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FLOURSOF ENRICHED BANANAS, EGGPLANTS, CORN AND CASSAVA WITH FOLIC ACID TO END HUNGER IN TIMES OF FOOD SHORTAGES IN THE ECONOMIC MARKET, REMEDY TO PREVENT HUMANITARIAN CHAOS WITH THE MANAGEMENT OF AGRICULTUREEX THE EXISTENCE OF HUMANITY, THE DIETARY STANDARD OF THE DREAMED AMERICAN DREAM.

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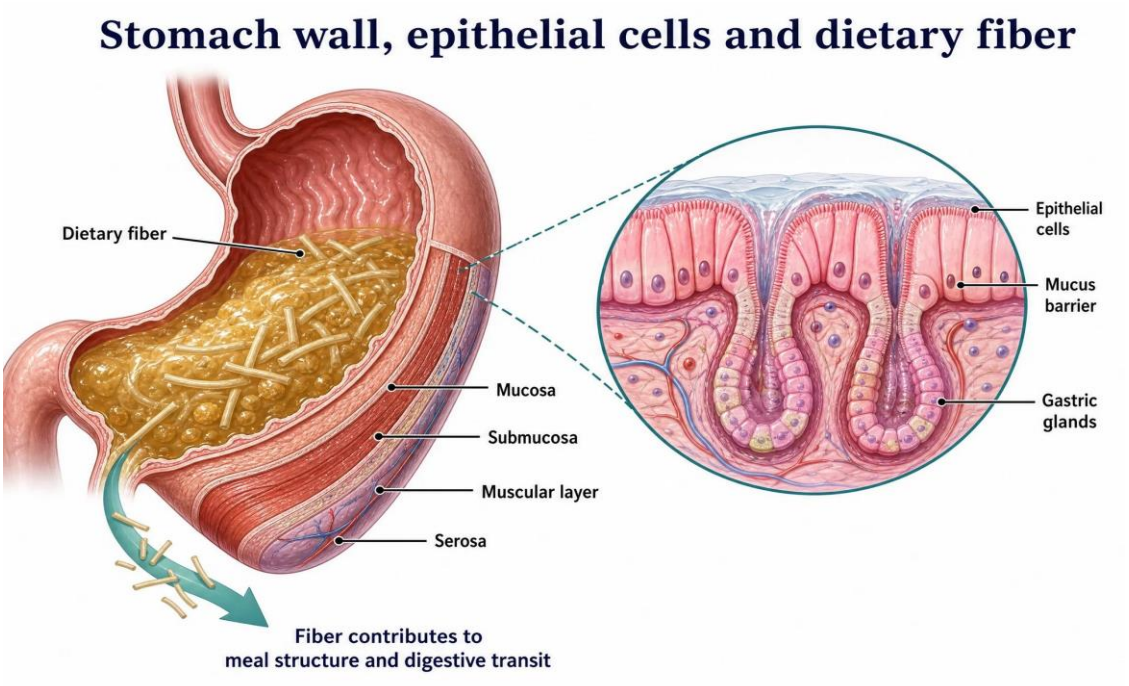
SUMMARY

This article presents a brief overview of hunger and cheap food, with the intention of comparing it to climate change and its impact on local, regional, and continental agricultural crops, from a global perspective. It is known that the humanitarian reality of people in the world is not a favorable one in relation to the dreamed-of consumer world of the AMERICAN DREAM; that is, it is a reality far removed from what is presented in films, soap operas, and cinema, or in the spotlight of the mainstream media. Being a reality far from the media spotlight, the human individual works in capitalism to earn a salary, and with this, to acquire food as a means of...Subsistence in the world, that is, food and nutrition. Therefore, humanity depends on food and water to absorb nutrients.and chemical compounds for the body's structurewith water. Aiming then to improve and MINIMIZE AGRICULTURAL PRODUCTION COSTS, this article presents food sources that are very cheap and extremely cheap to manage and produce, for consumption in a given society, AS WELL AS to acquire a FOOD CULTURE STANDARD.cheaper, more nutritious andhealthier, with the aim of society progressing in economic development in an efficient and effective way,With a healthy population, a change in food culture means that the population will be free from diseases such as cancer, diabetes, hypertension, kidney and heart disease.in the article ofdietary pattern that This can be linked to a sedentary lifestyle, as exemplified by Westerners and the Western world. Therefore, it is demonstrated that the The reality portrayed in the media spotlight is not the reality of how the world's population lives.their daily work to acquire their food and subsistence. And that is the

main concern of the article.It is climate change that affects the management and production of agricultural products to make them available to the market for the population, considering the commodity fetishism of commodities and products, and how this affects the food supply in the local, regional, and global scenario. Consequently… DEMAND From the population, one can generateA humanitarian chaos, as described in reality from 2 different locations in the world, being 2 locations and two TOTALLY DIFFERENT realities of experience and survival in the global economic scenario.This article presents a way to improve consumption and dietary patterns in society with nutrients and healthy nutritional sources.aiming for greater harmony among the local, regional, or global population, with broad concern for climate change and the supply of local, regional, and global products in the face of the humanitarian chaos that would be to come. IT BECOMES Obviously, a humanitarian food crisis is coming with climate change at any moment in any local, regional, or global region.globe, it ismunderdeveloped countries or developed countries.Examples of society ARE THE CONTROL OF Cooking gas, petroleum, electricity, and water, by large companies and large business conglomerates.Those who offer these products in society to the population, the same thing that can and does happen with food.In cultures with specific dietary patterns in local, regional, and global regions.

KEYWORDS: Hunger, Humanitarian Crisis, Climate ChangeFood Supply and Demand, Nutritious and Healthy Food Sources, Affordable Foods.The Production and Management of Subsistence Agriculture for Humanity.

Introduction and Theoretical Framework



Banana: Health, Dietary, and Nutritional Properties

Banana is a nutrient-rich fruit that providescarbohydrates, dietary fiber, potassium, vitamin B6, vitamin C, and small amounts of magnesium and manganese. Its carbohydrates provide energy, while fiber can supporthealthy digestion and bowel regularityPotassium is important fornormal muscle function, nerve signaling, and maintenance of normal blood pressure. Vitamin B6 contributes to normal energy metabolism and nervous-system function. Bananas also contain natural compounds such ascarotenoids and polyphenols, which contribute antioxidant activity. Because bananas are naturally sweet and convenient, they can be included in a balanced diet as asnack, breakfast ingredient, or addition to yogurt, oatmeal, and smoothies. Their nutritional composition varies with ripeness: the bananas ripen, starches are progressively converted into simpler sugars, making them sweeter and softer.

Banana Flour: Health, Dietary, and Nutritional Properties

Banana flour is made by drying and grinding unripe or ripe bananas into a fine powder.Green banana flouris particularly rich inresistant starch and dietary fiber, which can support digestive health and contribute to greater feelings of fullness. It providescarbohydrates, potassium, magnesium, vitamin B6, and other micronutrients, although the exact nutritional composition varies according to the banana variety and processing method. Resistant starch is fermented by beneficial intestinal bacteria and may contribute to a healthier gut microbiome. Banana flour is naturallygluten-freeand can be used in breads, cakes, pancakes, porridge, smoothies, and other recipes. Replacing part of conventional flour with banana flour can increase the fiber and resistant-starch content of a meal.

Eggplant: Health, Dietary, and Nutritional Properties

Eggplant (*Solanum melongena*) is a low-calorie vegetable rich inwater, dietary fiber, vitamins, minerals, and antioxidant compounds.

- Low in calories:useful as part of a balanced diet.
- Dietary fiber:supports normal digestion and contributes to feelings of fullness.
- Antioxidants:contains compounds such asanthocyanins, especially in the purple skin, which help protect cells from oxidative damage.
- Vitamins:provides small amounts offolate, vitamin K, vitamin C, and B vitamins.
- Minerals:containspotassium, manganese, and magnesium.
- Heart health:its fiber and overall nutrient profile can contribute to a heart-healthy dietary pattern.

• Blood glucose:its fiber content may help moderate the absorption of carbohydrates when eaten as part of a balanced meal.

• Dietary versatility:can be grilled, roasted, baked, steamed, or incorporated into sauces and stews.

In summary:eggplant is a nutritious, fiber-containing vegetable that can contribute to a varied and balanced diet, particularly when prepared with moderate amounts of oil and salt.

Eggplant Flour: Health, Dietary, and Nutritional Properties

Eggplant flour is produced by drying and grinding eggplant, concentrating many of its components into a convenient powder.

• Dietary fiber:can contribute to intestinal regularity, satiety, and healthy digestion.

• Low in calories:depending on preparation, it can be incorporated into balanced diets without adding large amounts of energy.

• Antioxidant compounds:retains compounds from eggplant, includinganthocyanins and phenolic compounds, particularly when the skin is included.

• Minerals:provides minerals such aspotassium, magnesium, and manganese.

• Vitamins:may provide smaller amounts of B vitamins and other micronutrients, although drying can reduce some heat- or oxidation-sensitive vitamins.

• Carbohydrate absorption:its fiber content may help slow digestion and absorption of carbohydrates when consumed with meals.

• Culinary uses:can be added to breads, cakes, pancakes, soups, sauces, smoothies, and other preparations.

• Gluten-free:naturally gluten-free, although commercial products should be checked for cross-contamination if this is important.

In summary:eggplant flour is a concentrated source ofdietary fiber and plant bioactive compoundsand can be used to increase the nutritional and fiber content of a varied, balanced diet. It should complement rather than replace a diverse intake of vegetables and other whole foods.

Corn: Health, Dietary, and Nutritional Properties

Corn (maize) is a nutrient-rich cereal that providescarbohydrates, dietary fiber, vitamins, minerals, and antioxidant compounds.

• Energy source:rich in complex carbohydrates that provide energy.

• Dietary fiber:supports healthy digestion and contributes to satiety.

- Vitamins:providesB vitamins, particularly thiamine (B1), niacin (B3), and folate (B9).
- Minerals:containsmagnesium, phosphorus, potassium, and zinc.
- Antioxidants:yellow corn contains carotenoids such aslutein and zeaxanthin, which are associated with eye health.
- Heart health:its fiber and nutrient profile can contribute to a balanced, heart-healthy diet.
- Gluten-free:naturally gluten-free, although processed corn products can sometimes have cross-contamination.
- Versatile food:can be consumed fresh, cooked, roasted, as cornmeal, or as flour and other products.

In summary: corn is a versatile source of energy, fiber, micronutrients, and plant compounds. Its nutritional value depends partly on the variety and how it is prepared.

Corn Flour: Health, Dietary, and Nutritional Properties

Corn flour is made by grinding dried corn and is an important source ofcarbohydrates, fiber, vitamins, minerals, and plant compounds.

- Energy source:rich in carbohydrates, providing fuel for daily activities.
- Dietary fiber:depending on the type and degree of processing, it can contribute to digestive health and satiety.
- B vitamins:provides nutrients such asthiamine (B1), niacin (B3), and folate (B9).
- Minerals:containsmagnesium, phosphorus, potassium, and zinc.
- Antioxidants:Yellow corn flour may containcarotenoids such as lutein and zeaxanthin, associated with eye health.
- Gluten-free:naturally does not contain gluten, although cross-contamination is possible in some products.
- Culinary uses:commonly used forcornbread, tortillas, polenta, cakes, porridges, and other baked or cooked foods.
- Whole-grain varieties:retain more of the corn kernel and generally provide more fiber and nutrients than highly refined versions.

In summary:corn flour can be a nutritious carbohydrate source and, particularly in less-refined forms, can contributefiber, micronutrients, and antioxidant compoundsto a varied and balanced diet.

Cassava: Health, Dietary, and Nutritional Properties

Cassava (manioc, yuca) is astarchy root vegetableand an important source of dietary energy, particularly in tropical regions.

- Energy source:rich in carbohydrates, providing readily available energy.
- Dietary fiber:contains fiber that can support normal digestion, especially when consumed as part of a varied diet.
- Minerals:providespotassium, magnesium, manganese, and phosphorus.
- Vitamin C:fresh cassava provides vitamin C, although some is lost during cooking.
- Naturally gluten-free:cassava does not naturally contain gluten and can be used in gluten-free foods.
- Versatile:can be boiled, baked, roasted, mashed, or processed intocassava flour, tapioca, and starch.
- Resistant starch:some forms and preparations can provide resistant starch, which is fermented by beneficial intestinal bacteria.
- Preparation is important: raw cassava should not be eaten. Proper peeling and thorough cooking/processing are important because cassava can contain naturally occurring cyanogenic compounds.
- In summary:Cassava is primarily a carbohydrate-rich food that provides energy and several minerals. When properly prepared and consumed as part of a balanced diet, it can be a useful staple food.

Cassava Flour: Health, Dietary, and Nutritional Properties

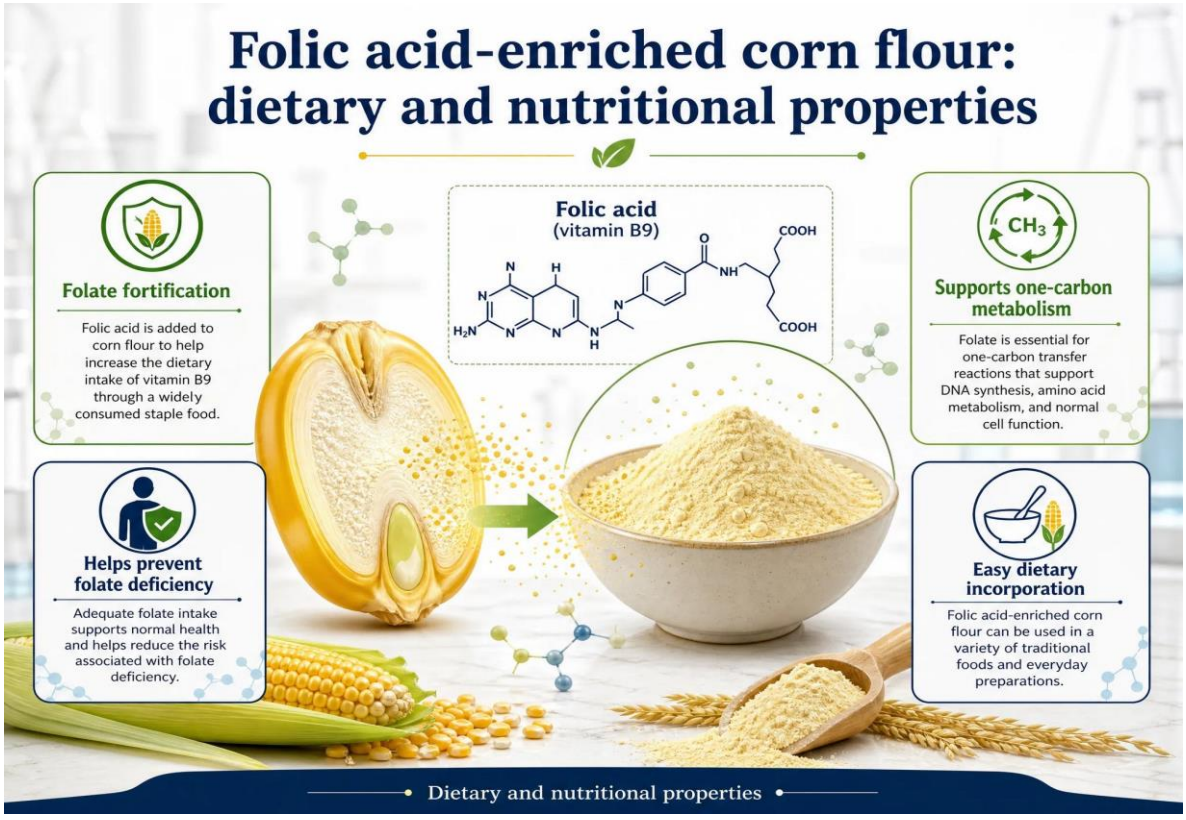
Cassava flour is produced by drying and grinding cassava roots. It is primarily acarbohydrate-rich, naturally gluten-free flour.

- Energy source:provides carbohydrates that supply energy.
- Dietary fiber:whole-cassava flour can contribute fiber and support normal digestion.
- Minerals:provides varying amounts ofpotassium, magnesium, manganese, and phosphorus.
- Vitamin C:cassava contains vitamin C, although processing and heating substantially reduce it.
- Gluten-free:naturally gluten-free, making it useful in gluten-free cooking and baking.
- Resistant starch:Depending on processing and preparation, some cassava products can contain resistant starch that is fermented by intestinal bacteria.

- Culinary versatility:used inbreads, cakes, cookies, porridges, farofa, and other recipes.
- Preparation and processing:commercially produced cassava flour undergoes processing intended to reduce naturally occurring cyanogenic compounds; properly processed products are appropriate for consumption.

In summary: cassava flour is mainly a source ofcarbohydrates and energy, with variable amounts of fiber and minerals. It can be a useful gluten-free alternative to wheat flour, especially when incorporated into a varied and balanced diet.Folic Acid-Enriched Corn Flour: Dietary and Nutritional Properties

Folic acid-enriched corn flour is corn flour fortified withfolic acid (vitamin B9)to increase its nutritional value.



- Folate source:folic acid is important forDNA synthesis, cell division, and the formation of red blood cells.
- Pregnancy:adequate folate intake before and during early pregnancy helps reduce the risk ofneural tube defectsin the developing fetus.
- Energy:Corn flour provides mainlycarbohydrates, making it an important source of dietary energy.
- Fiber:whole or less-refined corn flour can provide dietary fiber, supporting normal

digestive function and satiety.

- B vitamins:corn naturally contains several B vitamins, although amounts vary with processing and fortification.
- Minerals:can providemagnesium, phosphorus, potassium, and zinc.
- Antioxidants:yellow corn flour may contain carotenoids such aslutein and zeaxanthin.
- Gluten-free:corn is naturally gluten-free, although products should be checked for cross-contamination when necessary.

In summary:folic-acid-enriched corn flour combines the nutritional characteristics of corn with an additional source offolic acid, making it useful for increasing dietary folate intake. The exact nutritional value depends on the degree of processing and the amount of fortification.

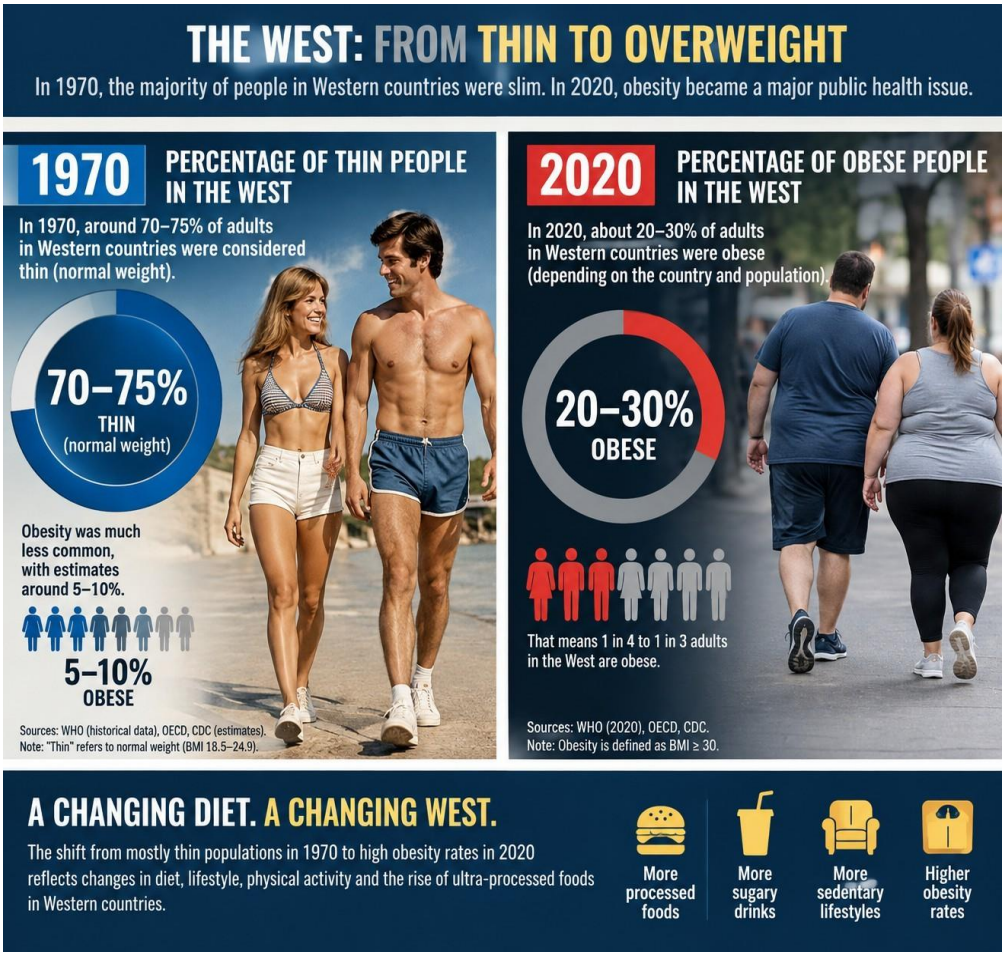
DISCUSSION

The West and Low-Nutrient Foods

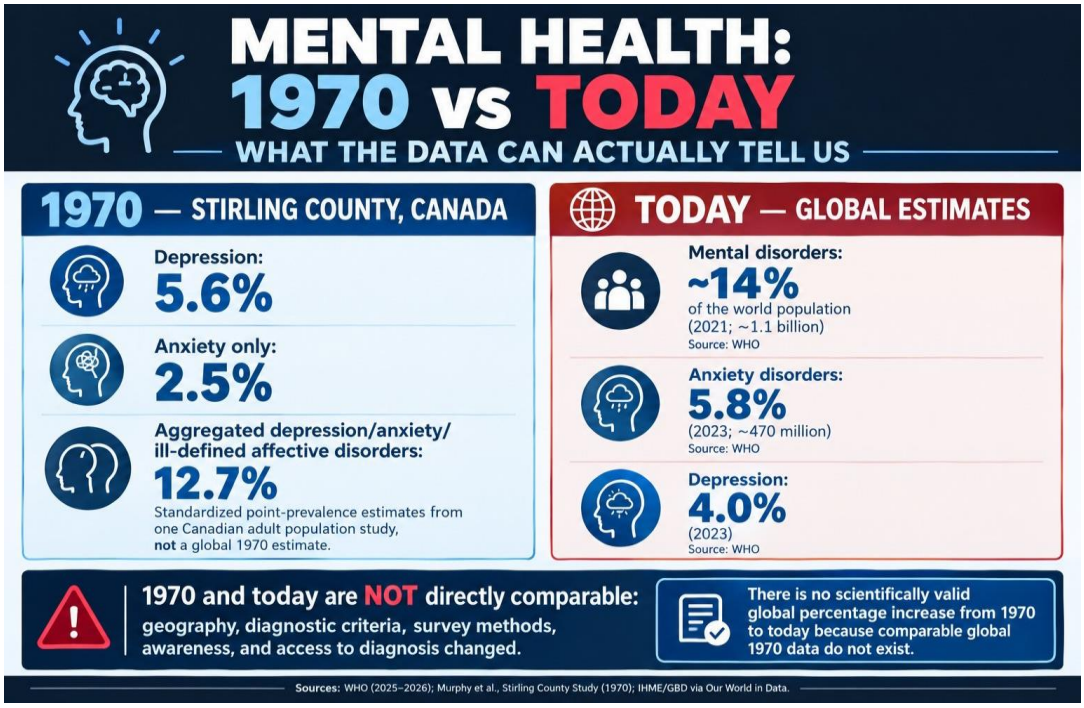
The idea thatWestern societies subsist on foods with low nutritional valueis an oversimplification. However, many Western dietary patterns contain substantial amounts ofultra-processed foods, which can be high in calories, added sugars, sodium, and saturated fat while providing relatively little fiber and certain micronutrients.

- Ultra-processed foods:packaged snacks, sugary drinks, processed meats, sweets, and fast food can contribute significantly to energy intake.
- Nutrient density:Diets dominated by these foods may provide fewer vitamins, minerals, and fiber per calorie.
- Health implications:high consumption is associated in observational research with poor overall diet quality and several adverse health outcomes.
- Dietary imbalance:replacing fruits, vegetables, legumes, whole grains, nuts, and minimally processed foods with highly processed alternatives can reduce nutritional diversity.
- Not all Western food is low quality:Western diets also include highly nutritious foods such as vegetables, fruits, whole grains, legumes, fish, eggs, and dairy products.

In summary: The most accurate statement is thatsome modern Western dietary patterns rely heavily on energy-dense, ultra-processed foods and may therefore have lower nutritional quality, rather than Western populations universally subsisting on nutritionally poor food.



Considering the population number ofThe 1970s and today's population.the main cause being diet.concurrently withenvironmental and hereditary factors:



EradicateSchool dropout with theseNutritional sources in schools in developed countries and around the world.hunger beingmain causeschool dropout in countriessubdeveloped and in the world.Global School Dropout and Out-of-School Education:Education remains a major global challenge.According to UNESCO's latest estimates, about272 million children and young people were out of school in 2023. This represents approximately11% of primary-school-age children, 15% of lower-secondary-age adolescents, and 31% of upper-secondary-age youth; 272 millionchildren and youth were out of school globally in 2023;Around650 million young people leave school without a secondary-school certificate, according to UNESCO;Sub-Saharan Africahas the largest concentration of children and young people who are out of school; Poverty, limited access to schools, conflict, displacement, child labor, gender barriers, and insufficient education funding are among the factors associated with exclusion from education; Progress has slowed considerably: between 2015 and 2023, the global out-of-school population declined by only about1%, despite more than 110 million additional children and youth enrolling in school; Climate-related disasters also disrupt education. UNICEF reported thatat least 242 million students in 85 countries had their schooling disrupted by extreme weather events in 2024.

“Out of school” is not exactly the same as “school dropout.”
*Out of school*refers to children or young people who are not attending school, while*dropout*generally refers to someone whostarted an educational program but left before completing it. Global statistics often combine access, non-enrolment, and completion measures rather than measuring dropout alone.
Main message:
Hundreds of millions of young people worldwide are still excluded from education, and global progress in reducing educational exclusion has slowed substantially.

Hunger

Hunger remains one of the greatest social and humanitarian challenges in the world. Although global agriculture produces enough food to feed the world's population, millions of people still do not have regular access to sufficient and nutritious food. This problem is closely related to poverty, armed conflicts, economic inequality, climate change, rising food prices, and difficulties in accessing land, water, employment, and basic services. In many regions, wars and political instability can interrupt food production and distribution, while droughts, floods, and other extreme weather events can destroy crops and reduce food

supplies. Hunger also affects children's development, education, health, and future opportunities, creating a cycle of poverty that can continue across generations. Therefore, reducing world hunger requires more than increasing food production: it also requires reducing poverty and inequality, improving agricultural and food-distribution systems, supporting sustainable farming, and ensuring that vulnerable populations can access nutritious food. Combating hunger is consequently a shared global responsibility involving governments, international organizations, communities, farmers, and society as a whole.

Why Was the French Roll Invented? —A Nutritional Perspective

TheFrench roll, commonly called*French bread*in Brazil, it was not invented specifically as a nutritional food. It developed from European bread-making traditions and became popular because it wassimple, inexpensive, convenient, and relatively energy-dense.From a nutritional perspective, a traditional French roll is mainly made fromwheat flour, water, yeast, and salt. The flour provides carbohydrates, which are an important source of energy, while the small amounts of protein and other nutrients come mainly from wheat. The crisp crust and soft interior also make the bread easy to eat and suitable for combining with other foods.However, traditional white French rolls contain relativelylittle dietary fiber and fewer micronutrients than whole-grain bread, because refined wheat flour has much of the bran and germ removed. Their nutritional value therefore depends considerably on what accompanies them—for example, eggs, cheese, beans, vegetables, or other nutrient-rich foods.In short, the French roll became successful primarily because it offeredaffordable, portable energy and a long-established baking tradition, rather than because it was designed to meet a specific nutritional requirement.

Folic Acid and the Brain

Folic acid (vitamin B9) is essential for normal brain function and the nervous system. It participates inDNA synthesis, cell division, and the production and metabolism of neurotransmitters. Adequate folate helps regulate homocysteine levels, an amino acid associated with neurological and cardiovascular health. Folate deficiency can contribute tomegaloblastic anemia, fatigue, cognitive difficulties, and neurological problems. During pregnancy, adequate folate is particularly important because it supports fetal brain and spinal-cord development and reduces the risk of neural-tube defects. Folate is found naturally in foods such asleafy green vegetables, beans, lentils, citrus fruits, and liver, while folic acid is the synthetic form commonly used in fortified foods and supplements. Both contribute to

maintaining adequate vitamin B9 levels.



Preventing School Dropout and Absenteeism

Preventing school dropout and absenteeism means helping students attend school regularly and complete their education. Students may avoid school because of poverty, family responsibilities, unsafe environments, bullying, learning difficulties, poor health, transportation problems, or a lack of support and motivation. Effective prevention requires cooperation among schools, families, communities, and governments. Schools can identify students at risk early, provide counseling and academic support, create safe and inclusive learning environments, and maintain regular communication with families. Flexible schedules, transportation assistance, meals, financial support, and access to healthcare can reduce practical barriers to attendance. Teachers should encourage participation, respect students' different needs, and use engaging teaching methods. Families can support learning at home, discuss attendance, and seek help when difficulties arise. Governments and communities should address poverty, discrimination, child labor, and unequal access to education. Conclusion: School dropout and absenteeism can be reduced through early intervention, caring relationships, safe schools, quality teaching, family involvement, and social support. Every student should have the opportunity to attend school regularly and finish their education.

Hunger and Food-Payment Conditions in Markets

Hunger occurs when people do not have reliable access to enough safe and nutritious food. In markets, hunger is often connected to high food prices, low incomes, unemployment, inflation, poor harvests, transportation costs, and unequal access to food. Even when food is available, families may not be able to afford it. Payment conditions also affect food security. Some customers must buy food on credit, delay payment, or purchase very small quantities because they lack cash. Small farmers and food vendors may face delayed payments, high borrowing costs, or unfair prices. These difficulties can reduce profits, limit food production, and make market prices higher. Possible solutions include improving wages and employment, supporting small farmers, reducing unnecessary transport and market fees, strengthening food-storage systems, providing targeted cash or food assistance, and promoting fair and transparent pricing. Safe credit arrangements and digital or cooperative payment systems may also help, provided that they do not create harmful debt.

Conclusion: Reducing hunger requires more than increasing the supply of food. People must have sufficient income, fair market access, reasonable prices, and safe payment options. Cooperation among governments, farmers, traders, communities, and aid organizations is essential for a reliable and affordable food system.

Commodity Fetishism in Karl Marx

In*Capital*, Karl Marx uses the concept ofcommodity fetishismto explain how capitalism makes social relationships between people appear as relationships between things. A commodity seems to have value naturally, as if its price and importance came from the object itself. However, Marx argues that this value is connected tohuman labor and the social organization of production. For example, a smartphone appears in the market simply as a product with a price. Behind it, however, are workers, factories, raw materials, transportation, technology, and many social relationships. These human relationships become hidden behind the commodity and its price. The “fetishism” therefore refers to the tendency to treat commodities as if they possess an independent power or value of their own. In Marx's analysis, the market can obscure thelabor and social relationsthat produced the goods. Commodity fetishism is consequently a central concept for understanding how capitalism can make historically and socially produced relationships appear natural and objective.

Food Supply, Demand, Climate Change, Malthus, and Keynes

The interaction betweenfood supply and demand under climate changecan be viewed as a

modern illustration of themes found in the theories ofThomas Malthus and John Maynard Keynes, although neither theory directly predicts today's climate crisis. Malthus argued that population could grow faster than the food supply, creating pressures that could lead to scarcity and hardship. Climate change introduces a different mechanism: droughts, floods, heat waves, soil degradation, and other environmental changes can constrain agricultural production while food demand continues to increase. Keynes, meanwhile, emphasized the importance ofaggregate demand, employment, income, investment, and government interventionin economic stability. From a Keynesian perspective, a food-supply shock can reduce real incomes, increase prices, weaken purchasing power, and require public policies to protect vulnerable households and maintain economic stability. Together, these perspectives help frame a contemporary risk:climate-related disruptions to food production combined with persistent demand could contribute to higher food prices, food insecurity, malnutrition, and humanitarian emergencies, particularly where governments and institutions have limited capacity to respond. The modern situation therefore differs from Malthus's original formulation because technological progress, international trade, productivity gains, and economic policy can substantially expand or redistribute food availability.

Two Copacabanas, Two Everyday Realities

Copacabana, Bolivia, and Copacabana, Brazil share the same name, but they represent very different ways of living. The Bolivian town is located on the shores of Lake Titicaca and is shaped by Indigenous traditions, small-scale commerce, fishing, religious pilgrimage, and tourism connected to the landscape. Its daily life is generally slower and more closely tied to localcommunity networks, although residents also face economic insecurity, limited infrastructure, and dependence on seasonal visitors. Copacabana, Brazil, is a famous neighborhood in Rio de Janeiro. Its lifestyle is marked by the beach, dense urban life, high-rise buildings, public promenades, cultural diversity, and constant movement. It is a place of leisure for tourists and residents, but it is also a workplace for street vendors, cleaners, transport workers, hotel employees, and informal workers. Behind the image of paradise, there are serious problems involving inequality, expensive housing, overcrowding, insecurity, and the displacement of poorer residents. In both places, tourism creates jobs and visibility, but it also transforms local culture, landscapes, and public spaces into commodities. Under capitalism, the beauty of Lake Titicaca and the beaches of Rio de Janeiro can become products designed for consumption. Visitors often experience freedom and pleasure, while local workers carry the costs through low wages, unstable employment, rising rents,

environmental pressure, and unequal access to the benefits of tourism. The main difference is not simply between a rural town and a global city. It is also between two forms of social organization: one more connected to Indigenous and local community traditions, and another shaped by intense urban commercialization. However, both Copacabanas reveal the same contradiction: places are advertised as paradise, but the people who maintain that paradise do not always have the right to live securely within it. A critical comparison therefore asks more than which place is more beautiful or attractive. It askswho profits from tourism, who performs the labor, who controls the land and public space, and who is excluded from the prosperity being advertised . The real question is not only who gets to visit, but who gets to live well.



It is known that all these factors discussed are relevant to eradicating hunger in the world, addressing CHEAP and NUTRITIOUS food sources for the sustenance of societies in developed countries. It remainsIt is evident that when an underdeveloped country emerges on the economic scene alongside imperialist and developed countries, the population of that country seeks out more expensive food products in retail. Therefore, the developed country begins to adopt the lifestyle of imperialist countries in terms of food consumption, forgetting and neglecting healthy food sources rooted in their own cultural traditions. Thus, people accustomed from a young age to...food sourcesIn more developed countries, this translates to a higher standard of food consumption, and therefore comes at a much higher cost.higher quality of life for people in developing and emerging countries in the scenarioglobal economy. And also,several appearDiseases in the population that are common in imperialist

countries., such as cancer, diabetes and hypertension, withThis reduces life expectancy for thousands of people, and the high cost of health insurance plans for foodborne illnesses is also a factor. And also...considering that the healthy food sources considered are moreCheaper and healthier options allow one to live a normal life with inexpensive food sources, leading to an exponential improvement in quality of life over the years. Furthermore, people remain free from health insurance coverage, given the high number of cancer cases that have skyrocketed in developing and emerging countries in the global economic landscape due to rising costs.in the consumption pattern of more expensive and less healthy foods in the economic market.

The enrichment of organic food compounds such as folic acid.They leave children and young people healthier during this crucial phase of life, allowing them to build a productive adult life, free from diseases like cancer and cardiovascular problems, and with greater productivity in the job market for these newly arrived young people.thethe job market.

Case: Vitamin A in rice in Asia

Vitamin A deficiency is an important public-health problem in parts ofSouth and Southeast Asia, particularly among young children. The WHO notes that vitamin A deficiency is especially significant in Southeast Asia and can contribute to impaired vision and increased susceptibility to infections. Rice is a logical vehicle for micronutrient interventions because it is a major staple food in many Asian countries. The WHO describes several approaches to rice fortification, including adding micronutrients to the surface of rice or producing fortified rice kernels that are mixed with ordinary rice. Vitamin A is among the nutrients that can be added.Golden Ricetakes a different approach: the rice plant is biofortified so that the grain producesβ-carotene (beta-carotene), a provitamin A carotenoid that the human body can convert into vitamin A. Ordinary polished rice contains very little beta-carotene. Research on Golden Rice therefore aimed to increase the nutritional value of a staple food without requiring people to change the basic food they consume.

Chemical Composition of Corn, Eggplant, Cassava, and Banana Flours

The chemical composition of vegetable and cereal flours is determined by the biological characteristics of the plant and by the processing methods used to transform the raw material into flour. Corn, eggplant, cassava, and banana produce flours with considerably different chemical profiles. These differences are mainly related to carbohydrates, proteins, lipids, dietary fiber, minerals, vitamins, pigments, phenolic compounds, and other bioactive

substances. The concentration of each component depends on the cultivar, geographical origin, stage of maturity, environmental conditions, drying temperature, grinding process, and storage conditions. Therefore, flour should not be considered a chemically uniform material, because its composition can change considerably according to production conditions.Corn flour is primarily characterized by its high carbohydrate content. Starch represents the main carbohydrate in most corn flours and is responsible for many of their technological properties. Corn starch is composed mainly of amylose and amylopectin, two glucose polymers with different molecular structures. Amylose consists predominantly of relatively linear chains of glucose molecules, whereas amylopectin has a highly branched molecular structure. The proportion and organization of these polymers influence gelatinization, viscosity, water absorption, texture, and digestibility. When corn flour is heated in the presence of water, starch granules absorb water and undergo structural changes known as gelatinization.

Corn flour also contains proteins that contribute to its nutritional and technological characteristics. Zeins are important storage proteins in corn, although other proteins are also present. The protein concentration varies among different corn varieties and according to whether the flour is produced from the whole grain or from more refined fractions. Corn proteins contain amino acids in different proportions, and their nutritional quality depends on the overall amino-acid profile. Processing can modify protein solubility, structure, and interaction with starch and other components. Lipids occur in smaller quantities than carbohydrates in corn flour but remain chemically important. Corn lipids include triglycerides, phospholipids, glycolipids, and other lipid compounds. Unsaturated fatty acids represent an important portion of the fatty-acid profile, with linoleic acid being particularly relevant. Lipids can interact with starch and proteins during processing and storage. These interactions may influence texture, flavor, oxidation, and shelf life. Oxidation of unsaturated fatty acids can produce compounds responsible for undesirable rancid flavors when flour is stored under unfavorable conditions.Dietary fiber is another component of corn flour, especially when whole corn is used. Cellulose, hemicellulose, and other structural polysaccharides contribute to the fiber fraction. The outer layers of the grain generally contain more fiber than the endosperm. Consequently, whole-grain corn flour can have a substantially different composition from highly refined corn flour. Fiber affects water absorption, viscosity, intestinal digestion, and the physical properties of food products.

Corn flour also contains minerals. Phosphorus, magnesium, potassium, zinc, iron, and other elements may occur in different concentrations. Some minerals are associated with phytate

and other compounds, which can influence their bioavailability. Corn also contains several vitamins, particularly B-group vitamins, although concentrations depend strongly on the part of the grain used and on processing. Milling can redistribute or remove nutrients because different anatomical parts of the grain have different chemical compositions.Eggplant flour has a different chemical profile because eggplant is a vegetable with a high natural water content. During flour production, much of this water is removed through drying. As a result, the remaining chemical components become concentrated. Eggplant flour contains carbohydrates, dietary fiber, proteins, minerals, phenolic compounds, pigments, and smaller quantities of lipids. Its exact composition depends strongly on the eggplant cultivar and on whether the skin is included in the flour.Dietary fiber is particularly relevant to the chemical composition of eggplant flour. Cellulose and hemicellulose contribute to the insoluble fraction, while pectin contributes to soluble and structurally important polysaccharides. These components contain complex carbohydrate polymers that are not completely digested by human digestive enzymes. The fiber structure can influence water retention, swelling, viscosity, and the physical characteristics of foods containing eggplant flour.

Eggplant flour also contains proteins, although the concentration is generally lower than the carbohydrate fraction. Eggplant proteins include enzymes and structural proteins naturally present in plant tissues. Their composition can change with maturity and processing. Drying and heating can cause protein denaturation and modify interactions between proteins, carbohydrates, and phenolic compounds.The lipid fraction of eggplant is relatively small. However, lipids are essential components of plant cell membranes. They include phospholipids and different fatty acids. Because eggplant contains relatively little total fat, its flour is generally not considered a fat-rich ingredient. However, the lipid fraction can still contribute to nutritional and chemicalcharacteristics. One of the most interesting characteristics of eggplant is its content of phenolic compounds. Chlorogenic acid is an important phenolic compound found in eggplant. Other phenolic acids and flavonoids may also be present. These substances contain aromatic chemical structures with hydroxyl groups and can participate in oxidation-reduction reactions. Their presence contributes to the antioxidant properties associated with eggplant.

The eggplant skin is especially relevant because it contains pigments. Purple varieties contain anthocyanins, which are water-soluble pigments belonging to the flavonoid family. Nasunin is a characteristic anthocyanin associated with purple eggplant skin. The concentration of these compounds can vary with cultivar, maturity, light exposure, and processing. Drying may preserve some compounds but can also cause degradation depending on temperature,

oxygen exposure, and processing time.Minerals are another component of eggplant flour. Potassium is generally an important mineral, while magnesium, calcium, phosphorus, iron, and other elements may also be present. The mineral composition depends on soil conditions, fertilization, cultivar, and processing. Because minerals are not destroyed by ordinary heating in the same way as many organic compounds, their concentration can increase on a dry-weight basis after water removal.Cassava flour is chemically dominated by carbohydrates, especially starch. Cassava is an important starch-producing plant, and its roots contain large quantities of starch accumulated as energy reserves. Cassava starch consists mainly of amylose and amylopectin. The molecular organization of these polymers determines important characteristics such as swelling, gelatinization, viscosity, and retrogradation.

Cassava flour generally contains considerably less protein than many cereal flours. This characteristic is important when comparing cassava flour with corn flour or other grain-based flours. The protein fraction includes various soluble and structural proteins, but the total concentration is relatively low. Consequently, cassava flour is primarily regarded as an energy-rich carbohydrate ingredient rather than a major protein source.The lipid content of cassava flour is also generally low. However, small amounts of fatty acids, phospholipids, and other lipid compounds can occur. These components can participate in interactions with starch and proteins. Because the total lipid concentration is low, lipid oxidation is usually less dominant than in high-fat flours, although storage conditions remain important. Cassava also contains dietary fiber. Cellulose, hemicellulose, pectin, and other non-starch polysaccharides contribute to this fraction. The amount of fiber depends partly on whether the flour is produced from peeled or unpeeled cassava and on the specific processing technique. Cassava peel contains a different composition from the inner root and can contain higher concentrations of certain structural components.

An important chemical characteristic of cassava is the presence of cyanogenic glycosides in some varieties. Linamarin is the main cyanogenic glycoside, while lotaustralin occurs in smaller amounts. These compounds can release hydrogen cyanide under appropriate enzymatic conditions. Consequently, cassava requires appropriate processing before consumption. Peeling, washing, grating, fermentation, drying, and cooking can reduce cyanogenic compounds, with the effectiveness depending on the processing method.The presence of cyanogenic glycosides makes chemical processing particularly important in cassava flour production. Properly processed cassava flour can have substantially reduced cyanogenic potential. The final concentration depends on the cassava variety and on the sequence and conditions of processing. Therefore, the chemical safety of cassava flour cannot

be evaluated only from its starch concentration. Cassava flour also contains minerals such as potassium, calcium, magnesium, and phosphorus. Smaller quantities of iron and other elements may be present. The mineral profile depends on soil composition, plant variety, cultivation conditions, and processing. Washing and other processing steps can cause losses of water-soluble components and minerals.

Banana flour has a chemical composition strongly influenced by the maturity of the fruit. Flour produced from green or unripe bananas generally contains substantial amounts of starch. As the banana ripens, enzymatic activity converts part of the starch into simpler sugars. Consequently, flour made from unripe bananas can have considerably different carbohydrate characteristics from flour produced from ripe bananas. One of the most important components of green banana flour is resistant to starch. Resistant starch consists of starch fractions that resist digestion in the small intestine. Depending on its structural type and processing history, resistant starch can reach the large intestine and undergo fermentation by the intestinal microbiota. For this reason, resistant starch is often discussed in relation to dietary fiber and carbohydrate digestion. Banana flour also contains ordinary digestible starch. The relative proportions of resistant and digestible starch depend on variety, maturity, drying temperature, and subsequent processing. Heating can change starch structure through gelatinization, while cooling can promote retrogradation and the formation of some resistant starch structures. Therefore, the chemical behavior of banana flour depends not only on the original fruit but also on processing conditions.

Dietary fiber is another important component of banana flour. Cellulose, hemicellulose, pectin, and resistant starch contribute to the overall fiber-related fraction. These components have different molecular structures and physiological properties. Cellulose consists primarily of glucose chains linked by beta-glycosidic bonds, whereas pectin contains galacturonic-acid-rich polysaccharide structures. Banana flour contains smaller quantities of proteins compared with its carbohydrate fraction. The proteins include enzymes and structural proteins naturally present in banana tissue. During maturation, enzymatic processes contribute to changes in starch, sugars, pigments, and other components. Drying can denature enzymes and modify protein structure. The lipid concentration of banana flour is generally low. Banana lipids include membrane-associated phospholipids and other minor lipid components. Fatty acids are present in relatively small concentrations compared with carbohydrates. Despite their low quantity, lipids can participate in flavor development and chemical reactions during storage.

Potassium is one of the characteristic minerals associated with bananas. Magnesium, phosphorus, calcium, and other minerals also contribute to the mineral fraction. The

concentration of these elements varies according to cultivar, soil, agricultural practices, maturity, and processing. Drying reduces water content and therefore increases the apparent concentration of minerals on a dry-weight basis.Banana flour also contains phenolic compounds and other phytochemicals. These compounds contribute to the antioxidant characteristics of banana tissue. Their concentration varies according to variety and maturity. Enzymatic browning can affect phenolic compounds when banana tissue is exposed to oxygen during processing. Drying techniques that reduce enzymatic activity can therefore influence the final chemical profile.The color of banana flour can also be related to chemical reactions during processing. Enzymatic browning involves phenolic compounds and enzymes such as polyphenol oxidase. When the tissue is damaged and exposed to oxygen, phenolic substrates can be oxidized and subsequently form darker pigments. Temperature, pH, oxygen availability, and drying conditions influence these reactions.

Comparing the four flours reveals important chemical differences. Corn and cassava flours are strongly characterized by starch. Both contain amylose and amylopectin as their main starch components. Banana flour can also contain substantial starch, particularly when produced from unripe fruit, but it is distinguished by its resistant-starch fraction. Eggplant flour differs because dietary fiber and phenolic compounds are particularly relevant to its composition. The protein content also differs among these materials. Corn generally provides more protein than cassava, while eggplant and banana contain smaller protein fractions. However, nutritional quality cannot be determined only from total protein because amino-acid composition and digestibility are also important. Processing can further change protein availability and structure.The lipid fraction is generally smaller than the carbohydrate fraction in all four flours. Corn usually contains more lipids than cassava, banana, or eggplant flour, although the actual amount varies with processing and cultivar. Lipids are chemically important because they can interact with starch and proteins and can undergo oxidation during storage.

Dietary fiber is another major point of comparison. Eggplant flour can contribute substantial structural and soluble fiber. Banana flour can contribute both dietary fiber and resistant starch. Whole-grain corn flour contains fiber from the bran and other grain structures. Cassava flour can contain variable amounts of fiber depending on peeling and processing. Minerals are present in all four flours but in different concentrations. Potassium is particularly relevant in banana and cassava. Corn contributes phosphorus and magnesium, among other minerals. Eggplant provides potassium and other mineral elements. The mineral composition is strongly affected by agricultural conditions and processing. Phenolic

compounds are especially relevant to eggplant and banana. These compounds include phenolic acids, flavonoids, and related substances. They can act as antioxidants under certain chemical conditions. However, antioxidant capacity measured in laboratory assays should not automatically be interpreted as a direct measure of health effects in humans. Processing is one of the most important factors determining flour chemistry. Drying removes water and changes the concentration of the remaining components. High temperatures can alter starch, proteins, pigments, vitamins, and phenolic compounds. Low-temperature drying can preserve certain compounds better but may require longer processing times.

Grinding also changes the physical characteristics of flour. Smaller particles generally provide greater surface area and can change hydration and reaction rates. Particle size influences water absorption, swelling, viscosity, and the behavior of starch during cooking. Therefore, chemical composition and physical properties are closely interconnected. Storage is another important factor. Moisture, temperature, oxygen, light, and packaging influence flour stability. Lipid oxidation can produce undesirable compounds, particularly in flours containing more unsaturated fatty acids. Moisture can promote chemical and microbiological deterioration. Proper packaging therefore contributes to maintaining flour quality. The chemical composition of these flours can also be affected by interactions between their components. Starch can interact with lipids to form complexes. Proteins can interact with starch and phenolic compounds. Fiber can bind water and some other molecules. These influence digestibility, texture, viscosity interactions, and technological performance.

From a food-science perspective, corn flour is primarily a starch-and-protein material, cassava flour is predominantly starch-based, banana flour combines starch with resistant starch and fiber, and eggplant flour provides a combination of fiber, minerals, and bioactive phenolic compounds. These differences explain why the four flours behave differently when incorporated into food formulations. The chemical analysis of these flours commonly includes measurements of moisture, ash, protein, lipids, total carbohydrates, dietary fiber, starch, minerals, and selected bioactive compounds. More advanced analyzes can identify individual sugars, fatty acids, amino acids, phenolic compounds, pigments, and different starch fractions. It is important to recognize that values reported for the composition of these flours can vary considerably between scientific studies. Different laboratories may use different analytical methods, sample preparation procedures, and units of expression. Results can also be reported on a fresh-weight or dry-weight basis. Direct comparison therefore requires attention to the analytical methodology.

Overall, corn, eggplant, cassava, and banana flours represent chemically diverse plant-

derived materials. Corn flour is predominantly a source of starch with significant protein, lipid, fiber, and mineral fractions. Eggplant flour is characterized by fiber, minerals, and phenolic compounds, particularly when the skin is included. Cassava flour is dominated by starch and requires appropriate processing to reduce naturally occurring cyanogenic compounds. Banana flour, especially from unripe fruit, is distinguished by starch, resistant starch, dietary fiber, minerals, and various phytochemicals. The chemical diversity of these flours makes them useful for different food applications. Their starch, fiber, protein, mineral, and bioactive components determine their nutritional and technological characteristics. Understanding their chemistry is therefore important for food formulation, nutritional analysis, industrial processing, storage, and scientific research. The final properties of each flour result from the interaction between the original plant composition and the processing methods used to produce the flour.

Genetics and the effects of hypotonic, isotonic, and hypertonic solutions on cells Althoughhypotonic, isotonic, and hypertonicare terms from cell biology rather than genetics themselves, they are important for understanding how the cellular environment can influence cells and their genetic material. These terms describe the relative concentration of dissolved substances, or solutes, in a solution compared with the interior of a cell. The movement of water across the cell membrane occurs throughosmosis, and this movement can change the volume and physical state of cells.In anisotonic solution, the concentration of effective solutions outside the cell is approximately equivalent to that inside the cell. Water can move across the membrane in both directions, but there is no significant net movement of water. As a result, an animal cell generally maintains its normal volume and shape. Isotonic conditions are therefore important for maintaining cellular stability and normal physiological processes.

In ahypotonic solution, the concentration of effective solutions outside the cell is lower than inside the cell. Water tends to enter the cell by osmosis. Animal cells can consequently increase in volume and, if the osmotic imbalance is sufficiently large, may undergo membrane rupture. Plant cells behave differently because their rigid cell walls provide mechanical support. Water entering a plant cell can increase its internal pressure, producing a firm orturgidstate.In ahypertonic solution, the concentration of effective solutions outside the cell is higher than inside the cell. Water tends to leave the cell through osmosis. Animal cells generally shrink, while plant cells can lose water from the cytoplasm and undergoplasmolysis, in which the plasma membrane pulls away from the cell wall. These osmotic conditions can influence cellular metabolism and the functioning of proteins, membranes, and organelles. Because DNA is located within cells and chromosomes depends

on an appropriate cellular environment, extreme changes in osmotic conditions can indirectly affect processes involving genetic material. However, a hypotonic or hypertonic solution does not automatically change the DNA sequence itself.

The relationship between osmosis and genetics becomes particularly important in laboratory biology. Cells used for genetic and molecular studies need appropriate solutions to preserve their structure and viability. Researchers therefore carefully control the concentration of salts and other solutions in experimental media. Maintaining suitable osmotic conditions helps prevent unwanted cellular damage that could interfere with experimental observations. The distinction among the three conditions can be summarized conceptually as follows:hypotonic solutions tend to cause water to enter cells, isotonic solutions maintain approximately stable cell volume, and hypertonic solutions tend to cause water to leave cells. The magnitude of these effects depends on the cell type, membrane permeability, temperature, and concentrations of the substances present.Therefore, hypotonic, isotonic, and hypertonic conditions are fundamental concepts in cell biology that complement the study of genetics. Genetics focuses on hereditary information, genes, chromosomes, and DNA, while osmosis explains how the physical environment affects cell volume and cellular stability. Understanding both areas provides a more complete picture of how cells maintain their internal conditions and perform their biological functions.

A healthy diet with plenty of water means a good life.Healthy, the use of legal and illegal drugs, such as cocaine and alcohol, degrades the body's cells, that is, it worsens the quality of life of the cells and the body. As an example, the consumption of alcohol, marijuana, and cocaine at parties and nightclubs evokes for young people and adults the Parisian Belle Époque of ostentation and glamour of the City of Lights, being a total deception for life expectancy. Much is observed withThe City of Lights, the American Dream in its emerging rise in the 1900s.and1950, whenThe lights arrived on the streets and the appliances arrived in the...residences, respectively. As well as THE LAWYER AND SANITARY ADMINISTRATOR OF URBANIZATIONGeorges-Eugène

Haussmannand SANITARIAN PHYSICIANS such as Adrien Proust (1834–1903), Alexandre Parent-Duchâtelet (1790–1836), Louis-René Villermé (1782–1863)and Émile Roux (1853–1933))in the 19th century.Being theBrazil is a society without education for all; young people are exposed to social marginalization, and therefore become dependent.Religious foundations in life and work are essential. It is considered that exposure to social marginalization, such as drugs, leads to social anarchy and severely deficient economic development. As intelligence quotient tests reveal developed countries ranking first

in IQ, and underdeveloped countries well below the average intelligence quotient, a strong educational foundation is essential for future intelligence quotient gains for the population. A society where education is accessible to all tends to distribute knowledge and development opportunities more widely. Education allows people to develop skills in reading, mathematics, science, technology, critical thinking, and social participation. When access is broad, people from different backgrounds can acquire the knowledge necessary to study, work, and participate in societal institutions.In a society whereEducation is restricted to the few.Knowledge tends to be concentrated in certain groups. Lack of access to education can limit professional opportunities and hinder social mobility. Furthermore, educational differences can contribute to the maintenance of economic and social inequalities between generations.

Education also influences a society's ability to produce scientific and technological knowledge. A larger, more educated population can increase the number of people capable of working in fields such as medicine, engineering, computer science, agriculture, and research. When advanced education is accessible only to a small segment of the population, the production and circulation of knowledge become more concentrated. There is also a difference in...social participationLiterate and educated people generally have greater access to information, documents, institutions, and mechanisms for participation. This does not mean that education automatically determines opinions or behaviors, but it expands the tools available to understand complex social issues. Universal education, however, does not simply mean putting everyone in school. It also involves quality teaching, prepared teachers, infrastructure, teaching materials, access to technology, and conditions that allow students to remain in school. Thus, the main difference between the two models lies in...distribution of knowledge and opportunitiesA society with education for all seeks to broaden access to basic and advanced education, while a society with education for the few concentrates these resources in a smaller segment of the population. This difference can profoundly influence the economy, science, culture, social mobility, and participation in institutions.

The 9 Types of IntelligenceLaborand Mental:

- Logical-mathematical:Aptitude for numbers, logic, calculations, and deductive reasoning.
- Linguistics:Proficiency in reading, writing, speaking, and learning new languages.
- Space:Ability to interpret images, shapes, colors, and the concept of physical space.
- Musical:Sensitivity to perceive rhythms, sounds, melodies, and to play instruments.
- Bodily-kinesthetic:Mastery of the body for self-expression in dance, sports, or precise

movements.

- Interpersonal:Ease in understanding, motivating, and relating well to other people.
- Intrapersonal:The ability to look inward, to understand one's own emotions, and to manage oneself.
- Naturalist:Ability to observe, identify and classify elements of nature, plants and animals.
- Existential:A tendency to reflect on profound questions of human existence, life, and death.



CONCLUSION

It can be concluded that hunger is a global problem, and especially so in underdeveloped countries.and emerginga way to make it viableThe eradication of hunger is withFloursof enriched bananas, eggplants, corn and cassavaWith Folic Acid to End Hunger in Times of Food Shortages in the Economic Market,Furthermore, considering climate change which alters the food supply in the global market, whether in retail or among micro-entrepreneurs,

especially with rising food prices. This consideration of food prices is a crucial factor for countries and societies to have stability; it is known that prevention is the best course of action, in the face of a food crisis that could come in the near future. Society should think more about climate change and the possibilities of food chaos that could happen to humanity, resulting in devastating crises in various countries, and regional crises specific to each country could be even worse in a humanitarian and sanitary crisis.Even more so with the crisis of rising pesticide prices.in producing countriesof food for various other countries. Climate change being a contributing factor.with the Malthusian Theory of Food Supply in the market to meet the diverse needs of the world's population.Considering theTypes of Climate Changein various locations, regionsand continental in the world. It is known that cells live healthily with water.Along with a healthy diet, this improves the process.The isonic activity of cells in the body and organs of the human body.This keeps the cell volume stable and with the saltsand minerals suitable for the cells that are the components of the tissues of the organs of the human body, consequently preventing chronic and premature diseases, such as the health problems of diabetes and hypertension, being 14%And 34% of the world's population currently suffers from these diseases, something that could have been avoided in the 2000s and 2010s. This health crisis could have been remedied in past decades, when the age pyramid was much younger, around 15-25 years old. With the progression of the world's age pyramid, with the average age of the population now around 35-45 years old, most of the world's population needs to be considered. We must think about the supply and demand of food and healthy nutritional sources at a low market cost.The future oldest population in the world. Considering the next 10 years, the population will have a world average age of 45-55 years, also considering a high number of elderly people over 60 and 70 years old.Types of climate change affect us in various ways.Agricultural management and production are affected by factors such as low or intense ultraviolet radiation, and insufficient or high rainfall. This is also the reality of the war in Ukraine.This has significantly and greatly affected the supply of pesticides and fertilizers worldwide. Consequently, the youth population will decrease even further in the coming years, as the supply of food and commodities will be lower for the world's population; in other words, the supply will be much lower.offood and commoditiesDue to the difficulties in food production, with the high cost of oil, fertilizers, and pesticides, it is considered that underdeveloped countries have a more manual labor force, since developed countries require more manual labor, consequently...cessiIt is a matter of protein and food sources that give the body more energy and vitality for work during the day, without considering the hormones of cattle, sheep and

pigs, which vary from country to country.Consequently, it depends on the federal government's labor rights and the minimum wage; however, in capitalism, the MINIMUM WAGE is determined according to the available LABOR SUPPLY in the market, and the labor market needs PRODUCTIVE LABOR in capitalism, with the minimum wage being determined according to intellectual, technical, and scientific functions. Thus, exploitationand the domination of cheap labor in countries with social inequalities that do not offer EDUCATION FOR ALL, with concentration of per capita income and concentration of private education, as a consequence MAKES ACCESS DIFFICULTFood, which is largely a source of cheap labor, and a climate crisis...hereOr, changes in the climate make evident the humanitarian chaos of food supply in local, regional, and continental markets, that is, it causes mass hunger.due to scarcity in agricultural production and management.

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