, 2020 in terms of the provisions contained in Section 15 of the FSS Act, 2006. The scope and composition of Scientific Panel is at **Annexure 1** and **Annexure 2** respectively.

2. The Scientific Panel shall carry out their work in accordance with the provisions of the "Food Safety and Standards Authority of India (Transaction of Business and Procedures for the Scientific Committee and Scientific Panels) Regulations, 2016".

3. The Scientific Panel constituted under this memorandum shall, in their first meeting, elect one of their members as its Chair. The Chair so elected of the Panel shall also be a member of the Scientific Committee.

4. This issues with the approval of the Competent Authority, FSSAI.

(Kumar Anil)
Advisor Standards
Phone: 011-23217833
advisor@fssai.gov.in

To

All the concerned members

Copy to:

1. Chairperson Scientific Panel for Milk & Milk Products.
2. Chairperson Scientific Panel for Meat & Meat Products, including poultry.
3. Chairperson Scientific Panel for Cereals, Pulses & Legume and their products (including Bakery).
4. Chairperson Scientific Panel for Fruits & Vegetables and their products (including dried fruits and nuts salt, spices and condiments).
5. Chairperson Scientific Panel for Oils & Fats.
6. Chairperson Scientific Panel for Sweets, Confectionery, Sweeteners, Sugar & Honey.
7. Chairperson Scientific Panel for Water (including flavoured water) & Beverages (alcoholic non-alcoholic).

Copy for information:

1. O/o Chairperson, FSSAI
2. O/o CEO, FSSAI
3. CMSO (HR/TCB/PC/Library), FSSAI
4. Advisor (Regulation/Codex), FSSAI
5. Director (RCD), FSSAI
6. Director (Import), FSSAI
7. Director (Risk Assessment and R & D), FSSAI
8. Director (FSMS), FSSAI
9. Head (GA/Legal/Parliament/Rajbhasha/RTI) GA/Legal), FSSAI
10. Head (QA/Sur), FSSAI
11. CITO, FSSAI: For publication on the website
12. All concerned officials

Annexure 1

The **Scope of Scientific Panel on Fortified and Enriched Food** is as follows:

(a) Identify critical nutritional gaps in Indian diet in general population as well as in specific target groups based on diet surveys and credible scientific evidence.

(b) Define strategies to address nutritional needs of the general population and vulnerable groups.

(c) Consider suitability of different food vehicles and related technological issues for nutrient fortification.

(d) Prescribe safe fortification levels in accordance with the Recommended Daily Allowances (RDAs) and Tolerable Upper Limits (TULs) of nutrients.

(e) Evaluate fortification proposals from industry using modern risk assessment methods for population in general and vulnerable groups in particular.

(f) Review and amend Food Safety and Standards (Fortification of foods) Regulations for fortification and enrichment of different foods from time to time.

(g) Prescribe standard sampling and test methods for effective monitoring, surveillance and enforcement of the fortification regulations.

Annexure 2

Composition of Scientific Panel on Fortified and Enriched Food

1. Dr. Ambrish Mithal MD, DM, Chairman, Division of Endocrinology and Diabetes, Medanta, the Medicity, Sector 38, Gurgaon- 122001.
2. Dr. Abhay M Harsulkar, Professor, Bharati Vidyapeeth Deemed University, Poona College of, Pharmacy, Pune, 604, A/3, Aaditya Shagun, NDA Road, Bavdhan, Pune- 411021.
3. Dr. CS Pandav, President, Indian Coalition for Control of Iodine Deficiency Disorders (ICCIDD), C II - 30, AIIMS, Ansari Nagar East, New Delhi – 110029.
4. Dr. Sumit Arora, Principal Scientist, Dairy Chemistry Division, National Dairy Research Institute, Karnal -132001.
5. Dr Yogeshwer Shukla, Area Coordinator & Chief Scientist (Scientist G), CSIR-Indian Institute Of Toxicology Research, Vishvigyan Bhawan, 31 Mahatma Gandhi Marg, Lucknow- 226001.
6. Maj. Gen. (Dr) RK Marwaha (Retd), Scientific Advisor and Senior Consultant Endocrinology, International Life Sciencies Institute (India) & Advisor Project, Dept. of Endocrinology, AIIMS, New Delhi -110029.
7. Dr. Sirimavo Hari Kumaran Nair, Associate Professor, Baroda University
8. Dr. Prema Ramachandran, Director, Nutrition foundation of India, C13 Qutab Institutional Area, New Delhi- 110016.
9. Dr. Anura Vishwanath Kurpad, Professor, Dept. of Physiology, St John's Medical College, Sarjapur Road, Bangaluru- 560034.
10. Dr. K. Madhavan Nair, Scientist 'E', Micronutrient Research Group Department of Biophysics, National Institute of Nutrition (ICMR), Jamai-Osmania PO, Tarnaka, Hyderabad- 500007.
11. Prof. H.P.S. Sachdev, Sr. Consultant, Paediatrics and Clinical Epidemiology, Sita Ram Bharatia Institute of Science and Research, E-6/12 Vasant Vihar, New Delhi -110057.

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ANNEXURE 4:

Fortification Toolkit

The following resources are available on the FFRC Website at http://ffrc.fssai.gov.in/

1. Standards
2. Logo Specifications
3. Registration for use of +F Logo
4. Technical Handbooks and Frequently Asked Questions, per staple
5. Standardised Tender Documents
6. List of Premix Suppliers
7. List of Equipment Manufacturers
8. List of NABL accredited labs for fortification testing

ANNEXURE 5:

Current Availability of Fortified Staples &Fortification Status across State

Status as of October 2017

Availability of Fortified Staples in the Open Market

Fortified Staple	Company Name	Brand Name	Availability
Double Fortified Salt	Ankur ChemFood Products	Ankur's Salt Plus	Gujarat
	Tamil Nadu Salt Corporation	Amma Salt	TN and Southern States only
	Shreeram Chemfood Pvt Ltd.	Shree	North India
	Tata Chemicals	Tata Plus	Pan India
Edible Oil	ADM	Parampara,HealthFit	Maharashtra, Karnataka, Rajasthan, U.P
	AAK Kamani	Jawan, Komal, Klassic	Pan India
	Adani Wilmar	Fortune, King, Aadhar, Bullet, Raag Gold, Alpha	PAN India
	Bunge India Pvt Ltd.	Dalda, Gagan, Ginni, Chambal, Lotus, Lily, Rica Primor, Coco Rica, Golden Fry	Pan India
	Cargill India Pvt Ltd	Sweekar, Nature Fresh, Gemini, Shubh	PAN India
	Marico Ltd	Saffola Active, Saffola Gold, Saffola Total, Saffola Tasty	Pan India
	Mother Dairy	Dhara, Lokdhara	Pan India
	Kaleesuwari Refinery Private Limited	Gold Winner	Tamilnadu, Kerala, Karnataka, Andhra Pradesh, Maharashtra, Odisha
	B. L. Agro Oils Ltd.	Bail Kolhu, Krishan, K.Jyoti, Khiladi, Garib Rath, Vatika, Nourish, Mohandhara	North East, U.P (East), Uttrakhand, Delhi- NCR
Milk	Mother Dairy	Mother Dairy, Dailycious (brand name in Kolkata)	Pan India
	Punjab State Cooperative Milk Producers' Federation Ltd	Verka	Punjab
	Jharkhand Milk Federation	Medha	Jharkhand
	West Assam Milk Producer's Cooperative Union Ltd	Purabi	Assam
	Rajasthan Cooperative Dairy Federation Ltd.	Saras	Rajasthan
	Private Dairies		
	Creamline Dairy Products Limited	Cream Line Dairy	Tamil Nadu

Fortified Staple	Company Name	Brand Name	Availability
Wheat Flour	Harmony Foods Pvt. Ltd.	Harmony Chakki Fresh Atta	Andhra Pradesh and Tamil Nadu
	Kumar Chakki	Kumar Chakki Atta	Haryana
	NavBharat Flour Mills	Vitamin Plus	Jammu and Kashmir
	General Mills Pvt Ltd.	Pilsburry	Gujarat
	Jagganath Rice Mill	Risshta Atta	Odisha
	Mishkat Aggro Industries	Energetic	Gujarat, MP and Maha-rashtra
	ITC	Aashirwad Atta	Delhi
Rice	DCP Foods Pvt Ltd	Asbah	PAN India
(Soon in Market)	LT Foods Pvt Ltd	Daawat Rozana-	PAN India

Inclusion of Fortified Staples in State Government Programmes

Fortified Staples	MDM		ICDS		PDS	
	States & No of District(s)	Progress	States & No of District(s)	Progress	States & No of District(s)	Progress
Edible Oil	Haryana (1)	Pipeline	Haryana (1)	Pipeline	Gujarat (All)	✓
	Rajasthan (All)	✓	Rajasthan (All)	✓	Himachal Pradesh (All)	✓
					Rajasthan (All)	✓
					Haryana (1)	Pipeline
Double Fortified Salt (DFS)	Tamil Nadu (All)	✓	Haryana (All)	✓	Madhya Pradesh (89 Blocks)	Pipeline
	Tripura (All)	✓	Tripura (All)	✓	Tami Nadu (All)	✓
					Uttar Pradesh (10)	Pipeline
Wheat Flour	Haryana (1)	Pipeline	Haryana (1)	Pipeline	Andaman & Nicobar Islands (All)	✓
	Maharashtra (3)	Pipeline			Haryana (1)	Pipeline
					Kerala (All)	Pipeline
					Maharashtra (1)	Pipeline
					West Bengal (All except 1)	Pipeline
Rice	Haryana (1)	Pipeline	Tamil Nadu (10)	Pipeline	Haryana (1)	Pipeline
	Chandigarh	Pipeline	Chandigarh	Pipeline	Odisha (1)	Pipeline
	Karnataka (3) + (4)	✓ + Pipeline	Dadra Nagar Haveli	Pipeline	Dadra Nagar Haveli	Pipeline
	Odisha (2) + (14)	✓ + Pipeline	Haryana (1)	Pipeline		
	Tamil Nadu (10)	Pipeline				
	Dadra Nagar Haveli	Pipeline				
	Uttar Pradesh (1)	Pipeline				

ANNEXURE 6:

Key Government Directives

Copies of the following directives are available on the FFRC Website at http://ffrc.fssai.gov.in/ -

- Order issued by Ministry of Human Resource Development (D.O. No. 14-10/2016/ MDM 1-2 (EE.5) directing states for mandatory use of fortified wheat flour, fortified edible oil, and double fortified salt under MDM, dated August 2nd , 2017.
- Order issued by Ministry of Women & Child Development (D.O. No. 25/16/2015- Nutrition Desk) directing states for mandatory fortified wheat flour, fortified edible oil, and double fortified salt under ICDS, dated July 10th, 2017.
- Circular issued by Ministry of Consumer Affairs, Food & Public Distribution (Circular No. 13-4/2016-bp-II) directing states to only use fortified atta for distribution under PDS, dated December 22nd, 2016.
- Order issued by Ministry of Human Resource Development (DO. No. 5-5/2011-MDM-1-1 (EE.5)) directing States to only use double fortified salt in the preparation of midday meals, dated July 1st, 2011.
- Order issued by Ministry of Women and Child Development (DO. No. 5-4/ 2011 ND/Tech) directing states for mandatory use of double fortified salt in ICDS, dated June 21st, 2011.

अनिल स्वरूप
सचिव
Anil Swarup
Secretary
Tel. : 011-23382587, 23381104
Fax : 011-23387859
E-mail : secy.sel@nic.in

सत्यमेव जयते

D.O.No. 14-10/2016 MDM 1-2 (EE.5)

भारत सरकार
Government of India
मानव संसाधन विकास मंत्रालय
Ministry of Human Resource Development
स्कूल शिक्षा और साक्षरता विभाग
Department of School Education & Literacy
124 'सी' विंग, शास्त्री भवन, नई दिल्ली–110 001
124 'C' Wing, Shastri Bhawan, New Delhi-110 001

2nd August, 2017

As you are aware deficiency of micronutrients affects the health and development of children. The main contributor to health problems is iron deficiency which can reduce children's cognitive ability. Children in India are found to be deficient in Iron as well as Iodine which may cause anaemia and goitre. A child suffering from micronutrient deficiencies finds it difficult to concentrate and work on a sustainable basis.

2. The problem of anaemia can be addressed by promoting consumption of iron rich foods and iron supplements. One of the easiest and cost effective method of increasing iron intake is by way of fortification of salt with iron and iodine. Ministry of Women and Child Development, Ministry of Consumer Affairs, Food and public Distribution and Ministry of Health and Family Welfare have already taken a joint initiative to address the issue by fortification of food items. Following this, the standards of food fortification namely "Food Safety and Standards (Fortification of foods) Regulation 2016" were operationalized by Food Safety & Standards Authority of India (FSSAI). After consulting various stakeholders, in-depth examination was done and it was decided by Govt of India that initially three food articles i.e. Double fortified salt (Iron and Iodine), wheat flour (Iron, Folic acid and Vitamin B-12) and edible oil (Vitamin-A&D) should be considered for mandatory fortification through Mid-Day Meal Scheme along with ICDS and PDS.

3. In the aforementioned context, it is reiterated that MDM Guidelines, 2006 and Food Safety Guidelines for school level kitchens under MDM in 2015 provide that only DFS should be used for cooking mid-day meal.

4 You are, therefore, advised to take suitable steps to ensure mandatory fortification of the aforesaid food articles used in Mid-Day Meal Scheme with immediate effect. In addition you may encourage the use of green leafy vegetables like Spinach, drumsticks, and other locally available and culturally acceptable iron-rich vegetables in your respective State/UTs under MDMS.

5. I shall appreciate if you could kindly provide information on the current position as well as the action taken to promote the mandatory use of DFS, fortified wheat flour if used in Mid-Day Meal and fortified edible oil.

Yours sincerely,
Sd/-
(Anil Swarup)

To

Chief Secretaries of all States/UTs

Copy for information to:

1. Shri Nripendra Mishra, Principal Secretary to the Prime Minister, South Block, New Delhi.
2. Shri Avinash K Srivastava, Secretary, Department of Consumer Affairs, Ministry of Consumer Affairs, Food & Public Distribution, Krishi Bhawan, ND
3. Smt. Preeti Sudan, Secretary, Department of Food and Public Distribution, Ministry of Consumer Affairs, Food & Public Distribution, Krishi Bhawan, ND
4. Shri C.K. Mishra, Secretary, Department of Health & Family Welfare, Ministry of Health and Family Welfare, Nirman Bhawan, ND
5. Shri Rakesh Srivastava, Secretary, Ministry of Women & Child Development, Shastri Bhawan, New Delhi.
6. Shri Ashish Bahuguna, Chairperson, Food Safety and Standards Authority of India, FDA Bhawan, Kotla Road, ND-02

Anil Swarup
(Anil Swarup)

केश श्रीवास्तव
सचिव
esh Srivastava
Secretary

6287/Staff
14.7.17
2453/CE
14.7.17

सत्यमेव जयते

भारत सरकार
महिला एवं बाल विकास मंत्रालय
शास्त्री भवन, नई दिल्ली - 110001

Government of India
Ministry of Women & Child Development
Shastri Bhawan, New Delhi-110001
Website : http://www.wcd.nic.in

ICP/2019
7.17

D.O. No. 25/16/2015-Nutrition Desk

10th July, 2017

Dear Chief Secretary,

As you are aware, improving the nutritional status of the population is imperative for National development. Under-nutrition in young children continues to be a major public health problem in India. The latest NFHS-4 survey has not shown an encouraging improvement in the nutritional status, especially among women and children. While the level of underweight has decreased by 6.8% and stunting by 9.6% and anaemia by 11%, the level of wasting has increased from 19.8% to 21% as compared to NFHS-3 figures.

2. Further, the situation is compounded by the prevalence of micronutrient deficiencies in the country. According to National Survey data, about 70% preschool children suffer from iron deficiency anaemia and 57% preschool children have sub-clinical Vitamin A deficiency. Iodine deficiency is endemic in 85 percent of districts. Moreover, Neural Tube Defects (NTDs) are the most common congenital malformation in the Indian context with an incidence that varies between 0.5-8/1000 births. It is estimated that 50-70% of these birth defects are preventable.

3. Considering this situation, a joint initiative was taken by the Ministry of Women and Child Development, Ministry of Consumer Affairs, Food and Public Distribution and Ministry of Health and Family welfare to address the issue by fortification of food items. Following this, the standards for fortification of foods namely "Food Safety and Standards (Fortification of Foods) Regulations, 2016 were operationalized by FSSAI (copy enclosed).

4. After Multi-Stakeholder Consultations, in-depth examination and detailed deliberations, it was decided that initially three food items, viz., Double Fortified Salt (Iodine and Iron), Wheat Flour (Iron, Folic acid & Vitamin-B12) and Edible Oil (Vitamin-A and D) should be considered for mandatory fortification through the public funded programmes, i.e., ICDS, MDM and PDS. Further, it has also been decided that for mandatory fortification of edible oil, Vitamin-D2 should be proposed since it is sourced from plants.

Shastri Bhawan, Dr. Rajender Prasad Road, Ne
Tel. : 011-23383586 Fax : 011-23381495 E-mail :

5. In view of the above, the States/UTs are advised to ensure mandatory fortification of the relevant food articles used in the administration of Supplementary Nutrition Programme of the ICDS Scheme with immediate effect.

6. States/UTs are advised to draw up a detailed action plan for implementation of the decision or mandatory fortification of above food articles and ensure to send detailed action taken reports on the same to the Ministry from time to time.

With regards,

Yours sincerely,

Sd/-

(Rakesh Srivastava)

Chief Secretaries of all States / UTs.

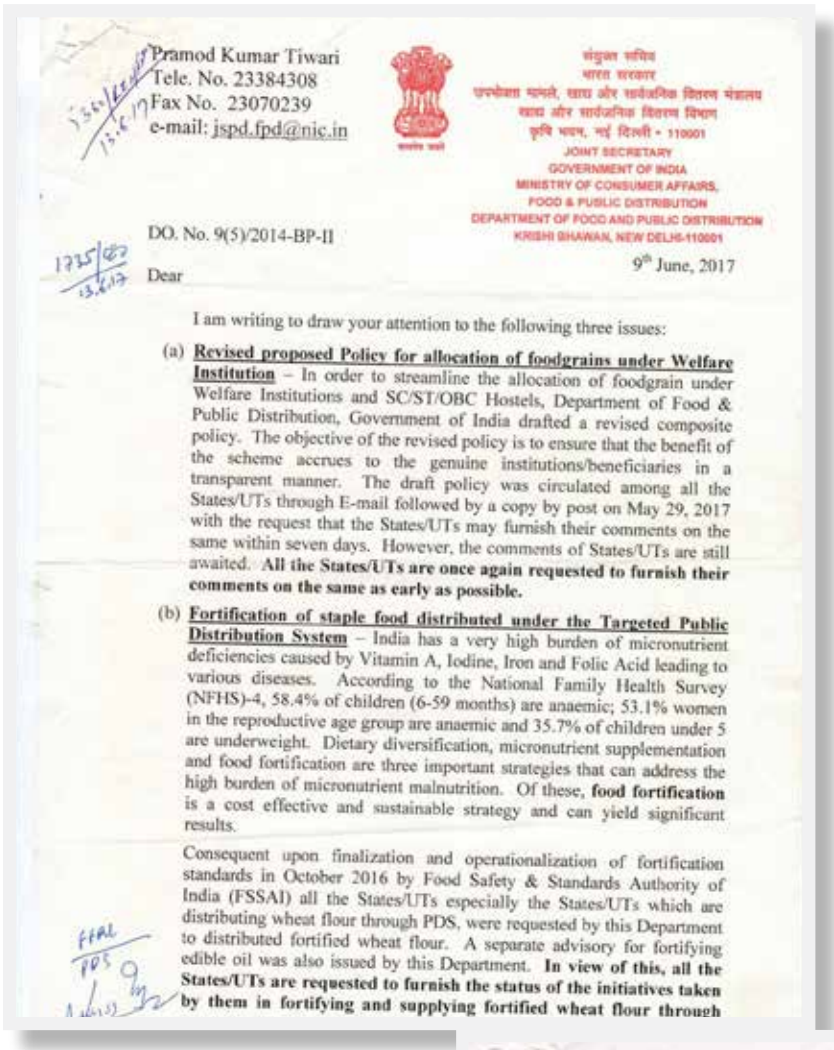
Copy to :

Principal Secretaries / Secretaries in-charge of ICDS of all States / UTs.

Copy for information to:

1. Principal Secretary to Hon'ble Prime Minister
2. Secretary, Ministry of Consumer Affairs, Food and Public Distribution
3. Secretary, Ministry of Health and Family welfare
4. Secretary, Department of Elementary Education, MHRD
5. Chairperson, FSSAI

(Rakesh Srivastava)



Pramod Kumar Tiwari
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संयुक्त सचिव
भारत सरकार
उपभोक्ता मामले, खाद्य और सार्वजनिक वितरण मंत्रालय
खाद्य और सार्वजनिक वितरण विभाग
कृषि भवन, नई दिल्ली - 110001
JOINT SECRETARY
GOVERNMENT OF INDIA
MINISTRY OF CONSUMER AFFAIRS,
FOOD & PUBLIC DISTRIBUTION
DEPARTMENT OF FOOD AND PUBLIC DISTRIBUTION
KRISHI BHAWAN, NEW DELHI-110001

DO. No. 9(5)/2014-BP-II

9th June, 2017

Dear

I am writing to draw your attention to the following three issues:

(a) **Revised proposed Policy for allocation of foodgrains under Welfare Institution** – In order to streamline the allocation of foodgrain under Welfare Institutions and SC/ST/OBC Hostels, Department of Food & Public Distribution, Government of India drafted a revised composite policy. The objective of the revised policy is to ensure that the benefit of the scheme accrues to the genuine institutions/beneficiaries in a transparent manner. The draft policy was circulated among all the States/UTs through E-mail followed by a copy by post on May 29, 2017 with the request that the States/UTs may furnish their comments on the same within seven days. However, the comments of States/UTs are still awaited. **All the States/UTs are once again requested to furnish their comments on the same as early as possible.**

(b) **Fortification of staple food distributed under the Targeted Public Distribution System** – India has a very high burden of micronutrient deficiencies caused by Vitamin A, Iodine, Iron and Folic Acid leading to various diseases. According to the National Family Health Survey (NFHS)-4, 58.4% of children (6-59 months) are anaemic; 53.1% women in the reproductive age group are anaemic and 35.7% of children under 5 are underweight. Dietary diversification, micronutrient supplementation and food fortification are three important strategies that can address the high burden of micronutrient malnutrition. Of these, **food fortification** is a cost effective and sustainable strategy and can yield significant results.

Consequent upon finalization and operationalization of fortification standards in October 2016 by Food Safety & Standards Authority of India (FSSAI) all the States/UTs especially the States/UTs which are distributing wheat flour through PDS, were requested by this Department to distributed fortified wheat flour. A separate advisory for fortifying edible oil was also issued by this Department. **In view of this, all the States/UTs are requested to furnish the status of the initiatives taken by them in fortifying and supplying fortified wheat flour through PDS.** Status of fortification of edible may also be furnished to this Department. In case any State/UT is facing any challenge in fortifying staple food, that should especially be highlighted so that these issues can be addressed with the help of FSSAI.

(c) **Amount of subsidy given by States/UTs under PDS for rice and wheat** – Rice and Wheat are distributed under the Public Distribution system at the rate of Rs.3/- and Rs.2/- per kg in respect of AAY and PHH category. Government of India is bearing a subsidy burden of Rs.29.64 per kg and Rs.22.09 per kg in respect of rice and wheat respectively i.e. 90.81% and 91.70% respectively. Against the cost to be borne by the beneficiary for the purchase of rice and wheat at the rate of Rs.3/- and 2/- per kg respectively, some States/UTs are sharing this cost partially or fully. **All the States/UTs are hereby requested to let this Department know about the amount of subsidy given by them under PDS for rice and wheat for AAY and PHH category.**

2. It will be highly appreciated if the comments of all States/UTs are furnished to this Department as soon as possible, preferably within seven days. A soft copy of the reply may be sent to the e-mail ID – dsbpfpd@gmail.com

With Regards,

Yours sincerely,
-Sd-
(Pramod Kumar Tiwari)

The Principal Secretary/Secretary,
Department of Food and Civil Supplies,
Government of all States/UTs

Copy with reference to (b) above:

1. Shri Pawan Kumar Agarwal, CEO, FSSAI, New Delhi
2. Shri T.K. Manoj Kumar, Joint Secretary, DFPD, New Delhi

(Pramod Kumar Tiwari)

ANNEXURE 7:

Key Consultations and Meetings Held

October 2016 – October 2017

National Summits & Consultations

- **October 16 – 17, 2016: National Summit on Food Fortification** - *Putting Food Fortification on the National Agenda*
  - Operationalisation of comprehensive Regulations on fortification of food namely, 'Food Safety and Standards (Fortification of Foods) Regulations, 2016' and Unveiling of Logo for fortified foods
  - Hon Union Minister of Consumer Affairs, Food and Pubic Distribution, Shri Ram Vilas Paswan and Hon Union Minister of State Smt. Anupriya Patel graced the occasion.
- **November 17, 2016: Special Meeting on Large Scale Fortification** with Mr. Bill Gates, Trustee and Co-Chair of the Bill and Melinda Gates Foundation as a Special Guest
  - The Food Fortification Resource Center (FFRC) and the FFRC portal was formally launched
  - Alignment of 8 key Central Government Ministries with Secretaries from Ministry of Health and Family Welfare ,Ministry of Women and Child Development , Department of Food and Public Distribution ,Ministry of Human Resource Development ,Ministry of Food Processing Industries, Department of Biotechnology , Department of Health Research (Indian Council for Medical Research), and Department of Animal Husbandry, Dairying and Fisheries were present.
- **March 17, 2017: CII & MoFPI - National Consultation on Staple Food Fortification** - Alignment of stakeholders for fortification of food
- **May 16, 2017: FSSAI National Summit on "Transforming the Food Safety and Nutrition Landscape" and Fortification Awards for Early Adopters amongst FBOs and States**
  - Annual Summit of FSSAI showcasing progress and new initiatives, and early adopters of fortification amongst Industry and States were recognised and awarded
  - Sh Amitabh Kant graced the occasion, attended by over 200 guests
- **June 14, 2017: Meeting with the Food Secretary of all States/UTs** - for inclusion of fortified staples in Public Distribution System (PDS)
- **September 27, 2017**: ASSOCHAM Conference cum Awards on Nutrition and Food Security. "Expanding use of fortified foods in Government safety net programs" chaired by Pawan Agarwal, CEO FSSAI

Zonal Consultations

Jointly organised by Ministry of Women and Child Development (MWCD) and FSSAI

- **January 4, 2017: New Delhi** - For large-scale food fortification for the Northern States
- **January 20, 2017: Bangalore** - For large-scale food fortification for the Southern States
- **January 24, 2017: Bhopal** - For large-scale food fortification for the Western States
- **January 30, 2017: Bhubaneshwar** - For large-scale food fortification for the Eastern States
- **February 15, 2017: Guwahati** - For large-scale food fortification for the North Eastern States

Industry / Commodity Consultations

Oil

- **January 4, 2017:** Alignment and advocacy with edible oil industry, with 40+ participants
- **March 21, 2017:** Consultation in partnership with Oil Traders Association of India to promote fortification
- **August 11, 2017**: Meeting on Scaling up Edible Oil Fortification and Partnering for a Nationwide Joint Marketing Campaign

Double Fortified Salt

- **February 3, 2017:** Alignment and advocacy with salt industry, with 30+ participants
- **April 7, 2017:** Double Fortified Salt Consultation on Available Technologies
- **9 May 2017:** Technical multi stakeholder meeting on formulations for DFS

Milk

- **February 9, 2017:** Alignment and advocacy with milk industry, with 35+ participants
- **August 3, 2017:** Milk Fortification Workshop in Mumbai in partnership with TATA Trusts & Aarey for adoption of fortification by all cooperatives dairies of Maharashtra
- **September 5, 2017**: Milk Fortification Awareness / Orientation Workshop at NDDB, Anand in partnership with TATA TRUST, attended by all cooperative dairies across India

Wheat Flour

- **February 13, 2017**: Alignment and advocacy with wheat flour industry, with 20+ participants
- **April 5, 2017:** Consultation with Wheat Flour Roller Mills Association, to promote large scale fortification of wheat flour across the country by the members of RFMFI, and its scale-up by the wheat flour milling industry partners. Attended by Roller Flour Millers Federation of India (RFMFI), Society of Indian Bakers (SIB), Wheat Products Promotion Society (WPPS) and ASSOCOM Institute of Bakery Technology and Management (AIBTM)
- **August 25, 2017:** Meeting with Roller Flour Millers Federation to prepare a roadmap to scale up wheat flour fortification across the country, and mapping of all centralised kitchens
- **September 12, 2017**: Meeting on Scaling up Wheat Flour Fortification and Partnering for a Nationwide Joint Marketing Campaign

Rice

- **April 10, 2017:** Alignment and advocacy with rice industry, with 50+ participants

State Level Meetings for Scaling Up Fortification

- **June 5, 2017:** Meeting with Mr. Manoj Agarwal, Principal Secretary Food, Government of West Bengal to discuss adoption of fortified rice in PDS. West Bengal is already supplying fortified wheat flour in PDS since 2000.
- **June 7, 2017:** Meeting with Delhi Government officials for inclusion of fortified staples in MDM, ICDS & PDS
- **July 19, 2017:** Meeting with Mr. Rajesh Prasad, Secretary Food, Government of Assam to discuss adoption of fortified rice in PDS; meeting with Centre for Sustainable Development Goals, Government of Assam
- **July 27 & August 17, 2017:** Meeting with Mr Ajay Seth, ACS, MDM, Karnataka along with PATH team
- **August 17, 2017:** Fortification review meeting with Chandigarh UT
- **September 14, 2017: Meeting with Director, FCPD, Govt of Punjab** - To gain in GoP's buy-in to introduce fortified wheat through the Punjab PDS system, on a pilot basis, along with an evaluation of supply chain efficiencies and fortification benefits with J-PAL
- **September 18, 2017: Meeting with Principal Secretary, Food Rajasthan**
- **September 19, 2017:** WCD Consultation on Undernutrition, and the role of Fortification therein
- **September 25, 2017:**
  - **Round Table Discussion on Scaling Up Edible Oil Fortification in Haryana, Punjab and Chandigarh** - To sensitize the key stakeholders from various departments such as Food, Civil Supplies and Consumers Affairs; Health and Family Welfare, Women and Child Development, School Education, Food Processing and representatives of oil industry
  - **Meetings with Punjab** Government including MARKFED, PUNSUP, Department of Food and Civil Supplies, Department of Women and Child Development.
  - **Meetings with Haryana Government** - Mr. Rakesh Gupta, Additional Principal Secretary to Chief Minister, Haryana.
- **September 28, 2017:** Regional Workshop organized by MHRD Secy. Of School Education, Mr. Anil Swarup - To move the fortification agenda forward in States and measures they can take to nudge States to include fortified staples in the MDM program.
- **October 4, 2017:** Fortification review meeting with MP State Government

Technical Consultations

- **May 11, 2017**: Technical Meeting on Strengthening Food Fortification with a focus on premix supply and quality, in partnership with GAIN
- **September 18 – October 17, 2017**: **"Divisional Level Workshop cum Reorientation Training on Edible Oil Fortification**"to be held across 7 locations in Rajasthan organised by GAIN and IIHMR
  - To provide technical training to the oil millers in regarding FSSAI standards for fortification of Food

Tea Garden Workshops

- **June 8, 2017**: Tea Garden Consultation In partnership with Indian Tea Board, Indian Tea Association & GAIN - To improve the nutritional status of tea garden workers in West Bengal and Assam
- **June 20-21, 2017**: Workshop for Tea Garden Managers on Food Fortification - Improving the nutrition status of tea gardens workers in Assam through food fortification, attended by 35 tea garden managers and ITA representatives

International Delegations:

- February 2017: WFP delegation to Sri Lanka to share India's experience on Food Fortification with a focus on fortified rice. Represented by Ms. Ranjana Chopra, Secretary School Education, Government of Odisha and Smita Mankad, Principal Lead, FFRC alongwith Dr. Shariqua Yunus, WFP
- September 19, 2017: Sri Lankan Delegation to India – Study tour to understand key learnings in rice fortification from India, in partnership with WFP
- October 10, 2017: Myanmar Delegation to India – Study tour to understand key learnings in rice fortification from India, in partnership with PATH

ANNEXURE 8:

Joint Declaration October 2016

National Summit on Food Fortification

New Delhi, 16-17 October, 2016

Joint Declaration

Micronutrient deficiencies are widespread in India and threaten the health and wellbeing of large sections of our population. The consequences of such deficiencies go well beyond the realm of health, seriously affecting learning potential of our children, productivity of our population and consequently the economic growth and development of our country. Contrary to popular belief, vitamin and mineral deficiencies affect all sections of the society, across all socioeconomic groups, in both rural and urban populations.

Fortification of common foods with vitamins and minerals is an evidence-based, sustainable and cost-effective strategy to deliver key micronutrients to large sections of the people. Food fortification is a realistic and sustainable complementary strategy to food supplementation and dietary diversificationto eliminate micronutrient deficiencies. Examples of foods that can be fortified include edible oil, milk, wheat flour, rice, and salt. The success of the salt iodisation programmein India is a major public health triumph, offering valuable lessons and confidence for staple food fortification to eliminate vitamin and mineral deficiencies from our population.

The success of the food fortification programme, particularly in a diverse country like India, demands asustained and co-ordinated inter-sectoral approach. Fortification needs to be supported by adequate food regulations, quality assurance and monitoring to ensure compliance and desired impact.

In this direction, the key stakeholders;

- Central Ministries of Health and Family Welfare, Women and Child Development, Food Processing Industries and Departments of Food and Public Distribution, School Education & Literacy, Industrial Policy & Promotion, Biotechnology, Animal Husbandry, Dairying and Fisheries and Health Research
- State Governments –Department of Health and Family Welfare, Department of Consumer Affairs, Food and Public Distribution, Department of Women and Child Development, and Department of School Education.
- Development Partners, PATH, TATA TRUSTS, Global Alliance on Improved Nutrition (GAIN), World Food Programme (WFP), Bill & Melinda Gates Foundation (BMGF), Clinton Health Access Initiative (CHAI), Food Fortification Initiative (FFI), Indian Coalition for Control of Iodine Deficiency Disorders (ICCIDD), The Micronutrient Initiative (MI), United Nations Children's Fund (UNICEF), World Health Organization (WHO) and Coalition for Food and Nutrition Security in India
- Food Business Operators and their Associations

- Technical experts from science and research institutions
- Experts and representatives from other related non-governmental organizations including consumer organizations

we hereby commit to collaborate with food manufacturers, businesses and scientists to utilise efficient technologiesin all phases of processing, production, packaging and transportation for promoting safe and nutritious fortified foods and generate awareness regarding its benefits amongst consumers.

In our country, staple foods are mainly produced, procured and consumed in the unorganized sector which is not easily amenable to fortification. It is, therefore, important to identifycommodities that are 'Fortifiable", that is those staple foods that go through processing by organised industry. However, our aim is to fortify staple foods like wheat flour, rice, milk, edible oil, salt in a given time frame. We would, however, strongly urge and implore the Government to mandate the use of fortified commodities in all its food based schemes including MDM, ICDS & PDS.

Consumer awareness regarding the benefits of fortification is essential for the success of this programme. Through partnerships with development agencies, schools, mass media outlets, social scientists, social workers, civil society and consumer organisations, we propose to conduct extensive and strategic social and behaviour change communication campaigns so that people can take responsibility for their health.

Our discussions regarding fortification of individual staple foods and behavioural change communication strategies for consumer awareness reflect our deep commitment to this important cause. The gist of our discussions is appended to this joint declaration.

We strive to encourage and promote fortification of staple foods as an important and necessary step towards food and nutrition security and building a healthier and developed India.

ANNEXURE 9:

Food Fortification – Select Media Coverage

March 9, 2017: Hindustan Times

Value addition to common foods can fight India's hidden hunger

India's performance in the recently released Global Hunger Index (GHI) report is tragic. The country which is one of the largest producers of cereals, vegetables and fruits in the world, ranks 97 among 118 countries and is home to over 184 million undernourished people. India also pays a very heavy price for vitamin and mineral deficiencies, often called "hidden hunger", as it loses $12 billion in gross domestic product across the world each year as per the World Bank estimates. This calls for a shift in focus from approaches for tackling hunger towards improving quality of diets to promote health. India has 70% anaemic pre-school children, 59% anaemic pregnant women, and 24% anaemic men. Iron deficiency anaemia results in an eight point lower intelligent quotient (IQ) in children.

Alongside, deficiencies of B group vitamins, zinc, and vitamin D are also widely prevalent. All these deficiencies have a devastating impact on the population in the form of impaired cognitive and motor development among children, growth retardation, reduced immune response, less capacity to do physical work, and increased mortality and morbidity among mothers and newborns. Despite four decades of a national supplementation programme, little progress has been made to reduce critical nutrient deficiencies in India. Recent national data reveals that annual declines in anaemia prevalence among women and children have been dismal, from 1% to 1.5% only.

In this context, food fortification as a complementary strategy presents a good opportunity to address vitamin and mineral deficiencies on a mass scale. Food fortification involves addition of minute quantities of missing vitamins and minerals in our diet to commonly consumed food such as rice, wheat flour, salt, and milk. It improves the nutritional value of such staples and enhances intakes at a population level.

India has also experienced the power of food fortification with the successful salt iodisation programme started in 1962 by the National Goitre Control Programme (NGCP). Today, over 90% of the country's population consumes iodised salt. Fortification can be highly effective, if implemented through the government's safety net programmes like the Public Distribution System (PDS), Mid-Day Meal Scheme (MDM), and Integrated Child Development Services (ICDS). Several states have run pilots that supply fortified meals/ staples in schools through the MDM and PDS and have garnered positive results. In 2016 there was a major landmark development in the field of fortification as the Food Safety and Standards Authority of India (FSSAI) launched fortification standards for five staples (rice, wheat flour, oil, milk, and salt) and a logo for consumers to make an informed choice. It is an important step as the government has created an enabling environment for all key stakeholders to adopt fortification. The need is now to fortify awareness: for industry to ensure supply side readiness, a regulatory mechanism to ensure enforcement and among consumers to create demand. Businesses are brilliant shapers of demand, often for unhealthy foods, it is time now to bend demand towards health.

http://www.hindustantimes.com/analysis/value-addition-to-common-foods-can-fight-india-s-hidden-hunger/story-sW5Cd4AJiWLZTFdyFDrCPO.html

March 25, 2017: Economic Times

Manufacturers agree to fortify edible oil with vitamin A and D

All major edible oil manufacturers and processors have agreed to fortify cooking oil with Vitamin A & D within the next three months, the food regulator FSSAI said today.

Fortification means deliberately increasing the content of essential micronutrients in food to improve its quality.

This decision is the outcome of a meeting convened by the Food Safety and Standards Authority of India (FSSAI) recently here. Over 130 persons, including the representatives of the edible oil industry and its associations, and academia attended this meeting among others.

The FSSAI is promoting food fortification in a big way and had last year issued standards for fortification of salt with iodine and iron, of vegetable oil and milk with Vitamin A and D, wheat flour and rice with iron, folic acid, zinc, vitamin B12, vitamin A and some other micronutrients.

"All major edible oil manufacturing and processing sector decides to fortify the edible oil with vitamin A and D within the next three months," FSSAI said in a statement.

"During the deliberations industry partners, including Patanjali, resolved to adopt fortification of all their edible oil variants as an industry norm and have agreed to initiate fortification within 8-12 weeks," it added.

As per the National Institute of Nutrition, there is a high prevalence of vitamin A and D deficiencies amongst Indian population. Almost 50-90 per cent of the Indian population, across all socio-economic groups, suffers from vitamin A and D deficiencies.

FSSAI said the fortification of edible oils with vitamin A and D, offers the most feasible and cost-effective intervention, as India has a fairly high consumption of edible oils, ranging from 12-18 kg per annum per person.

The country imported 14.5 million tonnes of vegetable oils in the 2015-16 oil year (November-October) to meet its domestic demand.

"Food fortification has a great potential to enrich the nutritional quality of various foods. It is encouraging to see such a traction and commitment within the food industry to initiate fortification of foods. This would indeed help India to improve the nutritional status of millions of people, both the poor and the rich." FSSAI's CEO Pawan Agarwal said.

The regulator also discussed the issues related to the sale of loose edible oil and the industry was advised to adopt small packaging of edible oil to discourage sale of loose oil.

At the behest of governments of Rajasthan and Gujarat, entire edible oil industry is already selling only fortified edible oil across these States.

Several state and UT governments like Haryana, Punjab, Karnataka, Chandigarh, Himachal Pradesh, etc. have started providing fortified oil through the public funded programmes like the PDS, ICDS and MDM.

"Edible oil processors also decided to come out with oils in small pouches in order to ensure effective ban on loose oil sale in the country," the statement said.

http://economictimes.indiatimes.com/industry/cons-products/food/manufacturers-agree-to-fortify-edible-oil-with-vitamin-ad-fssai/articleshow/57828029.cms

April 7, 2017: Economic Times

Big firms like ITC, HUL & Cargill to fortify wheat flour

NEW DELHI: Food regulator, FSSAI today said major wheat-flour brands like ITCBSE -0.82 %, HULBSE -0.98 %, Cargill and Patanjali would begin to fortify wheat flour with iron, folic acid and vitamin B-12.

Fortification means deliberately increasing the content of essential micronutrients in food to improve its quality.

To address malnutrition, the FSSAI is promoting food fortification in a big way.

It had last year issued standards for fortification of salt with iodine and iron, of vegetable oil and milk with Vitamin A and D, wheat flour and rice with iron, folic acid, zinc, vitamin B12, vitamin A and some other micronutrients.

"Market leaders like the ITC, General Mills, Hindustan Unilever, Patanjali, and Cargill have agreed to start fortification of their flagship brands of wheat flour (atta) such as Aashirwaad, Pillsbury, Annapurna, Patanjali and Nature Fresh respectively," the FSSAI said in a statement.

They have already initiated the process and their fortified wheat flour would begin to be seen in the market in different regions by July/August and then scale up pan-India by December 2017, the regulator said.

The FSSAI said that the decision is the outcome of a series of meetings convened by it over past two months with related businesses, including medium and small industry players and development partners such as GAIN who have been associated with fortification of wheat flour over the past few years.

FSSAI CEO Pawan Agarwal said: "Fortification Standards and a logo for fortified foods released by FSSAI recently, has provided a rallying point for food businesses to take up fortification on a large scale".

http://economictimes.indiatimes.com/industry/cons-products/food/big-firms-like-itc-hul-cargill-to-fortify-wheat-flour/articleshow/58071689.cms

May 10, 2017: BBC

Vitamin D and the Go India's Fortification Program

This hormone is vital for strong bones and muscles. But do our indoor work lives mean many of us are not getting the sunlight that our bodies need to produce it?

Presenter Justin Rowlatt heads to a hospital in India where Dr Ambrish Mithal explains why vitamin D deficiency - including rickets in children - is still commonplace in such a sunny country.

Back in the UK, endocrinologist Maralyn Druce explains why vitamin D is indeed a hormone.

Plus the BBC's Laurence Knight reports on one indoor profession where deficiency poses a serious risk of injury - ballet dancing.

http://www.bbc.co.uk/programmes/p051skbv

कार्यक्रम | पहली बार राज्य में होगी सुविधा

अब आंख और हड्डियों को विशेष दूध देगा मजबूती

विटामिन ए व डी युक्त दूध को लांच करते मंत्री रणधीर सिंह व अन्य ● जागरण

जागरण, संवाददाता, रांची : अब आंख और हड्डियों को मजबूती दूध देगा। क्योंकि, झारखंड मिल्क फेडरेशन ने मेधा डेयरी के दूध का फोर्टिफिकेशन किया है। यानी ग्राहकों को विटामिन ए और विटामिन डी युक्त दूध मिलेगा। इस दूध को लांच कृषि मंत्री रणधीर सिंह ने मंगलवार को फेडरेशन के प्लांट में फेडरेशन प्लांट व टाटा ट्रस्ट के पदाधिकारियों की मौजूदगी में किया।

कृषि मंत्री ने बताया कि पहली बार राज्य में इसकी व्यवस्था की गई है। रांची के साथ-साथ देवघर और कोडरमा में इसकी सुविधा उपलब्ध कराई गई है। दूध उत्पाद के क्षेत्र में सरकार मेधा डेयरी को हब बनाना चाहती है। उन्होंने बताया कि साहिबगंज, देवघर, जमशेदपुर और पलामू में प्लांट के विस्तार और बनाने पर सरकार प्रयासरत है। प्लांट को एक साल में तैयार कर लिया लाएगा, ताकि अधिक से अधिक दुग्ध उत्पादक किसानों को इसका लाभ मिल सके।

झारखंड मिल्क फेडरेशन के एमडी बीएस खन्ना ने बताया कि पहली बार इसकी सुविधा शुरू हुई है। इससे बच्चों को कुपोषित होने से बचाया जा सकेगा। विटामिन ए से नाइट ब्लाइंडनेस और विटामिन डी से हड्डियों को मजबूती मिलेगी। उन्होंने बताया कि इसके लिए दूध की कीमत में कोई बढ़ोतरी नहीं की गई है। यह सुविधा टोंड मिल्क में मिलेगी। पहले चरण में 16 हजार लीटर दूध में इसकी सुविधा उपलब्ध कराई जा रही है। इस दिशा में टाटा ट्रस्ट का भी सहयोग मिला है। मौके पर डेयरी डेवलपमेंट बोर्ड के असिस्टेंट डायरेक्टर मुकुल प्रसाद ने बताया कि भविष्य में टेट्रा पैक में दूध उत्पाद का उत्पादन किया जाएगा। कार्यक्रम में टाटा ट्रस्ट के एडवाइजर विवेक अरेड़ा भी उपस्थित थे।

May 24, 2017: ENN

FSSAI CEO Pawan Agarwal's interview on fortification

Dr Charulatha Banerjee, ENN's Asia Regional Knowledge Management Specialist caught up with Pawan Agarwal, CEO of the Food Safety and Standards Authority of India (FSSAI).

Mr Agarwal spoke to us about the progress in food fortification including the newly approved comprehensive food safety standards in India. He discusses the role of the Food Fortification Resource Centre and some of the challenges and opportunities of working in this area.

http://www.ennonline.net/mediahub/partiifoodfortificationinindia

May 15th, 2017 and June 13th, 2017: ENN

Food Fortification in India

For many people working in the nutrition sector or involved in efforts around nutrition scale up, understanding how the private sector can positively contribute to nutrition outcomes is a key priority. As part of ENN's work as a partner of the SUN Movement, providing support on learning documentation and sharing, we have identified private sector/ business engagement as an important area for knowledge capture. As there has been relatively little documentation so far and we will continue to work to document and understand how this is evolving to contribute to addressing this important knowledge gap and priority in the sector.

In this post, we share the outputs from a recent visit to Delhi by ENN's Asia based Regional KM Specialist Dr Charulatha Banerjee. She worked on a 3-part video series which captures different perspectives on private sector engagement in nutrition from India. In recent years there have been some important changes in how government and NGOs are working with corporates to improve social and health outcomes, including nutrition, which has produced some interesting learning opportunities. For example, India was the first country in the world to introduce a law (in April 2014) which mandates that all large firms with earnings above a specified threshold must spend 2% of their net profits on Corporate Social Responsibility (CSR) projects. India also has a long history of work on food fortification which continues to expand in scope, through new initiatives such as food labelling and fortifying additional staple foods

http://scalingupnutrition.org/news/experiences-from-india-on-engaging-with-the-private-sector-to-improve-nutrition/

Dr. Rajan Sankar, Director of Nutrition at TATA Trusts

https://youtu.be/AeGKGxENBU4

Mr. Pawan Agarwal, Chief Executive Officer of FSSAI

https://youtu.be/dJPMShAMRtk

May 28, 2017: Outlook

TATA TRUSTS address malnutrition

New Delhi, May 28 Tata Trusts are intensifying work on improving maternal and infant nutrition besides large scale food fortification, aiming to reduce incidence of malnutrition by 25 per cent in five states in the next five years.

The trusts, which received grants of around Rs 50 crore from Bill & Melinda Gates Foundation in the past two years, are currently carrying out various programmes in Andhra Pradesh, Uttar Pradesh, Maharashtra, Rajasthan and Tripura in co-operation with the state governments.

Sir Dorabji Tata Trust and Jamsetji Tata Trust have been focusing on various programmes, including maternal, infant, and young child nutrition and large scale food fortification, along with setting up platform for policy and research on nutrition and agricultural development in India.

A Tata Trusts spokesperson said by working with governments of the five states, the trusts "aim to bring down the incidence of malnutrition by 25 per cent in the next five years, thus impacting morbidity and mortality rates."

The annual investment of Tata Trusts itself in this programme is already close to Rs 28 crore, while various governments have added to this in their respective states.

"In case the trusts receive any funding, earmarked for this area, it goes into this overall programme," the spokesperson added.

In September and November 2016, Sir Dorabji Tata Trust had received a total grant of USD 73,52,987 from Bill & Melinda Gates Foundation, while Jamsetji Tata Trust was granted USD 10,00,000 in November 2015.

Highlighting progress made by the trusts, which own two-third of stock holding of Tata Sons — promoter of major operating Tata companies, the spokesperson said since 2012, they have been piloting and innovating several strategies to reduce the burden and incidence of malnutrition.

Moreover, the trusts also provided key technical inputs to Food Safety and Standards Authority of India (FSSAI) based on which Food Fortification Standards for five staple foods -- salt, oil, milk, wheat and rice -- have been released.

The trusts are running pilots with various state governments to make fortified wheat flour and rice available in the PDS on a trial basis, the spokesperson added.

Besides, the trusts are working with various entities, like the National Institute of Nutrition and state governments to implement use of double fortified salt (containing iron and iodine) in mid-day meals in schools.

They are also working jointly with the Ministry of Women and Child Development on a pilot in select districts of Andhra Pradesh and Maharashtra for digitising Integrated Child Development System (ICDS).

"The pilot will help understand whether digitisation is improving delivery services of Anganwadi Workers (AWW) to the community," the spokesperson said.

The aim of the project is to provide real time data to policy makers who can then make quick informed decisions as preventive measures to enable proactive response to endemics and disaster management.

The platform will also be piloted with an aadhaar-based identification, and pilot a model for direct benefit transfer of certain services like take home rations in cash rather than in-kind distribution, the spokesperson added

http://www.outlookindia.com/newsscroll/tata-trusts-aim-to-bring-down-malnutrition-by-25-in-5-states/1061627

The Hindu - May 2, 2017

Fortified foods to tackle malnutrition

MNCs, co-ops, other manufacturers will add premixes of micronutrients to products

JYOTI SHELAR
MUMBAI

Malnutrition isn't just about acute starvation. Often, healthy-looking people are malnourished too, because their diet does not include the right micronutrients. In severe forms, such deficiencies can have serious effects. For instance, iron deficiency leads to critical problems during pregnancy, and not enough Vitamin A can lead to poor vision, infections, and skin problems.

To tackle the issue, the Food Safety and Standards Authority of India (FSSAI) released a set of standards and a logo last year. Since then, it has focussed on awareness- and consensus-building. Now, a number of enterprises will begin adding premixes of micronutrients to launch fortified foods. Smita Mankad, head of the FSSAI's Food Fortification Resource Centre, told *The Hindu* that in the next few months, General Mills India, ITC, Hindustan Unilever and Patanjali will launch wheat flour; Adani Wilmar, Marico, Borges India, and Kaleesuwari Refineries are working on oil; I.T Foods, DCP Food and KKR Food are launching rice; and in salt, other brands will join Tata, which already has a double fortified brand in the market. Milk cooperatives in Haryana, Punjab, Rajasthan, Assam and Maharashtra will fortify their products too.

Targeting children, the Rajasthan, Madhya Pradesh, Haryana and Himachal Pradesh governments have begun using fortified oil for their mid-day meal schemes. West Bengal and Andaman and Nicobar Islands are now distributing fortified wheat flour through the public distribution system, and the Maharashtra government has started a pilot project.

The FSSAI is also working with small local suppliers, for instance local flour grinding mills, to get them to add premixed micronutrients. "The next level of awarenesses will be among consumers to opt for fortified staples," Ms. Mankad said.

The FSSAI has decided not to interfere in pricing.

Food for thought

Fortification of eatables is aimed at fighting malnutrition

What it means

Fortification is the addition of key vitamins and minerals, such as iron, iodine, zinc, Vitamins A & D, to staple foods such as rice, milk and salt to improve their nutritional content

- The nutrients may or may not have been originally present in the food before processing
- It is a simple, proven, cost-effective and complementary strategy in use across the globe
- The draft Food Safety and Standards Regulations, 2016, prescribe the standards for fortification of salt, oil, milk, and rice

Hindu Business Line – July 17, 2017

2 INDIA FILE

Healthy smiles: Children at the Government English Medium School in Kashti's Mundrigaam village get food, including fortified rice from a centralised kitchen that is run under a bilateral agreement between the Maharashtra Government and Tata Trusts

Giving their food the +F edge

A public-private partnership might *finally* fortify India against malnutrition. Preeti Mehra writes

What is food fortification?

When micronutrients are added to foods commonly consumed by the mass population

Which are the food items?

Oil, salt, wheat and rice, which are the most commonly consumed items in India

And micro-nutrients?

Oil is enhanced with Vitamin A and Vitamin D, while wheat flour is fortified with iron, folic acid, Vitamin B12, B1, B2, B3, B6 and zinc

How much does it cost?

Not much, just eight paise to fortify a litre of oil, eight paise for a kilogram of wheat flour and about 30 - 40 paise for a kilogram of rice

How it is done?

Micro-nutrients are manufactured as a premix and added according to the specifications of the FSSAI, in all the staples

Durrak Devi lives in one of Delhi's unauthorised colonies. She has no idea what the +F symbol stands for, but barely the 45-year old has started looking for it on the milk sachet that she buys. Her grandchild's paediatrician has told Devi that milk enhanced with the iron has "grade value" (more strength) and it's good for her three year old grandson who suffered from low weight since birth.

Her grandson is part of the 25 per cent of the Delhi's population that suffers from malnutrition. Addressing the problem, Delhi late last year joined the effort to fortify common foods with micro-nutrients when milk cartel, Mother Dairy, took the lead by adding Vitamin A and D to all its poly packs. Durrak's family, which was earlier buying unpackaged milk from Mother Dairy, was among the households that shifted to the sachet on advice from a medical practitioner.

Not just Delhi, malnutrition continues to be a significant percentage of India's population. For instance, the National Family Health Survey of March 2017 shows that over a quarter of children under the age of five are stunted (low height for age) in all of India's major state capitals, except in Kochi and Hyderabad.

The 2016 Global Hunger Index ranked India 97th out of 118 countries behind Nepal, Sri Lanka, Bangladesh. It was positioned at 100 of 104 countries the previous year.

Given the seriousness of the issue, a renewed attempt is being made to address malnutrition, through food fortification. While till a few months ago, there was talk of a food fortification policy being worked out, the Government is now moving forward through FSSAI (Food Safety and Standards Authority of India).

Nearly 40 companies have come forward to lend their hand and are fortifying their products, following the +F formula. Some are fortifying their product for the pan-India market, while others are targeting specific States.

"Food fortification is nothing new. Everyone agrees it needs to be done and wants to do it. But it doesn't get done," says Pawan Kumar Agarwal, Chief Executive Officer at FSSAI. "All it requires is aligning a few things for the industry to start fortifying and the consumer to start accepting. It's like the chicken and egg story, which comes first," adds Agarwal, who is perhaps only pushing for a greater confidence by states and food companies.

Testing the waters

Delhi is one of the seven states to join the fight against malnutrition. Some of its peers, including Rajasthan and Madhya Pradesh have taken the lead in adding nutrients to staple foods such as wheat flour and oil through a pilot project initiated by the Global Alliance for Improved Nutrition (GAIN). The international organisation was launched in 2002, at the United Nations (UN) special session on Children to tackle human suffering caused by malnutrition.

The two States were chosen due to their high burden of malnutrition. According to the National Family Health Survey-3 (NFHS-3), in Madhya Pradesh 23 per cent population under five years suffers from stunting, 10 per cent in the same group from wasting, 59 per cent from anaemia, 21 per cent newborns have low birth weight and 27 per cent of reproductive age women have chronic energy deficiency.

Rajasthan's indicators are also as poor. GAIN looked at consumption patterns of both the States and found that wheat, milk and oil were consumed in the largest volumes. They then contracted with large industries packaging the micronutrient and supplied them to fortify their products.

Typically oil is infused with Vitamin A and Vitamin D, while wheat flour was fortified with iron, folic acid, Vitamin A, B12, B1, B2, B3 and zinc. While voluntary fortification, through commercial channels were selected in both the States, in Rajasthan distribution of fortified foods was also carried out through key government schemes like the public distribution system (PDS), the school mid-day meals (MDM) and the Integrated Child Development Services (ICDS) that caters to children under six years, and to pregnant and lactating mothers.

Since 2013, several States have chosen to use government programmes for distribution of fortified staple foods and some are still in the process of building their strategy. For instance, fortified oil is being routed through the PDS in Himachal Pradesh, Karnataka and Gujarat; Rajasthan and parts of Haryana; it is being used for MDM in Madhya Pradesh, Punjab, Himachal Pradesh, Rajasthan and Sonepat district of Haryana; and for ICDS meals in Rajasthan and parts of Haryana.

Similarly fortified wheat flour has made inroads through PDS into West Bengal and Andaman & Nicobar Islands. While a pilot project for enhanced wheat flour is underway in Maharashtra's Navi Mumbai, a roll out is under consideration by the Kerala and Haryana governments. Fortifying of rice is still at a nascent stage and only some parts of Odisha, Karnataka and Haryana are using the fortified product for school mid-day meals. The crucial question in all efforts to introduce fortified staples is public acceptance of the product and willingness to pay marginally more for it.

Standards for staples

From the Government's end, the food fortification project is being taken forward by the FSSAI. Apart from Tata Trusts and GAIN, it is working with other development partners including the Bill and Melinda Gates Foundation, The Clinton Health Access Initiative, Inc., The Coalition for Food and Nutrition Security India, Sattire Global Network, UNICEF and World Food Programme.

While of course also coordinates with the concerned Central ministries to make the roll out successful.

And this year the food safety organisation has taken several steps to make things actually happen on the ground. To begin with, the FSSAI has formulated the +F symbol that denotes that a product has been fortified correctly – the same symbol that Durrak Devi looked for when she bought her milk sachet.

Along with this, FSSAI has put in place standards for fortification of five staples commodities – wheat flour, milk, oil, rice and salt. To converge all efforts at increasing the nutritional content of the Indian diet it established Food Fortification Resource Centre (FFRC) at its headquarters in Delhi in November last year. This is now functioning as a model agency for food fortification in the country.

For now, food fortification remains a voluntary exercise to be undertaken by the private industry, as well as the states. However, for it to be implemented effectively at any level it needs multi-stakeholder engagement. "We are a rallying point on fortification and are involved in facilitating and providing all the stakeholders technical support," explains Smita Mathur, head of FFRC, who says that the last six months has been an effort in bringing all the players to the table.

Identify the food vehicle

So, how is food fortification done? Dr Rajan Sankar, Programme Director, Nutrition at Tata Trusts, says that the first step is to identify commonly eaten foods in a region. These foods then "can act as vehicles for one or more micro-nutrients and lend themselves to centralised processing on an economical scale."

This is because while fortification is done on foods that are in the everyday diet of large populations, it does not require people to change their dietary and food habits, or are easily accepted. "It can be *downscaled* into existing food production and distribution systems," explains Dr Sankar who has implemented several fortification programmes.

And that is exactly how it is being rolled out. On the one hand, the food industry is being made aware of the need to fortify all its packaged food. On the other hand, State Governments are being sensitised on how crucial it is to distribute fortified food through public channels.

The trend seems to be catching on. For instance, in April this year, Tamil Nadu announced a salt refinery to manufacture double fortified salt (DFS), which will be channelled through the PDS, the mid-day meal scheme, anganwadis and primary health centres.

Tata Trusts is helping the State Government implement the project. DFS has also been a choice of other States like Uttar Pradesh, Tripura, Karnataka, Haryana and Madhya Pradesh.

It may be recalled that ahead of the 2017 assembly elections, then Uttar Pradesh Chief Minister, Akhilesh Yadav, launched double fortified 'Swadeshi' salt for marginalised communities.

Industry on board

Agarwal and Mathur say that the private sector has reacted quite positively to fortifying its products.

So wheat flour brands such as Aashirvaad, Golden Harvest, Rishtha, Evergreen, Vitamin Plus, Nutmet Chakki Atta and Harmony Chakki Fresh have chosen to fortify. Some States such as West Bengal, Andaman & Nicobar Islands are also supplying fortified wheat through their public distribution system. Milk is being fortified by a large number of players from Mother Dairy started with Delhi but has taken its initial leap into India. So has Kwality Limited, which is also sells milk apart from its cousins.

The milk cooperatives in Haryana, Punjab, West Bengal, Jharkhand, Rajasthan, and Chitambar Dairy in Tamil Nadu have followed suit. Oil has had as many as 8 companies joining in including the much advertised, top of the pile brands like Fortune, Saffola, Ruchi Gold, Sweekar and Nature Fresh.

What makes it easier to convince private players to come on board is the fact that cost has never been the main deterrent to fortification. According to FSSAI, the price to fortify food is minuscule. It costs as much as ₹30 to ₹300 per metric tonne which works out to an additional 210 to 2 paisa per kg of food, depending on the type and number of micro-nutrients that are being added and the staple food that has been chosen to be fortified.

It needs just eight paise to fortify a litre of oil, eight paise for a kilogram of wheat flour, to round 30 - 40 paise for a kilogram of rice and ₹2-3 for a kg of DFS.

"The challenge is not the cost, it's convincing companies and consumers on the merits of fortification. When the demand comes from the consumer, more industry players will fall in line," explains Agarwal.

This is the 'chicken and egg story that he has been trying to tackle. "Nudge both demand and supply, bring stakeholders in the table, connect industry to premix suppliers, offer technical training and expand consumer awareness." The result should soon be out for all to see.

A global initiative

Fortification is a popular tool to healthy life in countries like Finland and Sweden

PREETI MEHRA

While a spurt of activity is taking place in food fortification, several questions have been raised on why we need this to the last phase? According to nutrition experts who support the move, it is one of the "most cost-effective and sustainable strategies to deliver micronutrients to large populations."

WHO estimates that 3.5 million children die every year due to malnutrition. Apart from this, 1.4 million children are born mentally impaired every year due to iodine deficiency and treatment incapacity rises by 15 per cent due to the same; 250,000 child deaths are precipitated to vitamin A deficiency while 200,000 babies are born every year with neural tube defects due to folic acid deficiency. As many as 2.1 crore people, largely pregnant women, die every year from severe anaemia.

Food fortification is not a utopian concept. It has been used in South American and Europe since the 1920s. In fact, around 140 countries are implementing national salt programmes, 85 have mandated cereal and grain fortification while many others are adding micronutrients to edible oil, sauces and condiments. A paper by experts such as Mr. Venkatesh Mannar and R Sankar published in the Indian Journal of Paediatrics on micronutrient fortification of foods points out that the current low levels of iron deficiency in the USA are attributable to fortified sources. "Almost one-fourth of the iron intakes in the US diet come from fortified sources, much of that from flour products. In Denmark, Finland and Sweden 10 to 30 per cent of the iron consumed comes from fortified cereals," says the article.

Dr Rajan Sankar, Programme Director, Nutrition at Tata Trusts and one of the authors of the paper explains that India, too has had an iodised salt policy in place for several decades, but it needs to the last few years that it is looking at fortifying other staples as well.

155 million STUNTED
Stunting affected an estimated 22.9 per cent or 154.8 million children under 5 globally in 2016

41 million OVERWEIGHT
An estimated 6.0 per cent or 40.6 million children under age 5 around the world were overweight in 2016

52 million WASTED
In 2016, wasting continued to threaten the lives of an estimated 7.7 per cent or nearly 52 million children under 5 globally

Down To Earth Magazine, Centre for Science and Environment – April 2017

HEALTH

www.downtoearth.org.in/health

Staple solution

Can fortification of staple food like rice and wheat end malnutrition in India?

KARNIKA BAHUGUNA | NEW DELHI

IN FEBRUARY, the Food Safety and Standards Authority of India (FSSAI) set up a scientific panel to finalise standards on food fortification. The standards are India's latest attempt to combat the chronic problem of malnutrition, which is the reason close to 40 per cent children under five are stunted. The country also has poor adolescent and maternal health, which is symptomatic of the worrying malnutrition levels. Over 50 per cent women in the reproductive age of 15-49 years and almost 50 per cent of adolescent girls are anaemic, says the 'India Health Report: Nutrition 2015' by research consortium Transform Nutrition.

The 15-member panel comes just four months after FSSAI released the draft Food Safety and Standards (Fortification of Food) Regulations, which propose to fortify six staple food items (salt, vegetable oil, milk, wheat flour, refined flour and rice) with vitamins A, D, B12 and folic acid, and minerals such as iron and iodine (see 'Plans and challenges', p21). Micronutrients such as zinc, vitamin B1, B2, B6 and Niacin can also be used for fortification of wheat flour, refined flour and rice, say the regulations, which were uploaded on FSSAI website for receiving comments from the public.

The scientific panel will look into the comments. It will also identify nutritional gaps in the Indian diet and review the standards for all food that can be fortified.

FSSAI has also set up the Food Fortification Resource Centre to sensitise states about fortification, provide technical support, especially to small-scale food manufacturers, and educate people about fortified foods.

Plans and challenges

The fortified food items will initially be distributed through government schemes such as mid-day meals. They will be sold in the market by 2020

Salt
Micronutrients to be added: Iron (850-1,100 parts per million) and iodine (Not less than 30 parts per million)
When: By Dec 2018
Cost impact: ₹2 t/kg
Challenges: Price will deter poor people

Fortified vegetable oil
Micronutrients to be added: Vitamin A (25 IU per gm of oil), vitamin D (4.5 IU per gm)
When: By Dec 2019 **Cost impact:** 10 p/litre
Challenges: To get small manufacturers to fortify oil

Wheat flour, processed flour and rice
Micronutrients to be added: Iron (20g/kg), Folic acid (1,300 mg/kg), Vitamin B12 (10 microgram/kg)
When: By Dec 2019 **Cost impact:** 20-25 p/kg
Challenges: Most rural families buy or produce food locally

Milk
Micronutrients to be added: Vitamin A (770 IU per litre), vitamin D (560 IU per litre)
When: Not available
Cost impact: ₹2.50*/litre
Challenges: Not available

Source: Ministry of Women and Child Development and FSSAI regulations, * Global Alliance for Improved Nutrition

To begin with, fortified food will be distributed through government-funded programmes, such as the Integrated Child Development Services (ICDS), mid-day meals scheme and public distribution system. A consultation paper released in January by the Ministry of Women and Child Development (MoWCD), which is working closely with FSSAI in formulating the guidelines, states that the government will start distributing the fortified food items, except milk, by December 2018. The food items will be available in the open market by 2020, says the consultation paper.

Fortification not new

India's food fortification journey started in 1953 with the mandatory fortification of Vanaspati (hydrogenated vegetable oil) with vitamin A, which strengthens the immune system. In April 1962, the process of iodination of salt was started in a phased manner under the National Goitre Control Programme. This led to a significant reduction in the prevalence of iodine deficiency disorders (IDD) and is considered a landmark public health success story.

Since 2000, several state governments have voluntarily fortified staple food items with multiple micronutrients. In 2000, West Bengal became the first state to introduce wheat fortified with vitamin A, folic acid and iron in Darjeeling district to "combat large scale malnutrition among adolescent girls, pregnant women and the general public". Vitamin A deficiency weakens the immune system and increases a child's risk of contracting and dying from infections like measles, and diarrhoeal illnesses. Folic Acid deficiency causes neural tube defects. Iron deficiency causes anaemia, which increases the risk of haemorrhage and bacterial infection during childbirth and is implicated in maternal deaths.

In 2006, Gujarat introduced wheat fortified with iron and folic acid. In 2010, Andhra Pradesh launched a project to distribute rice fortified with iron. In 2011 and 2012, Rajasthan introduced an iron-fortified rice variety and a wheat variety fortified with iron, folic acid and vitamin B12 that keeps the nerves and red blood cells healthy.

In 2012, the Global Alliance for Improved Nutrition (GAIN), which provides technical input to FSSAI, rolled out a pilot project in Madhya Pradesh to train millers to produce wheat fortified with iron, vitamin A, B12 and folic acid.

The writeup paper says fortified food is one of the most cost-effective strategy to fight malnutrition, and it does not require any behavioural change.

In fact, there are several studies that establish that fortified food does help the overall nutrition levels. A 2014 literature review published in the *Indian Journal of Community Health* analysed 47 papers on food fortification and concluded that it improved haemoglobin when fortified with micronutrients. The report added that government-run nutrition programmes are good avenues for implementing food fortification programmes.

Another study published in the *Journal of Nutrition* in 2014 tested the efficacy of salt fortified with iodine and iron in reducing iron deficiency in rural women of reproductive age from northern West Bengal. The study, carried out over nine months, focused on 313 women aged between 18 and 35 years, who worked as full-time tea pickers on a large tea estate. It found that double-fortified salt improved haemoglobin, ferritin, soluble transferring receptors, and body iron concentrations in people who are moderately anaemic.

"The fortification of staple foods has the potential to address micronutrient malnutrition in India," says Tarun Vij, country director-India, GAIN. He says that in a recent meeting the government told all stakeholders that "until further action around mandatory fortification gets initiated, states already fortifying staples through government schemes should continue to do so and others should initiate fortification voluntarily on the basis of their state level priorities".

HEALTH

The world view

Over 67 countries have laws to fortify at least one industrially milled cereal grain

Source: www.fortiwatch.org

Not all good

While there are enough studies to suggest the benefits of food fortification and more than 97 countries are successfully fortifying at least one staple food (see 'The world view'), India's experience with food fortification has not been too impressive. Through the salt iodisation drive, the government had planned to reduce the prevalence of IDD below 10 per cent by 2012. In the absence of a national-level data, a 2013 paper published in the *Indian Journal of Medical Research* says IDD remains endemic in 252 districts of the 325 districts surveyed. Even workers have expressed concerns over the distribution of fortified staple food. In its January paper, the ministry says production of staple food items such as wheat flour is still primarily done by small mills and getting them to fortify the flour will be a constraint.

Rajan Sankar, programme director nutrition at TATA Trusts, says that food distribution is more centralised in the West, which makes targeting the marginalised families easy. Another problem is that eating habits largely vary in India. So fortifying only rice and wheat might not cover the entire undernourished population.

A cross-sectional survey of children under five in Telangana found that despite the high consumption of rice, sale of fortified rice did not have an impact on the health of the people because a large proportion of households produce their own rice or procure it locally. The study, published in the journal *Rice Due to July 2016*, stated that distributing fortified rice through public distribution system may be a viable approach to target low-income households, but would only reach a small population.

Dipa Sinha, co-convenor of the Right to Food Campaign, warns that fortification will require private players and the government's decision to channelise the food through mid-day meals and ICDS would eventually lead to corruption. "Any kind of food processing automatically brings in middlemen. This opens up the scope of corruption," Sinha says. In 2004, the Supreme Court had ordered that contractors should not be used for supply of nutrition in anganwadis. "So fortified food should not be made compulsory or should be implemented with local producers," says Sinha.

A 2013 paper published in the journal *Systematic Reviews* reviewed 201 studies on the impact of micronutrient-fortified food on women and children and said that although promising, fortification is not the complete solution to nutritional deficiencies. "With high burden of diarrhoea and enteropathy, widespread mal absorption may be a barrier to this strategy taking maximal effect. Integration of fortification together with other mother and child health and prevention programmes may be the correct way," it concluded, while advocating education and campaigns parallel to the fortification programmes to sensitise people. Experts say the government should also focus on better and balanced diet. "If micronutrient gap persists even after a balanced meal, then the situation could be dealt with supplementation," Sinha says. ■

The fortified food may not reach the undernourished because fortification pushes the cost. Besides, many families grow their own food

ANNEXURE 10:

Food Fortification Resource Centre Team

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ANNEXURE 11:

Partners

A. Government Partners

- **Ministry of Health and Family Welfare:** This is the administrative ministry of FSSAI and the Indian Council for Medical Research. One of its key mandates is working towards addressing widespread malnutrition in the country.
- **Department of Food and Public Distribution:** As part of the Ministry of Consumer Affairs, Food and Public Distribution, the objective of this department is to ensure food security for the country through timely and efficient procurement and distribution of food grains.
- **Ministry of Women and Child Development:** A key programme of this Ministry is ICDS, which provides food, preschool education, and primary healthcare to children less than 6 years of age and their mothers.
- **Department of School Education & Literacy:** As part of the Ministry of Human Resource Development, the objective of this department is to improve quality and standards of school education and literacy. This ministry provides nutritious food through the MDM Scheme.
- **Department of Health Research:** As part of Ministry of Health and Family Welfare, this department oversees the Indian Council for Medical Research, which is important for research on food fortification.
- **Department of Industrial Policy & Promotion:** As part of the Ministry of Commerce and Industry, one of the key objectives of this department is to promote and monitor industrial growth and performance, which is a key part of fortification of food, particularly, edible salt.
- **Department of Animal Husbandry, Dairying and Fisheries:** As part of Ministry of Agriculture, this department is responsible for matters relating to livestock and dairy development, Delhi Milk Scheme, and the National Dairy Development Board, which is key for fortification of milk.
- **Ministry of Food Processing Industries:** This ministry is responsible for formulation and administration of the rules, regulations, and laws relating to food processing, which is key for fortification of processed food.
- **Department of Biotechnology:** As part of the Ministry of Science & Technology, this department is responsible for large-scale use of biotechnology, research & development, which is key for indigenous technological support for food fortification.

B. Development Partners

Bill & Melinda Gates Foundation (BMGF): Bill and Melinda Gates Foundation (BMGF) works in India across four sectors: Health, Sanitation, Agricultural Development, and Financial Services for the Poor. All of their efforts are aligned with India's objectives - working closely with India's central and state governments, they partner with community groups, nonprofit organizations, academic institutions, the private sector, and development organizations, to achieve their shared goals.

Food Fortification Initiative (FFI): As a public private and civic partnership, FFI helps countries plan, implement, and monitor fortification programmes. In India, FFI supports the Government and FFRC in the formulation of policy and strategy on wheat flour fortification, provides technical support to state fortification programmes, builds and strengthens capacity through public-private-civic partnerships.

Global Alliance for Improved Nutrition: The Global Alliance for Improved Nutrition is a Swiss foundation headquartered in Geneva with a special international status granted by the Swiss Government. GAIN was created in 2002 at a Special Session of the UN General Assembly on Children. It is an alliance driven by the vision of a world without malnutrition. GAIN provides technical support at the national and state levels on fortification of edible oil, wheat flour and milk, in addition to engaging with the Tea Industry. GAIN is also piloting production of fortified rations for pregnant and lactating women and pre-school children in Karnataka and Bihar through self help groups.

Iodine Global Network (IGN): ICCIDD is the Indian arm of Iodine Global Network. It is an NGO focused solely on elimination of iodine deficiency disorders (IDD) through universal salt iodisation. It supports and catalyzes iodine programmes, working with key public, private, scientific, and civic stakeholders. In India, it has successfully translated research to policy to programme over the last six decades and significantly reduced the prevalence of IDD. IGN is supporting FFRC with the DFS initiatives in India.

Nutrition International (NI): NI is an international not-for-profit organization dedicated to ensuring that the world's most vulnerable, especially women and children, in developing countries get the vitamins and minerals they need to survive and thrive delivered through strong nutrition programmes. In India, NI works alongside FFRC and state governments to improve fortification efforts of DFS, wheat flour, and rice.

PATH: PATH is an international health organization driving transformative innovation to save lives across five platforms-vaccines, drugs, diagnostics, devices, and system and service innovations—that harness entrepreneurial insight, scientific and public health expertise, and passion for health equity. As a pioneer of rice fortification technology, PATH has played a leading role in making this innovation ready for large scale adoption across the country, along with FFRC.

Sight and Life Foundation (SALF): Sight and Life is a humanitarian nutrition think tank working to innovate in nutrition towards eradicating all forms of malnutrition in children and women of childbearing age, and so improve the lives of the world's most vulnerable populations. SALF is providing key technical support for the fortification initiatives in India.

TATA Trusts: TATA Trusts are among India's oldest, non-sectarian philanthropic organisations. In the field of healthcare and nutrition, TATA Trusts engage with government bodies, competent individuals, international agencies, and like-minded private sector organisations and provide grants and help to mobilise funds, offer on-ground support directly as well as in partnership with other stakeholders to promote nutrition based-interventions. TATA Trusts is supporting milk fortification initiatives across India.

The World Bank Group: With 189 member countries, the World Bank Group is a unique global partnership fighting poverty worldwide through sustainable solutions. It is working with FFRC to develop content for a communication campaign around fortification in India.

World Food Programme (WFP): WFP is the world's largest humanitarian agency fighting hunger worldwide. It is part of the United Nations system and is voluntarily funded. WFP is supporting rice fortification efforts across India.

ANNEXURE 12:

Statewise offtake of rice and wheat across various schemes for 2016

STATEMENT SHOWING ALLOTMENT AND OFFTAKE UNDER VARIOUS SCHEMES DURING 2016-17

Compiled on: 20.04.2017

COMMODITY: RICE **(PROVISIONAL)/(FIGURES IN THOUSAND TONNES)**

STATE	T.P.D.S. + NFSA		MID -DAY-MEAL		NUTRITION PR		WELFARE INST. & HOSTELS/ SCSTOBC		ANNAPURNA		SABLA		DEFENCE ETC.		OTHERS		RETAIL SALE		TENDER SALE OTHER THAN OMSS(D)	Export sale	TOTAL		%	Monthly Average Allotment	Monthly Average Offtake
	ALLOT	OFF	ALLOT	OFF	ALLOT	OFF	ALLOT	OFF	ALLOT	OFF	ALLOT	OFF	ALLOT	OFF	ALLOT	OFF	ALLOT	OFF			ANNUAL ALLOT	OFF	Offtake		
BIHAR	3296.32	3129.74	380.82	351.68	89.19	23.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	20.00	0.27	0.00	0.00	0.00	0.00	3786.33	3505.25	93	315.53	292.10
JHARKHAND	1486.15	1485.88	95.63	91.74	30.53	32.62	0.00	0.00	0.00	2.81	7.99	5.33	0.00	0.98	192.95	0.00	0.00	0.00	0.00	0.00	1813.24	1619.37	89	151.10	134.95
ORISSA	1776.81	1963.95	137.48	117.53	40.67	40.62	11.53	4.82	0.00	3.79	0.00	0.00	0.00	0.37	0.00	0.00	0.00	0.00	0.00	0.00	1966.48	2131.08	108	163.87	177.59
WEST BENGAL	1504.81	1360.72	325.43	187.30	96.91	72.30	2.19	1.69	0.00	3.92	0.00	0.00	0.00	9.82	0.00	0.00	0.00	0.00	0.00	0.00	1929.34	1635.75	85	160.78	136.31
SIKKIM	41.94	41.83	1.95	1.95	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	1.68	0.00	0.00	0.00	0.00	0.00	0.00	44.02	45.46	103	3.67	3.79
TOTAL	**8106.02**	**7982.12**	**941.31**	**750.20**	**257.29**	**168.83**	**13.85**	**6.51**	**0.00**	**10.52**	**7.99**	**5.33**	**0.00**	**13.13**	**212.95**	**0.27**	**0.00**	**0.00**	**0.00**	**0.00**	**9539.41**	**8936.91**	**94**	**794.95**	744.74
ASSAM	1633.14	1537.20	105.64	94.62	58.08	0.00	0.00	0.00	0.00	0.00	13.73	1.50	0.00	9.65	91.08	3.60	0.00	0.00	0.00	0.00	1901.67	1646.57	87	158.47	137.21
ARUNACHAL	88.99	93.13	6.03	6.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	95.02	99.23	104	7.92	8.27
TRIPURA	252.15	245.49	10.17	10.17	8.45	8.45	3.86	3.92	0.00	0.34	2.14	1.42	0.00	0.00	6.10	6.10	0.00	0.00	0.00	0.00	282.86	275.89	98	23.57	22.99
MANIPUR	141.56	139.55	4.78	4.78	19.56	19.56	0.21	0.21	0.00	0.00	1.43	1.43	0.00	0.81	0.00	0.00	0.00	0.00	0.00	0.00	167.53	166.33	99	13.96	13.86
NAGALAND	111.30	102.80	4.53	4.53	15.16	16.24	3.39	3.39	0.00	0.00	0.85	0.85	0.00	0.85	1.38	0.00	0.00	0.00	0.00	0.00	136.60	128.65	94	11.38	10.72
MIZORAM	61.87	63.42	3.48	3.48	1.71	1.71	0.95	0.86	0.00	0.06	0.50	0.38	0.00	0.00	22.60	22.60	0.00	0.00	0.00	0.00	91.12	92.51	102	7.59	7.71
MEGHALAYA	156.91	157.13	12.14	12.14	0.00	0.00	1.42	1.42	0.00	0.00	0.00	0.00	0.00	0.65	0.00	0.00	0.00	0.00	0.00	0.00	170.47	171.33	101	14.21	14.28
TOTAL	**2445.93**	**2338.71**	**146.77**	**135.81**	**102.96**	**45.96**	**9.82**	**9.79**	**0.00**	**0.40**	**18.64**	**5.56**	**0.00**	**11.96**	**121.16**	**32.31**	**0.00**	**0.00**	**0.00**	**0.00**	**2845.28**	**2580.50**	**91**	**237.11**	215.04
DELHI	92.86	92.36	13.29	12.41	0.00	0.00	0.38	0.32	0.00	0.00	0.00	0.00	0.00	5.47	0.00	0.00	0.00	0.05	0.00	0.00	106.53	110.61	104	8.88	9.22
HARYANA	0.00	0.00	33.84	19.78	8.59	8.31	0.00	0.00	0.00	0.00	1.66	1.23	0.00	2.49	0.00	0.00	0.00	0.00	0.00	0.00	44.08	31.81	72	3.67	2.65
HIMACHAL	253.02	235.09	15.18	15.16	5.44	5.31	0.00	0.00	0.00	0.00	1.10	1.62	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	274.74	257.39	94	22.90	21.45
J & K	556.08	550.67	18.36	11.74	19.50	4.07	8.99	3.24	0.00	0.00	0.61	0.00	0.00	25.81	0.15	0.00	0.00	157.24	0.00	0.00	603.69	752.76	125	50.31	62.73
PUNJAB	0.00	0.00	19.56	19.30	9.33	4.98	0.00	0.00	0.00	0.00	1.90	0.04	0.00	10.94	0.00	0.00	0.00	0.00	0.00	0.00	30.79	35.26	115	2.57	2.94
CHANDIGARH	0.00	0.00	0.76	0.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.93	0.00	0.00	0.00	0.00	0.00	0.00	0.76	3.52	466	0.06	0.29
RAJASTHAN	0.00	0.00	33.64	33.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.60	0.00	0.00	0.00	0.00	0.00	0.00	33.64	40.85	121	2.80	3.40
UTTAR PR	3671.47	3644.05	180.83	147.93	19.92	15.31	0.00	0.28	0.00	0.00	0.00	0.23	0.00	8.29	288.17	0.00	0.00	0.00	0.00	0.00	4160.39	3816.09	92	346.70	318.01
UTTRANCHAL	305.09	308.76	19.62	19.51	87.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.94	0.07	0.00	0.00	0.00	0.00	0.00	412.28	332.21	81	34.36	27.68
TOTAL	**4878.53**	**4830.92**	**335.06**	**279.66**	**150.28**	**37.98**	**9.37**	**3.83**	**0.00**	**0.00**	**5.27**	**3.13**	**0.00**	**67.69**	**288.39**	**0.00**	**0.00**	**157.29**	**0.00**	**0.00**	**5666.90**	**5380.51**	**95**	**472.24**	448.38
ANDHRA PR	1828.02	1830.54	68.99	67.08	108.81	106.32	126.89	123.91	0.00	3.26	11.43	5.76	0.00	0.00	102.31	102.31	0.00	0.00	0.00	0.00	2246.46	2239.18	100	187.21	186.60
TELANGANA	1295.72	1298.12	51.90	44.66	39.03	38.82	106.08	105.42	0.00	1.64	9.99	2.50	0.00	2.58	250.29	0.00	0.00	0.00	0.00	0.00	1753.01	1493.74	85	146.08	124.48
KERALA	1156.37	1208.91	57.49	57.36	5.52	4.57	0.94	0.94	0.00	0.00	0.00	0.00	0.00	0.44	0.00	0.00	0.00	2.29	0.00	0.00	1220.33	1274.51	104	101.69	106.21
KARNATAKA	2117.02	2104.61	124.99	105.68	69.53	64.37	35.38	34.25	0.00	0.00	4.51	2.83	0.00	4.26	2.58	2.49	0.00	33.62	0.00	0.00	2354.01	2352.12	100	196.17	196.01
TAMILNADU	3642.42	3938.99	129.21	79.51	32.21	32.21	33.36	33.36	0.00	3.98	0.00	0.00	0.00	1.17	0.00	0.00	0.00	0.00	0.00	0.00	3837.19	4089.23	107	319.77	340.77
PONDICHERRY	0.00	0.00	1.16	2.51	0.00	0.00	0.19	0.00	0.00	0.00	0.19	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.54	2.61	169	0.13	0.22
A&N ISLANDS	22.82	13.86	0.72	0.41	0.23	0.06	0.00	0.00	0.00	0.00	0.18	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23.95	14.41	60	2.00	1.20
LAKSHADWEEP	4.62	3.84	0.15	0.15	0.12	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.90	4.08	83	0.41	0.34
TOTAL	**10066.98**	**10398.88**	**434.62**	**357.36**	**255.46**	**246.42**	**302.85**	**297.89**	**0.00**	**8.89**	**26.31**	**11.28**	**0.00**	**8.46**	**355.18**	**104.80**	**0.00**	**35.91**	**0.00**	**0.00**	**11441.40**	**11469.88**	**100**	**953.45**	955.82
GUJARAT	527.71	540.34	61.82	60.61	12.11	12.11	5.57	5.57	0.00	0.00	0.00	0.00	0.00	1.56	8.00	2.75	0.00	0.05	0.00	0.00	615.21	623.00	101	51.27	51.92
MAHARASHTRA	2021.10	1841.56	221.49	218.61	32.08	21.10	39.21	27.69	0.00	0.00	0.00	0.00	0.00	4.60	22.49	113.73	0.00	0.00	0.26	0.00	2336.37	2227.55	95	194.70	185.63
GOA	52.57	51.94	0.00	0.00	3.78	3.61	0.25	0.25	0.00	0.00	1.58	1.18	0.00	0.55	0.00	0.00	0.00	0.00	0.00	0.00	58.18	57.52	99	4.85	4.79
MADHYA PR	969.28	814.98	64.86	48.68	54.42	40.66	13.11	7.54	0.00	0.00	14.81	9.37	0.00	3.06	26.50	0.00	0.00	0.00	0.00	0.00	1142.97	924.29	81	95.25	77.02
CHHATTISGARH	1384.06	1384.06	89.00	70.31	30.50	22.22	40.72	15.98	0.00	0.00	0.00	0.00	0.00	0.00	82.00	8.51	0.00	0.00	0.00	0.00	1626.27	1501.07	92	135.52	125.09
DAMAN & DIU	2.90	2.49	0.39	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.29	2.87	87	0.27	0.24
D&N HAVELI	8.39	8.02	0.72	0.69	0.19	0.19	0.16	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.45	9.06	96	0.79	0.75
TOTAL	**4966.01**	**4643.39**	**438.28**	**399.29**	**133.08**	**99.88**	**99.01**	**57.17**	**0.00**	**0.00**	**16.38**	**10.56**	**0.00**	**9.76**	**138.99**	**125.00**	**0.00**	**0.05**	**0.26**	**0.00**	**5791.74**	**5345.36**	**92**	**482.65**	445.45
GRAND TOTAL	**30463.47**	**30194.02**	**2296.04**	**1922.33**	**899.06**	**599.08**	**434.90**	**375.19**	**0.00**	**19.81**	**74.59**	**35.85**	**112.60**	**110.99**	**1116.67**	**262.37**	**0.00**	**193.25**	**0.26**	**0.00**	**35397.33**	**33713.15**	**95**	**2949.78**	2809.43

STATEMENT SHOWING ALLOTMENT AND OFFTAKE UNDER VARIOUS SCHEMES DURING 2016-17

Compiled on: 20.04.2017

COMMODITY: WHEAT **(PROVISIONAL)/(FIGURES IN THOUSAND TONNES)**

STATE	T.P.D.S. + NFSA		MID -DAY-MEAL		NUTRITION PR		WELFARE INST. & HOSTELS/ SCSTOBC		ANNAPURNA		SABLA		DEFENCE ETC		OTHERS		OPEN SALE		TENDER SALE OTHER THAN OMSS(D)	EXPORT SALE		TOTAL		%	Monthly Average Allotment	Monthly Average Offtake
	ALLOT	OFF	ALLOT	OFF	ALLOT	OFF	ALLOT	OFF	ALLOT	OFF	ALLOT	OFF	ALLOT	OFF	ALLOT	OFF	ALLOT	OFF		ALLOT	OFF	ANNUAL ALLOT	OFF	Offtake		
BIHAR	2197.54	2094.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.43	0.00	23.80	0.00	0.00	0.00	2197.54	2119.07	96	183.13	176.59
JHARKHAND	189.73	187.12	0.00	0.00	38.28	38.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.35	0.00	0.00	0.00	228.00	233.75	103	19.00	19.48
ORISSA	321.02	302.82	0.00	0.00	86.93	86.15	0.00	0.00	0.00	0.00	22.13	20.93	0.00	0.00	0.00	0.00	0.00	113.10	0.00	0.00	0.00	430.08	523.01	122	35.84	43.58
WEST BENGAL	2287.25	2248.11	0.00	0.00	0.00	0.00	0.29	1.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	680.90	0.00	0.00	0.00	2287.54	2930.25	128	190.63	244.19
SIKKIM	2.39	2.38	0.00	0.00	0.50	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.89	3.01	104	0.24	0.25
TOTAL	**4997.92**	**4835.25**	**0.00**	**0.00**	**125.71**	**124.85**	**0.29**	**1.24**	**0.00**	**0.00**	**22.13**	**20.93**	**0.00**	**0.23**	**0.00**	**0.43**	**0.00**	**826.15**	**0.00**	**0.00**	**0.00**	**5146.06**	**5809.08**	**113**	**428.84**	484.09
ASSAM	53.72	49.63	0.00	0.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.00	0.00	0.00	279.11	0.00	0.00	0.00	117.72	328.74	279	9.81	27.39
ARUNACHAL	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01		0.00	0.00
TRIPURA	18.85	22.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.85	22.46	119	1.57	1.87
MANIPUR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.20	0.00	0.00	0.00	0.00	0.00	0.00	4.20	0.00	0	0.35	0.00
NAGALAND	17.66	18.93	0.00	0.00	0.00	0.00	1.13	1.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.79	20.06	107	1.57	1.67
MIZORAM	3.88	4.03	0.00	0.00	2.24	1.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.12	5.99	98	0.51	0.50
MEGHALAYA	19.09	23.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.09	23.86	125	1.59	1.99
TOTAL	**113.21**	**118.90**	**0.00**	**0.00**	**6.24**	**1.97**	**1.13**	**1.13**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**64.20**	**0.00**	**0.00**	**279.11**	**0.00**	**0.00**	**0.00**	**184.77**	**401.11**	**217**	**15.40**	33.43
DELHI	357.74	355.73	14.23	13.42	0.00	0.00	0.17	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	441.41	0.00	0.00	0.00	372.13	810.65	218	31.01	67.55
HARYANA	795.00	751.30	14.51	10.58	28.92	27.41	0.00	0.00	0.00	0.00	3.53	2.62	0.00	0.11	0.00	0.00	0.00	829.54	0.00	0.00	0.00	841.95	1621.57	193	70.16	135.13
HIMACHAL	254.99	271.24	0.00	0.00	9.83	9.83	0.00	0.00	0.00	0.00	3.23	4.76	0.00	0.50	0.00	0.00	0.00	20.10	0.00	0.00	0.00	268.05	306.42	114	22.34	25.54
J & K	195.00	192.27	0.00	0.00	0.00	0.00	2.58	1.42	0.00	0.00	0.00	0.00	0.00	2.53	0.07	0.00	0.00	237.16	0.00	0.00	0.00	197.65	433.37	219	16.47	36.11
PUNJAB	870.12	801.35	19.94	19.82	13.17	6.51	0.00	0.00	0.00	0.00	2.09	0.04	0.00	0.10	0.00	0.00	0.00	687.41	0.00	0.00	0.00	905.32	1515.23	167	75.44	126.27
CHANDIGARH	0.00	0.00	0.52	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.35	0.00	0.00	0.00	0.52	30.57	5922	0.04	2.55
RAJASTHAN	2791.57	2596.00	77.87	76.23	19.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1138.20	0.00	0.00	99.05	0.00	0.00	0.00	4026.83	2771.28	69	335.57	230.94
UTTAR PR	5680.83	5637.46	91.48	74.65	175.36	135.06	0.00	0.00	0.00	0.00	29.98	18.09	0.00	0.08	471.01	0.36	0.00	28.01	0.00	0.00	0.00	6448.66	5893.71	91	537.39	491.14
UTTRANCHAL	197.91	199.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.95	0.08	0.00	0.00	18.65	0.00	0.00	0.00	197.98	218.94	111	16.50	18.25
TOTAL	**11143.17**	**10804.70**	**218.54**	**194.93**	**246.46**	**178.81**	**2.75**	**1.52**	**0.00**	**0.00**	**38.83**	**25.52**	**0.00**	**4.26**	**1609.35**	**0.36**	**0.00**	**2391.67**	**0.00**	**0.00**	**0.00**	**13259.10**	**13601.76**	**103**	**1104.93**	1133.48
ANDHRA PR	43.81	12.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.20	0.00	0.00	0.00	43.81	24.55	56	3.65	2.05
TELANGANA	42.28	34.23	0.00	0.00	20.99	18.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	47.23	0.00	0.00	0.00	63.27	99.59	157	5.27	8.30
KERALA	244.23	250.75	0.00	0.00	7.68	6.54	0.00	0.00	0.00	0.00	12.24	8.44	0.00	0.00	0.00	0.00	0.00	35.70	0.00	0.00	0.00	264.15	301.43	114	22.01	25.12
KARNATAKA	280.92	254.50	20.11	14.96	89.69	78.38	7.08	6.52	0.00	0.00	4.16	1.80	0.00	0.00	2.59	2.58	0.00	97.20	0.00	0.00	0.00	404.55	455.95	113	33.71	38.00
TAMILNADU	154.86	158.11	0.00	0.00	55.43	55.41	0.00	0.00	0.00	0.00	8.16	8.16	0.00	0.00	0.00	0.00	0.00	146.45	0.05	0.00	0.00	218.45	368.18	169	18.20	30.68
PONDICHERRY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.70	0.00	0.00	0.00	0.00	9.70		0.00	0.81
A&N ISLANDS	6.74	6.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.74	6.56	97	0.56	0.55
LAKSHADWEEP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.09		0.00	0.17
TOTAL	**772.85**	**716.50**	**20.11**	**14.96**	**173.78**	**158.46**	**7.08**	**6.52**	**0.00**	**0.00**	**24.56**	**20.49**	**0.00**	**0.00**	**2.59**	**2.58**	**0.00**	**348.48**	**0.05**	**0.00**	**0.00**	**1000.96**	**1268.05**	**127**	**83.41**	105.67
GUJARAT	1651.66	1673.40	61.91	60.76	59.34	44.54	5.57	5.57	0.00	0.00	4.95	2.91	0.00	0.00	48.00	15.29	0.00	20.50	0.00	0.00	0.00	1831.42	1822.96	100	152.62	151.91
MAHARASHTRA	2584.09	2399.34	0.00	0.00	128.27	108.79	17.12	20.14	0.00	0.00	19.75	16.90	0.00	0.00	35.88	185.00	0.00	110.05	1.11	0.00	0.00	2785.12	2841.32	102	232.09	236.78
GOA	6.45	7.07	3.74	3.74	0.04	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.20	0.00	0.00	0.00	10.26	27.05	264	0.86	2.25
MADHYA PR	2502.76	2470.71	117.12	98.17	147.29	126.61	31.77	21.59	0.00	0.00	10.40	12.24	0.00	0.00	76.50	0.00	0.00	674.05	0.00	0.00	0.00	2885.84	3403.38	118	240.49	283.61
CHHATTISGARH	0.00	0.00	0.00	0.00	53.36	50.18	0.60	0.54	0.00	0.00	10.92	9.77	0.00	0.00	0.00	0.00	0.00	7.55	0.00	0.00	0.00	64.88	68.04	105	5.41	5.67
DAMAN & DIU	3.22	2.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.22	2.92	91	0.27	0.24
D&N HAVELI	0.77	0.72	0.00	0.00	0.08	0.08	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.89	0.84	95	0.07	0.07
TOTAL	**6748.96**	**6554.16**	**182.77**	**162.67**	**388.37**	**330.24**	**55.13**	**47.87**	**0.00**	**0.00**	**46.02**	**41.83**	**0.00**	**0.00**	**160.38**	**200.29**	**0.00**	**828.35**	**1.11**	**0.00**	**0.00**	**7581.62**	**8166.52**	**108**	**631.80**	680.54
GRAND TOTAL	**23776.10**	**23029.52**	**421.42**	**372.56**	**940.55**	**794.33**	**66.38**	**58.28**	**0.00**	**0.00**	**131.55**	**108.78**	**3.69**	**4.49**	**1836.52**	**203.65**	**0.00**	**4673.77**	**1.15**	**0.00**	**0.00**	**27176.22**	**29246.52**	**108**	**2264.68**	2437.21

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