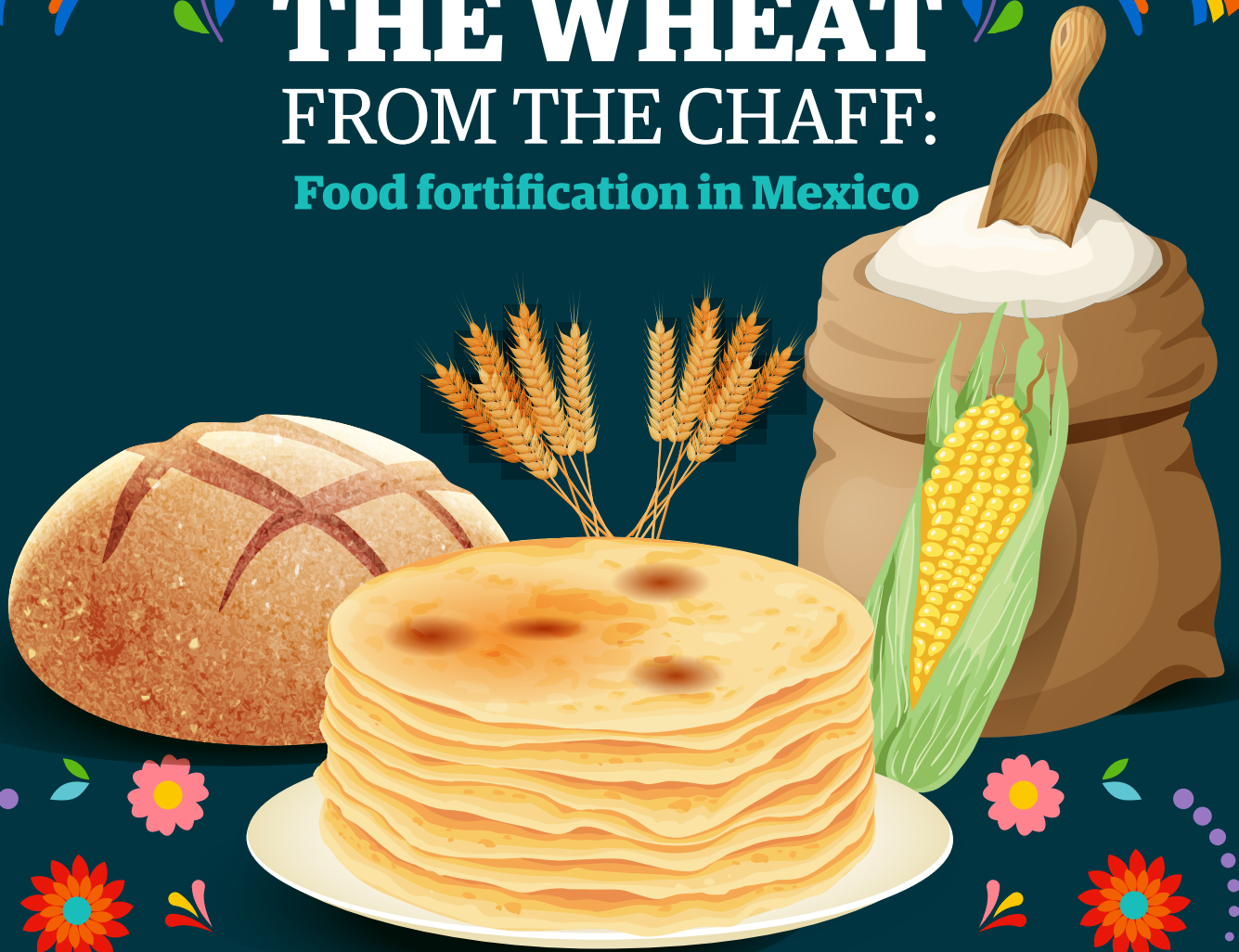




SORTING THE WHEAT

FROM THE CHAFF:
Food fortification in Mexico





www.changingmarkets.org

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Executive summary

Micronutrients are essential vitamins and minerals that humans need in small amounts in order to develop and maintain good health and which are usually obtained through a balanced diet. Globally, more than two billion people suffer from deficiencies of micronutrients such as iron, iodine, folic acid and vitamin A. These deficiencies result in serious health and economic impacts, preventing '*a third of the world's population from reaching their physical and mental potential*'.¹

The best medium- to long-term solution is to guarantee the right to food and nutrition by ensuring that all people have access to diverse, sustainable and healthy diets based on natural, traditional, nutritious foods. But balanced diets are not always accessible or affordable to all the vulnerable groups within a country's population. Furthermore, it is difficult for many women to get the recommended daily amount of folic acid through their diet alone.²

This report takes a closer look at a complementary solution: food fortification – the addition of micronutrients to food to correct or prevent deficiencies and improve public health. Adding essential vitamins and minerals to staple foods such as flour, oil and salt is a well-known, evidenced and cost-effective strategy which is practised in many countries. Fortification of commonly consumed foods can be highly effective in tackling micronutrient deficiencies. So far, it has helped nearly eradicate disabilities associated with iodine deficiency and contributed to a significant reduction in deaths, disability and suffering associated with folic acid deficiency.

Food fortification can only work well through cooperation and partnership between the private sector, governments and civil society. It requires governments to put in place a robust legal framework that can regulate, monitor and enforce industry practices to ensure that public health is placed first. It is widely recognised that the food industry plays a crucial role in delivering this intervention that could save millions of lives. However, recent global research suggests that even where mandatory legislation exists in countries, less than half of products are adequately fortified to national standards. Furthermore, media reports highlight how some players in the food industry purposefully under-fortify foods to gain commercial advantage over their competitors.

In this report, we delve deeper into the issue of food fortification in Mexico, a country with a double burden of malnutrition. While it has one of the highest obesity rates in the world, certain micronutrient deficiencies, particularly iron deficiency, continue to be a public health concern. Mexico has attracted

investment from the largest multinational food and beverage companies in the world. Some Mexican-owned food companies also have a significant global presence and therefore a big responsibility to play in providing nutritious foods and supporting healthy diets both within Mexico and worldwide. In addition, the Mexican government first mandated the fortification of wheat flour in 2000 and adopted legislation on the mandatory fortification of both wheat and maize flour in 2002. The current nutritional standards for the fortification of both flours have been in place for nearly a decade.

However, on the basis of publicly available information, this report highlights significant gaps with flour fortification in Mexico. Existing regulations omit crucial details about how the fortification standard should be externally monitored and enforced, seemingly leaving it up to the flour-milling industry to regulate itself. While the government seems to be doing some limited sampling and testing, it is not clear whether it also audits the fortification process at the flour mills. The available government sampling data show a variable level of compliance. While the levels of micronutrients in wheat flour seem relatively close to the requirements, the data show a significant drop in compliance in the fortification of maize flour with folic acid and omit analysis of other added micronutrients, such as iron and zinc. This casts doubt on the flour-milling and food-processing industries' actions to provide Mexican people with sufficiently fortified flours, tortillas and breads to help tackle micronutrient deficiencies, in line with the legislation. The report therefore concludes with recommendations on how the situation could be improved, specifically with regard to strengthening the enforcement regime.

*'Almost every
country in the world
is facing a serious
nutrition related
challenge.'*

*Global Nutrition Report 2017*⁵

1. Introduction: The importance of healthy diets

A healthy diet throughout life is essential for reducing malnutrition in all its forms and plays an important role in preventing heart disease, diabetes and cancer. What makes up a diverse and balanced diet will depend on a person's individual needs, where they live and which foods are available locally. However, the World Health Organization (WHO) gives general guidelines on what makes up a healthy diet: at least five portions of fruit and vegetables each day, plus legumes (lentils and beans), nuts and whole grains. Ideally, a healthy diet should also contain less than 5% of total energy intake from free sugars, less than 30% of total energy intake from fats (preferably unsaturated fats) and less than one teaspoon of salt per day.³

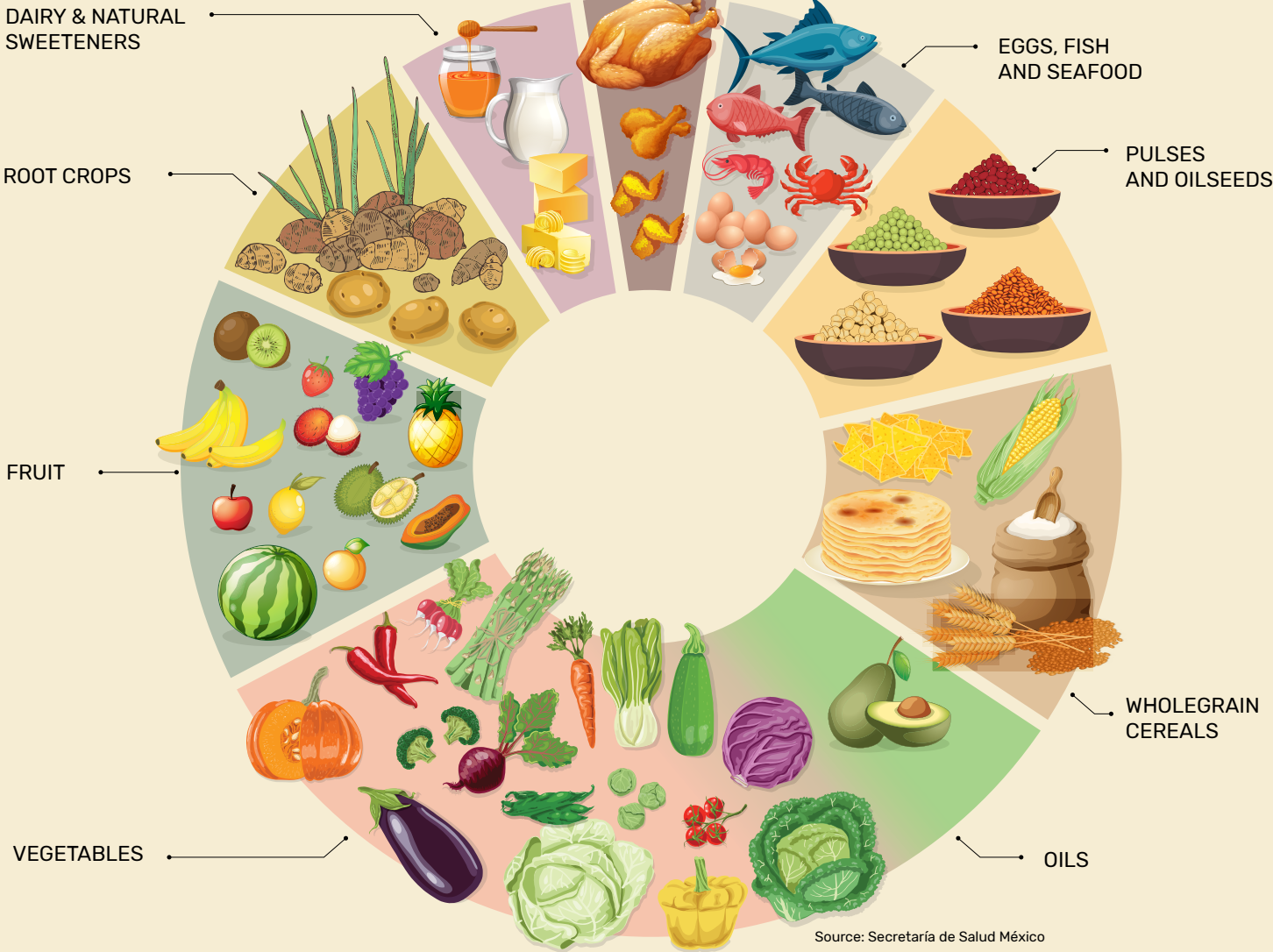
Eating a variety of unprocessed, fresh foods each day helps people obtain the right amount of essential nutrients, plus it can help people avoid unhealthy weight gain.⁴ People should be able to obtain all the energy and nutrients they need from a diverse and healthy diet. However, despite significant steps being taken to improve nutrition around the world, malnutrition remains a huge global problem.

The quality of nutrition in early life is vital for good growth, development and health in the future. However, there are several interconnected reasons for poor nutrition. For example, poverty, inequality, lack of education, and the absence of public policies that protect the right to food contribute to malnutrition in different ways. Living conditions are important too; for example, having access to clean water and sanitation or having an environment which promotes physical exercise. The availability of nutritious foods has a direct impact on whether a person is able to access a healthy diet, and this is underpinned by food systems. In other words, activities such as the production, processing, transportation, distribution and availability of food are crucial in shaping what people eat and their risk of malnutrition.⁶

This report will start by explaining the importance of good nutrition, especially with regard to micronutrient deficiencies, which affect two billion people worldwide. It will continue by looking at different solutions, including food fortification globally, and then take a closer look at the situation in Mexico, a country facing a double burden of malnutrition. The report will focus on the prevalence of micronutrient deficiencies and anaemia in Mexico and analyse the national legislation on mandatory flour fortification which aims to address this problem.

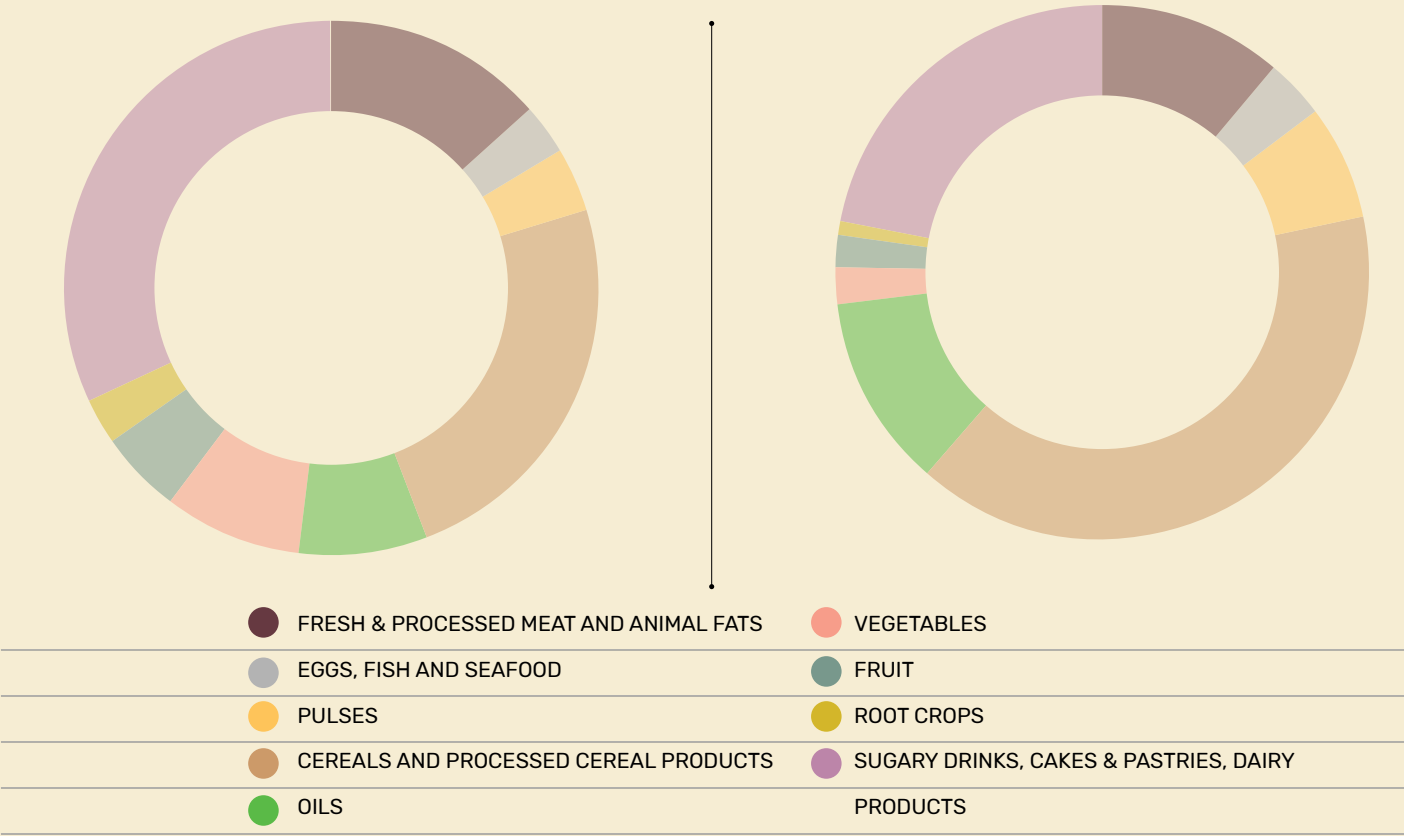
DIETS IN MEXICO

MILPA: THE MEXICAN TRADITIONAL DIET



TYPICAL URBAN DIET ▼

▼ TYPICAL RURAL DIET



SOURCE: INCMNSZ

MICRONUTRIENTS AND HEALTH

MICRONUTRIENTS	FOOD SOURCES	BIOLOGICAL FUNCTION	IMPACTS ASSOCIATED WITH DEFFICIENCY
26 Fe Iron	RED MEAT POULTRY FISH WHOLEGRAIN CEREALS PULSES FRUIT VEGETABLES	Plays a major role in delivering oxygen around the body. Contributes to a healthy immune system.	Severe iron deficiency leads to anaemia, which can cause haemorrhage and death of the mother in childbirth. Iron deficiency causes extreme fatigue and depression. Negatively affects economic productivity in adults and future productivity of children.
53 I Iodine	SEAWEED SEAFOOD FISH EGGS	Vital for brain development in babies. Needed for formation of thyroid hormones.	Pregnant women with low folic acid levels are at increased risk of having a baby with neural tube defects, where the spine or brain does not close properly. Neural tube defects are a major cause of death and lifelong disabilities.
B9 Vitamin	GREEN LEAFY VEGETABLES Folic Acid Food supplements and fortified foods	Essential for the development of the brain and spinal cord in babies.	Pregnant women with low folic acid levels are at increased risk of having a baby with neural tube defects, where the spine or brain does not close properly. Neural tube defects are a major cause of death and lifelong disabilities.
30 Zn Zinc	WHOLEGRAIN CEREALS PULSES GREEN LEAFY VEGETABLES RED MEAT	Helps the growth and development of the nervous system. Promotes immune response and resistance to infection. Important in pregnancy for the development of the baby.	Zinc deficiency restricts growth in children and impairs immunity – leading to increased infections, skin disorders and diarrhoea. Deficiency in pregnant women can increase the risk of premature birth.
A Vitamin	FISH LIVER OIL WHOLE MILK EGG YOLK NON-CITRUS YELLOW OR ORANGE FRUITS GREEN LEAFY VEGETABLES YELLOW VEGETABLES	Needed for good eyesight and a healthy immune system.	Lack of vitamin A in children causes blindness and increases the risk of severe illness and death from conditions like measles and diarrhoea.

SOURCE: World Health Organization & various



2. Hidden hunger: The urgent problem of micronutrient deficiencies

Micronutrients are essential vitamins and minerals – such as iron, zinc, folic acid and vitamin A – needed by the body in small amounts and obtained through the food we eat. They are vitally important for human development, disease prevention and well-being. When a person doesn't get enough of these vitamins and minerals, the consequences are devastating. Millions of children suffer from stunted growth, delays in cognitive development, weakened immunity and disease as a result of micronutrient deficiencies. For pregnant women, a lack of essential vitamins and minerals increases the risk of birth defects and stillbirth, and increases the risk of death in childbirth.⁷

Good nutrition is not just about having enough food but having the right food at the right time of life in the right quantities. The risk of poor nutrition often begins in the womb, caused by maternal undernutrition both before and during pregnancy. The most severe damage to children's nutritional status often occurs during the first 1,000 days; from conception until the child's second birthday. Poor nutrition can also have lasting effects that continue through generations.⁸ Adults who were undernourished at birth or during the first two years of life are more likely to become overweight later in life and suffer from high blood pressure, diabetes and heart disease in the future.⁹

*'Micronutrient
deficiencies are a
serious public health
problem that "condemn
a third of the world's
people from reaching
their physical and
mental potential"*

*The Micronutrient Initiative and
UNICEF¹⁴*

Currently, over two billion people worldwide suffer from one or more micronutrient deficiencies.¹⁰ This is more than double the number of people who do not have enough calories to eat.¹¹ Poverty, lack of access to a variety of foods, lack of knowledge about healthy diets and high levels of infectious diseases and illnesses are some of the main reasons for micronutrient malnutrition. This is also known as 'hidden hunger', because it often shows no warning signs and people affected may not even be aware of it. A person may be eating enough food or food in excess, but his or her body is still not receiving all the nutrients needed for a healthy life.¹²

This is a major public health issue that is not only a concern for low-income countries, but an important problem for industrialised nations too. Even low-level vitamin and mineral deficiencies impair development and cause ill-health and death on a large scale. As well as a direct effect on an individual person's health, hidden hunger has a negative impact on a country's economic development and productivity, and its people's capacity to work.¹³

Improving nutrition is crucial to the achievement of the Sustainable Development Goals (SDGs)

Food is a common thread in the SDGs. The 2017 Global Nutrition Report shows it will be a challenge to achieve the SDGs without addressing malnutrition and vice versa: addressing the underlying factors of poor nutrition through the SDGs will help end malnutrition.¹⁵ The ambition to improve nutrition is explicitly set out in SDG 2, but at least 12 of the 17 goals have indicators that are relevant to nutrition.¹⁶

Nutrition is a catalyst for achieving the SDGs. A good diet and good nutrition can:

- Drive environmental sustainability
- Drive economic development
- Reduce the burden on health systems
- Support equality and inclusion
- Improve peace and stability

2.1. What are the solutions?

The best way to prevent and overcome the problem of micronutrient deficiencies is to ensure access to a diverse range of high quality and nutritious foods and limit the consumption of ultra-processed foods across the population. This requires developing integrated policies and actions, which are free from conflict of interest, and that draw on a range of strategies to tackle malnutrition and address its underlying causes. It should start with strategies to improve exclusive breastfeeding rates and from six months of age introduce appropriate complementary foods according to WHO recommendations. Governments should support the production of healthy foods, ensuring they are available to everyone, and raise awareness across the population about healthy eating practices.¹⁷

People of all backgrounds in all parts of the world can be affected by a lack of micronutrients, but according to the WHO and the Food and Agricultural Organisation of the United Nations (FAO), the most severe deficiencies disproportionately affect the ‘resource poor, food insecure, and vulnerable households’.¹⁸ Nutrient-rich foods are not always accessible or culturally appropriate, and many people cannot afford a diverse, healthy diet. Furthermore, it is difficult for many women to get the recommended daily amount of folic acid through diet alone.¹⁹ This leads to the need for complementary measures that can deliver essential vitamins and minerals to people who lack them.

Besides shifting to better food systems, there are widely accepted strategies available which can help correct major micronutrient deficiencies. These strategies include food fortification, supplementation and public education about how to choose foods that contain the necessary vitamins and minerals. Each of these approaches has an important place in helping to improve the nutritional status of a population.



Strategies for tackling micronutrient malnutrition

The most common globally recognised and widely studied strategies to prevent and treat micronutrient deficiencies are:

Diverse diets – increase people's access to and consumption of a range of high quality and nutrient-rich foods. A long-term sustainable strategy which requires making changes to current food systems (growing, harvesting, processing, packaging, transporting, marketing, consuming and disposing of food). It also entails promoting the consumption of locally grown produce, supporting small scale farmers through agricultural policy, and regulating the multinational food and beverage industry.

Adequate infant and young child feeding – implement appropriate strategies for breastfeeding and complementary feeding practices. Optimal feeding practices during the first years of life can prevent malnutrition, reduce morbidity and mortality, improve school performance and intellectual development, and increase economic capital and work capacity in adults.²⁰

Supplementation – programmes which provide relatively large doses of specific micronutrients (usually in the form of pills, capsules or syrups) to individuals or population groups who are deficient in particular micronutrients. Supplementation is especially important at times when the body has high micronutrient needs that are difficult to meet with diet alone; for example, during pregnancy and breastfeeding. In many countries, iron and folic acid supplements are given to pregnant women. Supplementation has the advantage of being a fast and effective way to control micronutrient deficiencies, but compared to other strategies, it is relatively expensive and people often do not take the supplements as recommended.²¹

Food fortification – the deliberate addition of micronutrients to foods. Food fortification strategies can be used for the general population or targeted to a specific group.

In mass fortification or mandatory large-scale food fortification, mandates require micronutrients to be added to staple foods or condiments that are consumed regularly by the population, such as salt, grains (wheat, maize and rice) and oil. This population-based approach to fortification is an evidenced strategy which can lead to rapid improvements in the micronutrient nutrition status of a population. It is also very cost-effective: often it only costs a few cents per person per year. Fortification is often used on a national level to increase the intake of certain micronutrients to prevent or correct a demonstrated deficiency in a population. For example, universal salt

iodisation and flour fortification programmes have proven successful in many countries. The successful application of this approach requires commitments from both government and industry to implement.

Targeted fortification focuses on specific groups of the population who may not eat enough commonly consumed foods to benefit from mass fortification. For example, some governments have programmes that deliver fortified cereals to children from vulnerable groups in their early childhood.

Voluntary or market-driven fortification is where a food manufacturer takes the initiative to add micronutrients to a food product. This is often driven by commercial considerations as manufacturers can promote the health and nutritional benefits of their fortified products via labels and advertising. Although voluntary, this type of fortification usually takes place within a legal framework.²²

Public education and behavioural change – improving nutrition involves not only ensuring that diverse micronutrient-rich foods are available and accessible, but also increasing consumer awareness and changing behaviour so that people understand the benefits provided by a diverse diet and know how to achieve a healthy diet. Such changes can be achieved partly through mass media campaigns, but also through policies that guarantee consumers' right to information about their food, such as front-of-pack warning labels and policies to regulate food marketing directed at children.

Public health measures – general public health strategies including prevention and treatment of infectious diseases, deworming, and improvement of water and sanitation can minimise micronutrient depletion and reduce micronutrient deficiencies among vulnerable groups.

2.2. Food fortification in the spotlight

Food fortification is the deliberate addition of micronutrients to foods, often to commercially available foods, in order to prevent or correct a demonstrated deficiency in a population and provide a benefit to public health. Each country will set its own standards according to the specific nutrients its population needs.²³ It is a well-known strategy that is relatively cost-effective, easy to implement and effective at reaching large populations.²⁴ But the huge potential of fortification to improve people's lives requires good programme design, appropriate implementation, industry compliance and government enforcement.

Mass food fortification has a long history of use in industrialised countries for the successful control of micronutrient deficiencies. For example, iodine was first added to salt in Switzerland and the USA in the 1920s. More than 140 countries now implement universal salt iodisation programmes, and this practice has helped almost eradicate goitre and intellectual disabilities associated with iodine deficiency.²⁵ Currently, at least 85 countries have flour fortification programmes with iron and/or folic acid.²⁶

It is important to note that only some foods are suitable for fortification, and the potential impact depends on the appropriate choice of food. For example, the food needs to be consumed widely in adequate amounts and to be affordable by the target population. Of the foods which are widely consumed, some are better suited to fortification than others. It is more appropriate to implement fortification in foods where production is centrally concentrated, rather than across a large number of smaller production sites, as the technology is easier to transfer and monitoring can be more effectively carried out.²⁷

Technical considerations are also very important in the success of fortification programmes. For instance, vitamins could be lost if fortified foods are exposed to heat, air, light and humidity. The stability of the selected nutrients and the food packaging need to be carefully considered to ensure that any exposure during distribution, processing and storage does not result in vitamin losses. For a food fortification programme to be effective, there should be no change in the colour, smell or taste of the fortified food. The amount of a particular nutrient and the type of compound added may also be limited by technical considerations related to the appearance of a fortified food. There are also different compounds of micronutrients that can be added; some compounds are more easily absorbed by the human body and more effective in tackling micronutrient deficiencies.^{28,29}

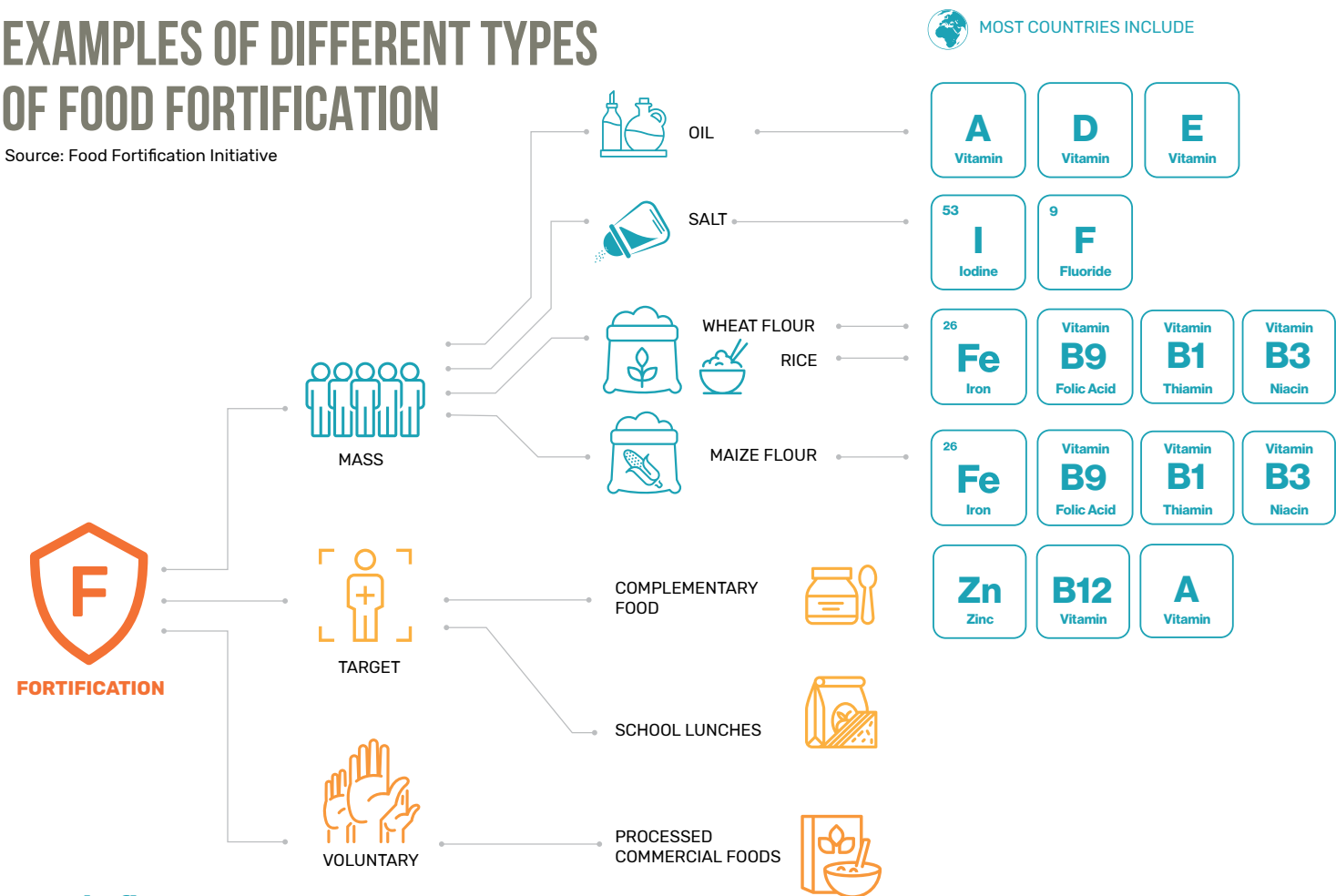
Global evidence from large-scale implementation of flour fortification programmes shows that fortification can reduce micronutrient deficiencies and improves people's health. For example, Costa Rica's wheat and maize flour fortification with folic acid in 1997 and 1999 resulted in a significant reduction in babies born with neural tube defects.³⁰ Meanwhile, a 2013 systematic review in nine countries (including several Latin American countries) also concluded that flour fortification with folic acid has had a major impact on reducing neural tube defects.³¹ A further study in 2015 looked at whether anaemia was reduced in non-pregnant women after countries implemented wheat, or a combination of wheat and maize, flour fortification programmes. It found that each year of flour fortification resulted in a 2.4% reduction in anaemia compared to the previous year.³²

2.3. Closing the gap between theory and practice

Fortification is not a silver bullet; it must be integrated with other approaches and a human-rights based approach which ensures access to high quality foods and diverse diets. However, when fortification is done well, it has huge potential to tackle micronutrient deficiencies. In spite of this, '*there exists evidence of non-fortification and under-fortification among products claiming to be fortified*'.³³

EXAMPLES OF DIFFERENT TYPES OF FOOD FORTIFICATION

Source: Food Fortification Initiative



Why flour?

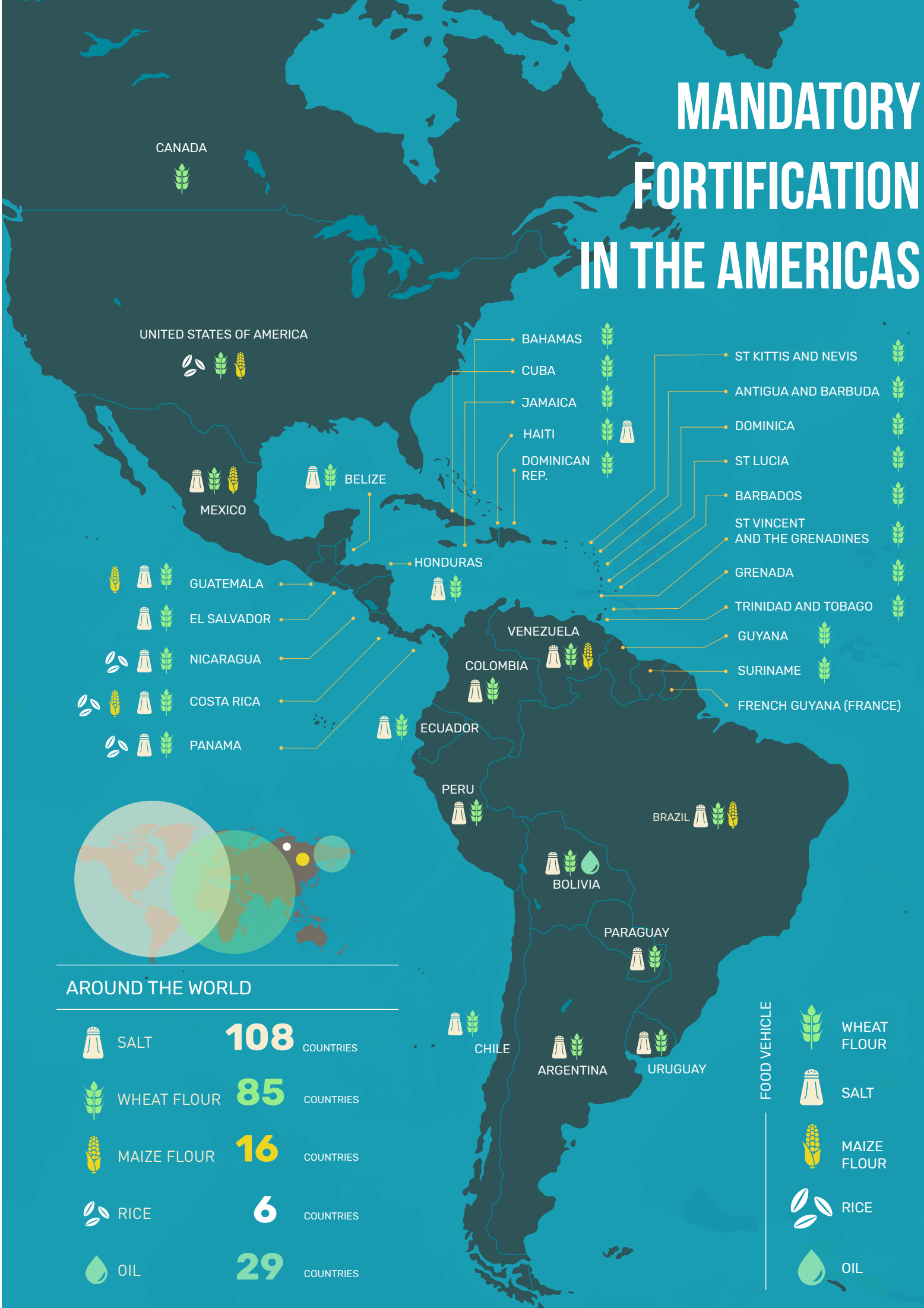
Generally speaking, in order for a food type to be considered an appropriate vehicle for fortification, it must meet a number of requirements. It must be affordable and widely consumed by the population, especially those segments of the population that are most at risk of micronutrient deficiencies. The food must allow for the addition of nutrients in small quantities, and its continued consumption should significantly increase the ingestion of these nutrients. The added nutrients must be distributed evenly throughout the food type, and the food itself should not interfere with the stability or absorption of the added nutrients. The added nutrients should also not affect the smell, taste, colour or other characteristics of the food in a way that will discourage people from eating it.

In the past, the challenges of successful fortification focused on technical considerations or infrastructure constraints. More recently, analysis has cast light on the challenges of regulation and enforcement. A 2015 survey conducted in 12 countries estimated that even where legislation exists to mandate industry to fortify certain staple foods, less than half of products are adequately fortified to the national standards of each country.³⁴

There are several factors along the food chain which result in low rates of compliance with national fortification standards. At government level, reasons include a confusing legislative environment, imprecise language to describe the fortification standards, a lack of clarity over which authorities should be monitoring fortification compliance and a lack of resources to ensure effective enforcement.³⁵

Another factor is analytical: there is some variability in nutrient levels during the fortification process and some variability in measuring small amounts of micronutrients. It is important for government inspectors to therefore audit the whole fortification process and take a systems-based approach to inspection using

MANDATORY FORTIFICATION IN THE AMERICAS



SOURCE: GLOBAL FORTIFICATION DATA EXCHANGE

established Hazard Analysis and Critical Control Point (HACCP) principles. This should also include inspecting proof of premix purchase by food companies and premix usage reconciliation calculations.³⁶

In some cases, regulatory agencies are unwilling to enforce laws due to pressure from industry interest groups. This can also result in weak penalties that do not go far enough in ensuring industries fortify adequately.³⁷ It has been highlighted that inadequate fortification is in large part due to '*poor regulatory monitoring*' which '*does not sufficiently identify and hold producers accountable for under-fortified products*'.³⁸

At an industry level, reasons for the gap can include a lack of technical capacity to appropriately fortify foods or poor processing procedures, especially in small industries. Yet an additional and deeply concerning reason is due to '*other industries which purposefully under-fortify or do not fortify at all*'.³⁹ These industries seemingly do so without consequence.

The research by Luthringer and colleagues notes that when authorities fail to monitor and enforce fortification legislation then '*industries may choose to stop fortifying to increase profits, jeopardising the nutritional impact on the population*'.⁴⁰ In other words, it should not be assumed that industry is fortifying adequately, even when mandated to do so by law. A recent *Financial Times* article highlighted this problem in Nigeria, a country where nearly half of all child deaths are attributable to malnutrition. Several businesses in the food industry in Nigeria recently pledged to fortify staple foods, despite the fact the government has required certain foods to be fortified by law since 2002. Bill Gates, who visited the country several times, noted that staple foods are '*a high-volume, low-margin business*' and companies that did not fortify foods therefore had '*a commercial advantage over competitors*' even though fortification added only 1–4% to the cost.⁴¹

Food fortification is an intervention that works through cooperation and partnership between governments, civil society and private industry. Fortification regulation should, however, be led by government to ensure it is anchored in scientific evidence and best practice. It is widely recognised that the food industry plays an essential role in delivery, and this is reflected in the implementation of several public-private partnerships set up to address micronutrient malnutrition.

Fortified Junk Food

It is important to note a parallel phenomenon, referred to here as “bad fortification” which is the fortification of ultra-processed foods and beverages, such as sweet snacks, cereals, flavored yogurts and sugary beverages. The fortification of junk foods and beverages is a strategy that the Food and Beverage Industry use to “sanitize” the image of their obesity-causing products. The marketing of these products often highlights that they have been fortified with micronutrients, minerals and/or vitamins in order to de-stigmatize the products and convince consumers of their health benefits, despite the fact that these products are harmful to health.

In Mexico there is a pattern of fortifying unhealthy foods, especially foods marketed to children. For example, Kellogg’s Choco Krispis, a cereal with a high sugar content advertises that it contains 12 vitamins and minerals as well as calcium so that children can grow strong bones. Meanwhile, a package of Jell-o highlights the fact that it has been fortified by Vitamin C, which serves to deemphasize the fact that it also contains colorants and artificial sweeteners not recommended for children. Sweetened beverages also often contain claims that they are fortified with vitamins to detract from the fact that they contain excessive amounts of sugar.

A study carried out by Mexico’s Institute for Public Health on cereal health claims demonstrates that more than 70% of unhealthy cereals presented at least one nutritional claim on their box, these claims often promote the fact that these cereals are fortified with vitamins, minerals or other micronutrients⁴². The study found that such claims were more often present on unhealthy rather than healthy cereals, underscoring the fact that fortification is utilized as a strategy to mislead consumers to think unhealthy foods are in fact beneficial to their health.

Fortification is also utilized by the ultraprocessed Food & Beverage Industry to cast themselves as part of the solution to addressing malnutrition. This is the case not only in Mexico but around the world, where transnational food corporations have tried to profit by arguing that the solution to micronutrient deficiencies and undernutrition is through the fortification of processed foods.

The fortification of junk food, however, stems from a very reductive understanding of nutritional health and one that focuses on the effect of isolated, individual nutrients on health rather than recognizing the beneficial effect of whole foods. This approach often referred to as “nutritionism” is one championed by the industry because it legitimizes their role in combating malnutrition, and allows them to profit from it. However, this “technical” approach has been heavily criticized because it fails to address the root causes of malnutrition (over and under nutrition), such as the current, broken food system. It is important to emphasize that full alleviation from all forms of malnutrition, cannot be achieved by the fortification of ultraprocessed foods but rather by strengthening local and regional food systems that are economically and environmentally sustainable, promoting the production of unprocessed, natural and diverse foods, protecting cultural and culinary knowledge and ensuring food sovereignty and the human right to adequate food and nutrition.

Credit: El Poder del Consumidor

For more information, please check <http://elpoderdelconsumidor.org/>



3. Nutrition in Mexico

Mexico suffers from a multiple burden of malnutrition: it faces one of the world's highest obesity rates⁴³ and the public health problems which have occurred as a result have become a justified cause for concern. Running parallel to this, almost 1.6 million children in Mexico (15.5%) suffer from chronic malnutrition (low height for age): the highest absolute number of malnourished children in the Americas region.⁴⁴ Furthermore, the high prevalence of micronutrient deficiencies and anaemia continues to be an important public health concern.⁴⁵

Mexico is not unique in this situation; the combination of obesity, undernutrition and micronutrient deficiencies is a public health problem in nearly half of all countries.⁴⁶ In Mexico, several programmes have been implemented which target a variety of population groups to address different food and nutrition issues. In terms of food fortification, national mandatory legislation is in place requiring maize and wheat flour to be fortified with iron, zinc and other nutrients. Mexico also fortifies salt with iodine and is one of the countries reported to have above 90% household coverage with iodised salt.



THE DOUBLE BURDEN OF MALNUTRITION IN MEXICO

OVERWEIGHT
AND OBESE



COMBINED
72.5%
ADULTS IN MEXICO

DIABETES



100,000
DEATHS
EACH YEAR



CHRONIC
MALNUTRITION

1.6



million
CHILDREN HAVE LOW
HEIGHT FOR THEIR AGE

SUFFER FROM **ANAEMIA**



WITH IRON DEFICIENCY
ESTIMATED AS THE CAUSE IN

1/4



CHILDREN UNDER 5 YEARS

1/5



PREGNANT WOMEN

50%

OF THESE CASES

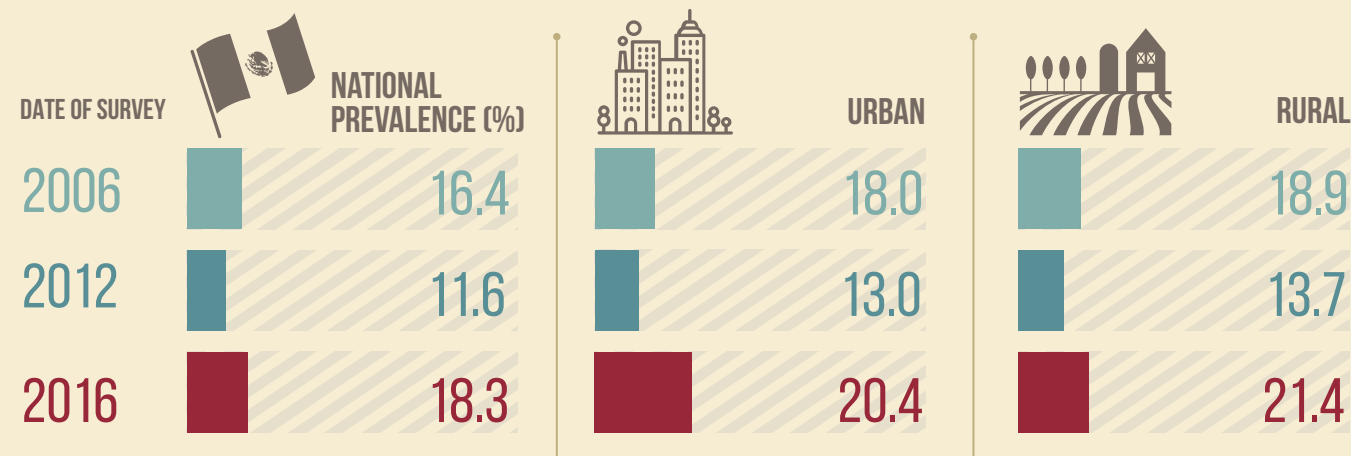


INADEQUATE IRON INTAKE
90% OF WOMEN

ZINC DEFICIENCY **1/4**
ADULT MEN AT RISK



PREVALENCE OF ANAEMIA IN NON-PREGNANT MEXICAN WOMEN, AGE 20-49 YEARS OLD



Source: ENSANUT and various

Changing diets in Mexico

In recent years, Mexico has seen a rapid and dramatic shift in consumption patterns, with people moving away from traditional diets towards processed foods that are high in sugar and fat. In the last 30 years, the price of fruit and vegetables has increased much faster than the price of ultra-processed products⁴⁷ and Mexicans now have the highest consumption rate of sugary soft drinks in the world.⁴⁸

A recent report by the Pan American Health Organisation found an increase in retail sales of fast food and ultra-processed foods in 11 Latin American countries between 2000 and 2013. By 2013, Mexico had the fourth highest number of sales of ultra-processed foods: 212kg per person per year, surpassed only by the USA (307kg), Canada (229kg) and Germany (218kg).⁴⁹ Mexico is also the eighth biggest food-processing country in the world.⁵⁰ The dramatic change has resulted in an explosion of food-related illnesses. Diabetes is now Mexico's biggest killer, claiming 80,000 lives each year.⁵¹

The radical change in diets and the food environment in Mexico cannot be separated from the context of the North America Free Trade Agreement (NAFTA), signed in 1994. Although the causes of obesity are complex, many studies have linked weight gain to the consumption of processed foods. NAFTA allowed billions of dollars of foreign investment to flow into Mexico, resulting in the growth of American fast food restaurants and convenience stores, and also caused an increase in imports of cheap maize and processed foods, whose production is subsidised in the USA.⁵² In the years since the agreement, imports of high fructose corn syrup from the USA have increased by 500% and the consumption of sugary cereals has multiplied.⁵³

Until recently, personal choice, not corporate actions, has been blamed for dietary problems. Although there is an element of individual choice, people make decisions within the context of their food environment.⁵⁴ Food manufacturers feed a large proportion of the population in Mexico; their widespread distribution channels enable processed products to reach even the most remote areas of the country. Many brands of processed foods are available in the government-run Diconsa shops – providing a guaranteed market for major food manufacturers, as people who receive public funds under the cash transfer programme have to spend the money in these shops.⁵⁵

The Pan American Health Organisation five-year plan until 2019 says that healthy diets need to be supported by strengthening national healthy food systems. This includes the development of market opportunities for healthy foods and regulation to curb the rapid increase of ultra-processed products (e.g. sweets, chocolate, fries, crisps, energy bars, packaged desserts, soda and energy drinks).⁵⁶

The power and influence of multinational companies in the country is significant. Mexico has attracted the investment of the largest food and beverage companies in the world, including Nestlé, Unilever, Danone and Coca-Cola, plus many from the USA, such as Kellogg, PepsiCo, General Mills and Mondelez.⁵⁷ Mexican companies are also big global players in this sector; Bimbo is the world's largest bakery company and the biggest bread seller in the USA, while Gruma is the world's largest tortilla and maize flour producer. These companies play an increasingly important role in nutrition and public health in Mexico, and also around the world.

3.1. Micronutrient deficiencies in Mexico

In Mexico, micronutrient deficiencies impact on a significant proportion of people. The 2017 Food Sustainability Index, which ranks 34 countries according to their food system sustainability and has nutritional challenges as one of the key areas, placed Mexico at a mere 27th place for the country's progress towards addressing micronutrient deficiencies.⁵⁸

A 2012 national health survey to gather data on the nutritional status of the Mexican population found low intakes of minerals – iron, zinc, calcium and magnesium – in the Mexican diet, especially in adults and teenagers. The prevalence of inadequate iron intakes ranged from 62% to 89% among teenagers and adults and between 46% and 52% in children.⁵⁹ Shockingly, almost 90% of women were found to have an inadequate intake of iron. The reasons for low intake of minerals are thought to be due to the consumption of large amounts of energy-dense but nutrient-poor foods, including the consumption of sweetened beverages. Researchers concluded that significant deficiencies in iron and calcium are a public health concern that needs to be addressed.⁶⁰

The survey also found there were inadequate intakes of some essential vitamins in the Mexican population. Intakes of folate and vitamin A were moderately inadequate, with prevalence ranging from 47% to 70% in adults and teenagers. The highest prevalence of inadequate vitamin intakes was found to be in teenagers and adults in rural areas in the southern states of Mexico.⁶¹

A paper based on these results concluded that the Mexican diet '*favours processed, nutrient-poor foods at the expense of non-processed or minimally processed basic foods*' which results '*not only in high intakes of added sugars and saturated fats but also in low intakes of minerals, vitamins, and fibre*'. These findings may explain the double burden of undernutrition and high levels of obesity in the Mexican population.⁶²

Inadequate intakes of micronutrients through diet contribute to important public health problems in Mexico. Nearly a quarter of children under five years and a fifth of pregnant women in Mexico suffer from anaemia,⁶³ with iron deficiency estimated as the cause in half of all cases.⁶⁴ Anaemia seriously harms pregnant women and young children: globally, it is associated with 20% of women's deaths during childbirth, and it leads to severe learning and development problems for children. Iron deficiency leads to tiredness and depression, impacting on economic productivity and the overall quality of people's lives.⁶⁵

'Iron deficiency affects more people than any other condition, constituting a public health condition of epidemic proportions.'
WHO⁶⁶

Worryingly, the midway National Health and Nutrition Survey in 2016 suggests progress made in reducing the prevalence of anaemia in women of reproductive age (20–49 years) in the last ten years has

been reversed and is at its highest at 18.3%. The highest rates of anaemia are observed in Mexico City and the southern states.⁶⁷

Anaemia is a worldwide problem, and the 2017 Global Nutrition Report found that no country is on track to meet targets to reduce it. Globally, the number of women of reproductive age with anaemia has actually increased since 2012.⁶⁸ Iron deficiency is thought to be the most common cause of anaemia globally, although there are other nutritional causes (folate, vitamin B12 and vitamin A deficiencies) and non-nutritional causes (chronic inflammation and parasitic infections).⁶⁹

Zinc is also a substantial deficiency among adult men in Mexico, with nearly a quarter at risk of inadequate intake.⁷⁰ Results from the 2006 National Health and Nutrition Survey also show high rates of zinc deficiency in children aged 1–4 years (28%) and also in schoolchildren aged 6–11 years (26%). This is above the percentage of the world's population at risk of zinc deficiency – 17%.⁷¹ Zinc deficiency weakens the immune system and increases the risk of dying from infections.⁷²

3.2. Maize, wheat and tortillas

Maize plays an integral role in the Mexican diet and culture. It has been a staple food and a principal crop cultivated by farmers in Mexico for millennia. Each year, around 30 million tonnes of maize are consumed in the country; this includes both human consumption and animal feed. Nearly three-quarters comes from domestic production of white corn and the remaining quarter from imported yellow corn, mainly from the USA.⁷³

Maize tortillas are a staple food in Mexico. It is estimated that in some parts of the country, 65% of dietary nutrients are derived from tortillas.⁷⁴ Mexico's National Institute of Statistics and Geography (INEGI) released a survey which shows that maize and tortillas account for an average of 8.3% of total food expenditure in Mexican households,⁷⁵ with 81% of households spending at least 6.5% of their income on corn tortillas alone.⁷⁶ Results from the National Council for the Evaluation of Social Development Policy (CONEVAL) showed in 2010 that, on average, a person in Mexico eats nearly 62kg of tortillas per year.⁷⁷

However, despite the fact that maize continues to be the most important staple crop in Mexico, analysts state that tortilla consumption has fallen by nearly 20% in the last decade.⁷⁸ One report based on information from the National Household Income Expenditure Survey suggests that in 2002 daily consumption of tortillas was an average of 249g per person, but by 2010 this had reduced to 157g.⁷⁹ This change is most noticeable in the cities, and primarily in the diet of young people and in the middle to upper classes. It can partly be explained by the increasing presence of ultra-processed and fast foods which are already being consumed in both urban and rural areas.^{80,81}

Besides maize tortillas, wheat bread is also a staple in the Mexican diet, with per capita consumption at 34kg per year, of which 70–75% is white bread.⁸² Analysis also suggests that while historically Mexicans have preferred maize tortillas over bread, this trend has been gradually shifting, with Mexico's wheat consumption per capita steadily increasing over the past ten years.⁸³

According to the Alianza por Nuestra Tortilla, there are two different ways of making tortillas: the traditional and the industrial method. The traditional method is where maize kernels are cooked with quicklime, steeped in the cooking water overnight and then rinsed. This process is known as nixtamalisation, which produces fresh dough, called '*masa*'. The industrial method is where maize is industrially processed into a dried flour, which can then be reconstituted to make a dough.⁸⁴ Research and testing undertaken in

KEY FACTS - FLOUR FORTIFICATION IN MEXICO



28%

5.5 M

MILLIONS METRIC TONS



72%

14.4 M

MILLIONS METRIC TONS

MEXICAN MARKET, CONSUMPTION OF WHEAT AND MAIZE (2009-2017)

CONSUMPTION OF TORTILLAS AND BREAD

PER PERSON
ANNUALLY



URBAN
56.7 kg



RURAL
79.5 kg



34 kg BAKED PRODUCTS
PER PERSON ANNUALLY

Source: International Grain Council and various

MINIMUM AMOUNT OF NUTRIENTS TO BE ADDED TO FLOUR (MG / KG OF FLOUR)

RECOMMENDED SOURCES	MINERALS		B VITAMINS			
	Iron	Zinc	Folic Acid	Niacin	Riboflavin	Thiamine
	Ferrous sulphate Ferrous fumarate	Zinc oxide	Folic acid	Nicotinamide	Riboflavin	Thiamine mononitrate
WHEAT	40	40	2	35	3	5
MAIZE	40	40	2	35	3	5

Source: COFEPRIS

Mexico City show that tortillas made from fresh masa dough using the traditional process are higher than industrially processed maize flour in dietary fibre, calcium and iron. This is due to the processing techniques but also the different type of corn used.⁸⁵

Tortillas are often produced by small '*tortillerías*'; usually a small family-owned business, although sometimes there are groups of 10-20 *tortillerías* owned by the same person. Approximately half the *tortillerías* use the traditional nixtamalised process, and half use industrially processed maize flour for making their tortillas.⁸⁶ However, in cities, approximately 80% of *tortillerías* use the industrially processed maize flour rather than the traditional process because it is less time-consuming.⁸⁷ Besides *tortillerías*, there is a growing trend of supermarkets making their own fresh tortillas on the premises and selling them more cheaply than the smaller operators in order to attract customers. There is also an increasing presence of industrially produced packaged tortillas sold throughout Mexico in markets, supermarkets and smaller convenience stores such as OXXO and 7-Elevens.

Campaigning for traditional diets in Mexico

The Alianza por Nuestra Tortilla (Alliance for Our Tortilla) is an alliance of civil society organisations concerned about the quality of tortillas in Mexico.

Maize and its many varieties originated in Mexico more than 10,000 years ago. A total of 65 native varieties of maize exist in Mexico, and these have adapted to different ecosystems ranging from tropical zones at sea level to arid zones at 3,000 metres high. This makes maize a unique living databank of genetic information and of key importance for global food security. The nixtamalisation of maize more than 3,500 years ago signified a major advancement for ancestral communities in Mexico as it allowed the conversion of maize into tortilla – a food of superior quality capable of maintaining an entire civilisation.

Nixtamalisation is the process through which a solution of quicklime is added to white corn during cooking, then allowed to stand, getting through the pericarp (i.e. outermost part) and softening the seed. Once cold, the nixtamal mixture is drained and ground by stone into flat circular shapes, which are cooked on a flat griddle to produce tortillas. The process of nixtamalisation facilitates the absorption of proteins and vitamin B3, and provides 30 times more calcium and important types of starch for human nutrition. Different variations of this process exist in line with the type of corn, the variety of quicklime and the environmental conditions; therefore, it is not possible to talk about a single type of nixtamalised tortilla.

Tortillas, which continue to be the main source of energy in the Mexican diet, represent a profitable market for industrial food producers, which have displaced traditional processes with industrial ones. The exponential growth of commercial brands has reached all segments of the maize market to the great detriment of traditional Mexican culture and food.

The aim of the Alianza por Nuestra Tortilla is to protect maize varieties native to Mexico and traditional tortilla production processes (i.e. nixtamalisation), as well as to avoid the presence of agrotoxins, genetically modified organisms (GMOs) and unnecessary additives to tortillas. Although the Alianza is relatively new, it has already carried out several actions, including holding a public forum, and writing and disseminating its objectives, and it is currently designing a strategy to advocate for public policies based on the exercise of human rights. Its main areas of expertise include corn production, tortilla production, marketing and human consumption. The Alianza continues to call on Mexican society to demand high quality tortillas, to protect traditional production processes, to take part in organised initiatives and to defend the rights of consumers.

Credit: Alianza por Nuestra Tortilla
For more information, please see
<http://alianzapornuestratortilla.com/>



4. Is flour fortification being done well in Mexico?

4.1. Nutrition initiatives in Mexico

Mexico has in place multiple programmes targeted at a variety of vulnerable populations, and continued research and resources are put towards the prevention and control of the double burden of malnutrition in Mexico.

Nearly 40% of households in Mexico report being a recipient of one or more nutrition programmes, with around half of the population in the south of the country benefiting from these programmes. Prospera (previously Oportunidades) is the programme with the highest national coverage, reaching over a quarter of households in Mexico, while the school breakfast programme reaches 12%.⁸⁸ Folic acid supplementation is targeted at nearly a third of women of reproductive age, and vitamin A and iron supplementation is targeted at 20% of households.⁸⁹

The Prospera programme began in the 1990s by giving cash transfers to mothers to encourage them to send their children to school and access health centres. The programme also delivers micronutrient supplements to children under five, pregnant women and nursing mothers. The Liconsa milk programme is targeted at children aged 1-11 years in families living in poverty across Mexico. Since 2002, the milk has been fortified with iron, zinc, folic acid and several vitamins. Diconsa is a Mexican government agency with a network of 27,000 community shops across the country. The shops aim to sell foods with a high nutritional value at low prices in some of the most remote and poorest areas of the country.⁹⁰



The role of NGOs in Mexico providing care to children suffering from anaemia

Un Kilo de Ayuda (UKA – A Kilo of Help) is an organisation with more than 30 years of experience in Mexico. The organisation's actions are focused on helping people achieve dignity and freedom by developing their physical, intellectual and emotional capacities during early childhood. UKA's model for early childhood development sets out three major strands of actions:

- Neurological and psycho-affective development programme: to provide parents or caregivers with tools for nurturing care and protection, practices of timely stimulation and play for the optimal development of children;
- Physical development programme: to improve the health and nutritional status of pregnant women and children under five years of age;
- Community development programme: to initiate the development of the community based on the identification of its needs, creating a favourable environment for early childhood development and self-sufficient communities.

UKA also conducts advocacy work to ensure the prioritisation of early childhood development in policymaking. UKA advocates for reform of the legal framework, the improvement of public programmes, and the assessment of the effectiveness and allocation of public resources to support early childhood development. UKA also participates in networks of civil society organisations and advises government institutions in Mexico, which has enabled the organisation to reach more than 39,000 children in seven states in 2018 alone.

UKA's operational and advocacy work seeks the achievement of the right to food, nutrition, health protection, education and early childhood development. A number of corporate partners, including Amway and Takeda, support UKA's actions to prevent and treat anaemia in pregnant women and children aged six months to five years. UKA's interventions include performing capillary haemoglobin tests and ensuring immediate treatment after diagnosis with anaemia. These interventions allow for timely referral of serious anaemia cases to health centres.

As a complementary strategy, UKA organises workshops and counselling events every two weeks to develop parents and primary caregivers' capabilities on topics relevant to the prevention of anaemia in children; for example, techniques for handwashing, hygienic handling of food, safe water in the home, promotion of breastfeeding and complementary feeding, emphasising the consumption of native foods rich in micronutrients. After a three-month follow-up, an additional test is carried out, and families are supported through home visits by female facilitators – women who are a key link between the communities and UKA.

Through experience, UKA has developed strategies supported in scientific evidence, such as the promotion of feeding practices which establish healthy habits in the first years of life and reverse the effects of malnutrition.

Credit: Un Kilo de Ayuda

For more information, please see <https://www.unkilodeayuda.org.mx/>

4.1.1. A short history of flour fortification in Mexico

Regulation of flours in Mexico dates back to the 1970s.⁹¹ However, it wasn't until the 1990s that general guidelines for the fortification of foods were established,⁹² and the first initiative to introduce nutritional specifications for the fortification of both maize and wheat flour was a voluntary agreement between government and industry in 1998.⁹³

Mandatory regulation was introduced at different times for the fortification of wheat flour and maize flour. In the case of wheat flour, the first legislation came into force in 2000, requiring fortification with iron and folic acid.⁹⁴ In 2002, the amendment of the General Health Law established the mandatory fortification of both wheat and maize flour.⁹⁵

In 2010, the Mexican government published legislation NOM-247-SSA1-2008 which provided mandatory and more complete nutritional standards for the fortification of both wheat and maize flours with iron, zinc, folic acid, niacin, thiamine and riboflavin.⁹⁶ This legislation cancelled the previous regulation for wheat flour and set out the current standard for the nutrients that must be added to fortify and restore both wheat and nixtamalised maize flours.

The measure intended to restore up to 60% of the micronutrients lost in the industrial processing of refined flour, as well as to supplement the micronutrients that are most lacking in the Mexican diet.⁹⁷ This legislation also set sanitary specifications, contaminant limits, and transportation, storage, labelling and packaging requirements for cereals for human consumption.

4.2. Analysis of legislation in Mexico

The current standards for wheat and maize flour fortification in Mexico specify the minimum levels of nutrients to be added per kilogram of flour. It was decided that fortifying both wheat and maize flours covers the widest demographics of the Mexican population and therefore has most impact on addressing micronutrient deficiencies.⁹⁸

4.2.1. Which nutrients and what levels?

Recommendations about which nutrients should be added to flours, how much of each nutrient to use and from what sources depend on several factors. Technical information is considered about the nutritional needs of the target populations, consumption levels of flours to be fortified and products made with those flours, the potential interactions among the nutrients and potential adverse effects on health at very high levels.⁹⁹ Technical variables with the wider supply chain are considered, such as the crop varieties used in production and the potential impact of food-processing methods.¹⁰⁰ The decision on nutrients is also integrated within the picture of other fortification policies and government nutrition programmes.¹⁰¹

The legislation was based on a 1999 study by Rosado and colleagues which developed recommendations for the micronutrients, their levels and sources, for the fortification of wheat and maize flour in the Mexican context.¹⁰²

A constraint of the current Mexican standard is that it does not give nutritional specifications for the fortification of tortillas and breads made from fortified flours¹⁰³ or state that fortified flours must be used in the preparation of flour-rich products. In practice, this means the fortification of tortillas, breads and

other flour-based products sold in Mexico relies solely on the food processor having good systems in place for procuring flour fortified to the Mexican standard.

4.2.2. Recommended sources

For some nutrients, there are different available sources; some sources provide a compound which is more easily absorbed by the human body. The WHO guidelines provide details of the optimal compounds for fortification. However, it has been noted that in many countries, most flour millers do not follow WHO recommendations for the type of iron compound. A study by Hurrell and colleagues in 2010 concluded that *'it seems unlikely that a meaningful reduction in the worldwide prevalence of iron deficiency will be achieved via wheat flour fortification unless current practices are changed'*.¹⁰⁴

The Mexican legislation recommends the iron source as either ferrous sulphate or ferrous fumarate. Although the sources of each micronutrient are only *'recommended'*, the concentrations of nutrients from sources different from those recommended are not specified. More recent guidelines issued in 2016 by WHO do not recommend the use of certain types of iron in the fortification of high extraction maize flours¹⁰⁵

4.2.3. Regulatory monitoring

A recent review of grain fortification documents from 68 countries shows that many documents give technical details about fortification, but a significant number lack details about how the regulations should be monitored and enforced.¹⁰⁶ These findings are confirmed in our examination of the Mexican legislation.

The Mexican legislation states the industry is required to carry out internal quality control with regard to fortification. The information that wheat and maize flour producers should provide for control purposes includes written procedures of the fortification processes, the controls applied to guarantee their efficiency, details of any corrective measures to be applied in case of deviations, plus records of the critical variables of the process, as well as product analysis reports. However, these measures are self-controlled by the industry, and the legislation does not provide any requirement for companies to maintain their reports for inspection by government officials.

The legislation does not provide any information about which government agency is responsible for overseeing external compliance and enforcement at the mills, at the retail level or at points of import. It also does not provide any details about the government procedures and mechanisms which should be in place to assure compliance. It is therefore very unclear from this particular piece of legislation which government department carries out external monitoring of flour fortification, how frequently this is done, with which methods and what indicators it uses to measure success.

Furthermore, the Mexican legislation does not provide details of enforcement measures, incentives or penalties that the government has at its disposal to ensure compliance on fortification of flours in Mexico. The law is also silent on how details of external monitoring should be shared with stakeholders such as the milling industry, civil society and members of the public.

Assuming that good documentation is more likely than not to lead to good implementation, the detail omitted in the Mexican standard on external monitoring leaves a gaping hole between the law on flour fortification and its enforcement. This is important as regulatory monitoring is crucial for ensuring short- and long-term compliance with national standards.

Furthermore, the lack of detail in the legislation raises vital questions about the practice of flour fortification in Mexico. Industry self-regulation is often inadequate to ensure compliance. Regulatory monitoring, especially incentives and penalties for enforcement, has been shown to be a key factor in ensuring industry compliance with national fortification standards.¹⁰⁷

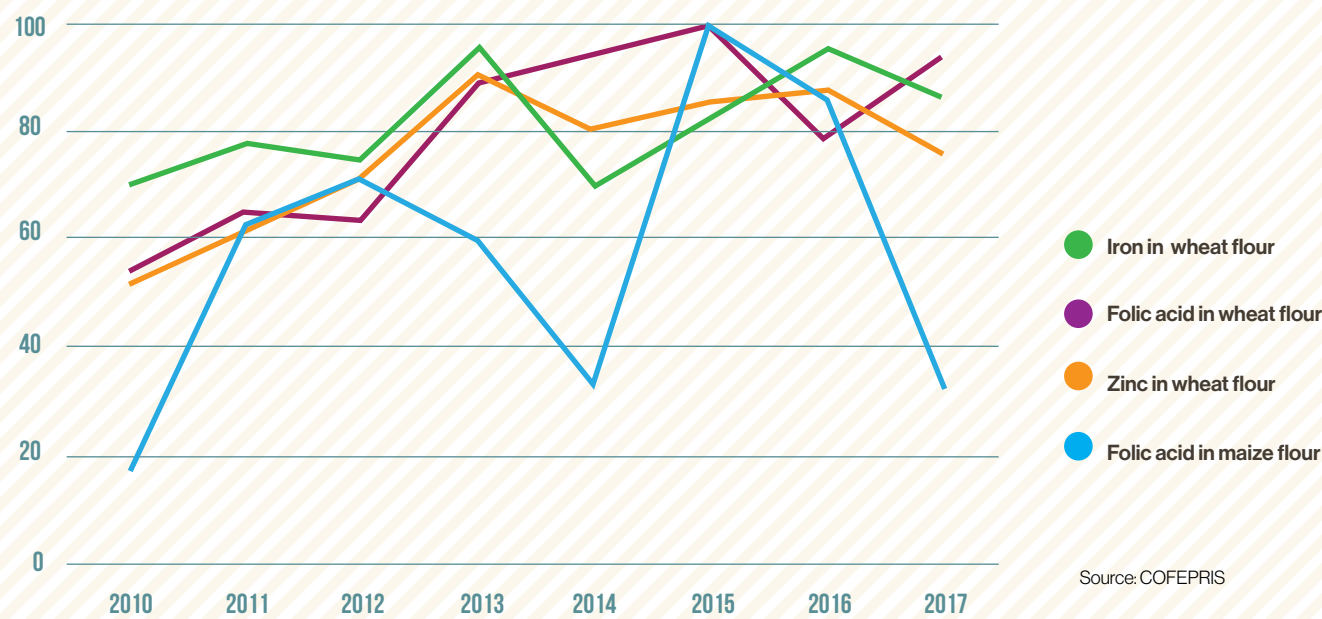
4.3. What does the government monitoring show?

Despite the lack of direction given in the legislation, the Mexican government appears to conduct some monitoring of the implementation of fortification requirements for maize and wheat flour mills. This is carried out by the Ministry of Health, via the Federal Commission for the Protection against Sanitary Risk (COFEPRIS). However, only limited details of sampling results have been made publicly available, and no information is made available about government inspection and auditing of the fortification process at production sites.¹⁰⁸ For this reason, we contacted COFEPRIS for further information, but we have not received a response at the time of writing this report. For this reason, we will try to analyse the limited information available on its website.

The information published on the website casts no light on the methodology used to collect the samples. For instance, we do not know the requirements for sampling, the number of samples collected, from which mills, the amount sampled, the frequency at which sampling takes place each year or where samples are taken along the production process. Perhaps most crucially for compliance, we are not clear if the samples were collected at random and independently of industry influence, and we do not have information on what laboratory analyses were completed or how results were interpreted.

The graph provided suggests a very variable level of compliance across several years against the current standards. Wheat flour results in 2017 were more encouraging than the results for maize flour, although different nutrient levels were reported in wheat flour for iron (86%), zinc (76%) and folic acid (94%).

COMPLIANCE RATE WITH FORTIFICATION REQUIREMENTS - % FLOUR SAMPLES ANALYSED



This is interesting, considering most milling companies buy their vitamins and minerals already mixed according to national Mexican standards. Some nutrient variability could be due to factors including distribution of micronutrients in the premix or the capacity of equipment to combine the premix with the flour. Assuming the same food samples are being tested, the results raise the question of why the levels of compliance are different for the different micronutrients. They also emphasise the need for government inspectors to audit the whole fortification process at the mills in addition to sampling and testing.

Maize flour is only measured for one nutrient – folic acid. Although many countries choose to select one nutrient as the indicator of compliance, it is perhaps surprising that iron has not been selected. Iron is much cheaper to measure, there is significant iron deficiency in Mexico and maize flour is consumed by a large segment of the population. Furthermore, the available results show a significant drop in compliance: while in 2015, 100% of samples were compliant with folic acid fortification standards, in 2017 this dropped to only a third. Assuming the same methodology was followed each year, this is a very concerning trend.

5. Conclusions and recommendations

While fortification of industrially processed flour is widely considered to be an effective strategy for supplying necessary vitamins and minerals to large segments of the population, it must be monitored and enforced to achieve optimal impact. The current standard for wheat and maize flour fortification in Mexico – in place since 2010 – is an important component alongside a raft of other national nutritional interventions.¹⁰⁹

However, this report has shown that the legislation is not properly enforced and that the external monitoring is incomplete. The shortcomings start with the legislative text itself, which omits crucial details about how the fortification standard should be externally monitored and enforced, seemingly leaving it up to the flour-milling industry to regulate itself. Examples from other countries show that regulatory monitoring, especially incentives and penalties for enforcement, is a key factor in ensuring industry compliance. A recent example from Nigeria has shown that industry players intentionally do not fortify their products in order to gain a competitive advantage over their competitors. The lack of robust information on government inspection processes and insufficient data on compliance testing, in parallel with documented micronutrient deficiencies among the Mexican population, raise questions about the effectiveness of this programme.

The current legislation also does not state that industrially produced tortillas and breads need to be made using fortified flour. This means the fortification of tortillas, breads and other flour-based products sold in Mexico relies solely on the food processor having good systems in place for procuring flour fortified to the Mexican standard. The lack of any publicly available comprehensive data set on flour-rich foods sold at retail level suggests no government agency is sufficiently vigilant to this potential loophole in the fortification supply chain.

Given the omission of details in the legislation and the queries raised by the available monitoring data, this report questions whether the flour-milling and food-processing industries are doing enough to provide Mexican people with sufficiently fortified flours, tortillas and breads to help tackle the serious problem of continuing micronutrient deficiencies. The new Mexican government has a significant opportunity to reform the system and ensure that the potential benefits of these measures are fully realised.

Recommendations

Government
• Update the legislation on flour fortification to include details of external monitoring and enforcement at mills, retail level and points of import. This should specify the frequency of monitoring, the methods used and the indicators of success, and provide details of enforcement incentives and penalties. • Provide clarity on which government agency has the responsibility for monitoring and compliance (at mill, retail and import levels) and ensure the relevant agency has allocated budget, human resources and regular timelines to implement effective monitoring and enforcement. • Provide clear guidance on what protocols government inspectors should follow in monitoring compliance at mill, retail and import levels. Monitoring at the flour production level must follow HACCP principles and include proof of premix purchase by food companies and the premix usage reconciliation calculations. • Ensure regular external monitoring and compliance data are made publicly available to stakeholders including industry, civil society and consumers. • Ensure the standard is clear and unambiguous about the source of micronutrients which should be used to fortify flours. • Update the legislation to state that wheat and maize flours fortified to the Mexican standard must be used in the preparation of industrially produced tortillas, breads and other flour-rich products. • Promote the participation of civil society organisations and research institutes during the development and modification of official Mexican standards to ensure the development, implementation, monitoring and enforcement of legislation is carried out free from conflict of interest.

Industry – flour millers
• The flour-milling industry needs to achieve full compliance on the fortification of flours in line with mandatory legislation and clearly demonstrate to the government and the public that this is taking place at production level. • The flour-milling industry should use the recommended sources of vitamins and minerals, as stated in the Mexican legislation. • The flour-milling industry should maintain internal quality control reports on fortification and make these available for inspection by government officials. • The flour-milling industry must provide evidence of proof of purchase of premix and premix usage reconciliation practices.
Industry – food processors
• Food processors need to ensure they have a policy in place to procure fortified flour in line with national Mexican standards and should demand fortified flour from their suppliers. • Food processors should maintain documentation on procurement and use of fortified flours and make this available for inspection by government officials.

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