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IMPLICATIONS OF FOOD DESERTS AND FOOD SWAMPS AT SCHOOL ENVIRONMENT

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Abstract: *This study explores the implications of food deserts and food swamps in school environments, particularly in relation to health outcomes and academic performance. Food deserts refer to areas with limited access to healthy food options, while food swamps are areas with an abundance of unhealthy food choices. The study highlights the negative effects of food deserts and swamps on students' health, including obesity, diabetes, and other diet-related diseases, as well as poor academic performance. The research emphasizes the need for healthy food options in schools and the importance of nutrition education to promote healthy eating habits among students. By understanding the impact of food deserts and swamps on students' health and academic performance, policymakers and educators can work together to create healthier school environments that support students' overall well-being.*

Keywords: *food deserts; food swamps; schools; obesity; cancer; death; poor academic performance; health education.*

Introduction

The nutritional problems in youngsters at any life stage are significant. However, nowadays there is rise in prevalence of nutritional problems such as overweight in children and youngsters from infancy to 19 years, everywhere in the world. In 2020, about 39 million children (below the age of 5 years) are affected by obesity or overweight, and over 340 million children (5-19 years old) are affected by obesity or overweight (as being obese) (UNICEF, 2021). Youngsters are at high risk of developing nutritional problems, such as obesity, if they are close to ultra-processed foods (empty calories), and in turn afflicted by chronic diseases such as heart diseases, cancer, diabetes; therewith, increased morbidities, and mortalities is great concern (Sheena, 2020; UNICEF, 2021; Collado-soler et al., 2023). Food environments, such as food deserts or food swamps make it very hard for the young ones to obtain, afford, and consume healthy foods for growth, learning, and

development (Saraca & Butnariu, 2020). This is fueled by the consistent persistence of the food industries in making wide range of food marketing through several modes, and making empty calories available, cheaper, convenient, and highly promoted while risking the health of children (UNICEF, 2019). Vaida (2013) in a study of fast foods in urban (adolescents) students in Kashmir, revealed that, flavor, fast service, and availability, are major drivers to empty calories. Vidya et al. (2015) assessed school going children for junk food consumption pattern, using a sample size of 200, taste, marketing using television, and advertisements, spur junk food intake among children. Rezae (2017) determined the frequency and attitudes to fats food consumption in southeastern part of Iran (Yasuj), out of 540 respondents (18-45 years old), there was high consumption of fast foods among youths and students. Lalnunthara & Kumar (2020) in a study of Mizoram College students indicated that, out of 150 respondents, only 23% are conscious about health effects of fast foods. The college was not doing any tangible efforts to curb the spread of fast foods around premises. Mageswari et al. (2021) determined knowledge of pregnant women concerning health effects of junk foods in Tirunelveli, India. The results revealed that, 80% of the women revealed that, taste is the major driver of junk food consumption, and most of the women are unaware of the effects therewith. Meena et al. (2023) in a study in adolescents at Nursing Department in India, show that, some adolescents had insufficient knowledge about fast foods hazard. Shamsol & Fisol (2023) indicated that factors influencing youth to junk foods include, friends, parental control, and food trends.

Nowadays, empty calories (unhealthy foods) are trending to become ubiquitous in our environment while eliciting diverse array of problems (Qiu, 2016). There is rising course of urbanization, whereby people are busy and in turn unable at cook at home or schools, farms have been converted to cities, people are relying on white-collar jobs; therefore, increasing morbidities and mortalities due to unhealthy foods (Horowilz et al., 203; Shamsol & Fisol, 2023; Sarkingobir & Miya, 2024). Staff and students cannot properly interact to achieve educational objectives unless if they are healthy. And health is largely relied on nutritional behavior of populations or individuals. Verily, the behavior of people at schools toward nutrition is influenced by the foods or unhealthy foods present at environments. Poor environments give unhealthy foods and are food deserts or food swamps (Nayak, 2020; Harris et al., 2023). On the other hand, unhealthy food environments have detrimental implications on education (Nipun et al., 2017; Raouf et al., 2022; Lane et al., 2024). This study explores the

implications of food deserts and food swamps in school environments, particularly in relation to health outcomes and academic performance

Food Deserts and Food Swamps

Food Deserts are areas where there are no markets in a nearby distance that allows buying of healthy foods. Food Deserts are areas where it is difficult for a person to find healthy foods including fruits, vegetables, grains, animal-based milk and meat, etc to buy and consume for healthy life (Qiu, 2016; Kroll et al., 2019). Food Deserts conditions may be predominant in rural or urban areas depending on certain factors. In some areas, instead of having food deserts, they have food swamps. Food swamps are areas having shops or markets selling unhealthy foods more than the healthy ones. It is an area where there is predominant selling of obesogenic, junk, empty calories, and fast foods (Chen & Gegg, 2017; Hamish & angus, 2019; Mhamoud et al., 2021). This may be more occurring in some urban areas of the world. In some urban areas, consumption of empty calories is a rising culture, people have stopped farming and moved to the cities to join white-collar jobs, a behavior that reduces healthy farm produce made from villages or rural areas, thereby stimulating food deserts or food swamps (Nayak, 2020; Honorio et al., 2021). Food Deserts and food swamps are forefront causes of malnutrition in the environment, especially at schools. Food is significant for health, growth, and development. Consumption of healthy foods encourages health, growth, and development, immunity, longevity, and high educational attainment (Barth et al., 2021). Whereas, poor nutrition encourage obesity, diabetes, cognitive decline, osteoporosis, cancers, etc. Food deserts and swamps spur malnutrition or food insecurity. Malnutrition is lack of right amount of nutrients to meat daily energy and nutrients requirements. It can spur undernutrition or overnutrition. Undernutrition is the insufficient consumption of nutrients and energy to meet the body's need, and overnutrition refers to overconsumption of certain nutrients. Poor intake or usage of nutrients results in wasting (low weight-for-height), stunting (low height -for-age), underweight (low weight-for-age). Overnutrition causes obesity, overweight, and many of the chronic diseases (Arimond et al., 2021; Barth et al., 2021; Nagothi, 2021).

Healthy Foods Needed by the Human Body

Healthy foods contain higher amount of fiber, nutrients; and are low in saturated fats, low in added sugar or sodium, low in preservatives, and encourage health, growth, and development (Michigan WIC Program,

2022; Sarkingobir et al., 2023). Some of the healthy foods are as follows:

- Non-starchy vegetables include, carrot, cabbage, cauliflower, Nopales, broccoli, spinach, onions, peppers, green beans, tomatoes, eggplant, etc.
- Fruits include, apples, oranges, grapefruits, blueberries, grapes, peaches, and pears
- Milk include, whole milk, wheat, whole oats, whole corn, sorghum, Quinoa, rice, barley, millet
- Starch vegetables include, sweet potatoes, corn, pumpkin, parsnip, plantain
- Protein sources include, beans, soybeans, walnuts, seeds, eggs, chicken, duck, and turkey without skin, and lean meats
- Oil sources include, olive oil, soybeans, walnut, flax seed, and fishes (Zehra et al., 2018; American Diabetes Association, 2022).

Needed Nutrients by the Human Body

Children, youngsters, and teachers (school administrators) need nutritious foods to live up to the expectations. Poor nutrition is linked to ill-health and poor education, therefore, school environment should be providing nutritious foods for easy access and food security to the children, youngsters, and teachers. Carbohydrates, proteins, and fats food classes provide energy when metabolized by the human body. Carbohydrates are obtained from food types such as cereals, grains, starchy vegetables, etc. The role of carbohydrates in the body is to majorly provide energy to the body. Sucrose, lactose, maltose, are examples of disaccharide carbohydrates, but glucose is the most vital sugar. Some other polymer carbohydrates are starch, cellulose, and fiber. Fiber prevents obesity, heart diseases, cancer, constipation, hemorrhoids, colorectal cancer, and diverticulitis (Sarkingobir et al., 2021; Michigan WIC Program, 2022).

Proteins are food classes that are responsible for building new tissues, maintenance of old tissues, regulation of body processes such as information, clotting, fluid balance, signal pathways. Moreover, proteins are useful to provide energy for the body, when carbohydrates or fats are limiting. Proteins are made with building blocks called amino acids, and are obtained from eggs, meat, poultry, beans, peas, nuts, milk, etc (Aimuson-Quampah et al., 2022; Annam et al., 2024).

Children age 1-3 years need 13 grams of proteins daily, while children 4-8 years old need 19 grams, children 9-13 years need 34 grams of proteins daily, girls at 14-18 years need 46 gram of proteins daily, boys

14-18 years need 52 gram of proteins everyday (Michigan WIC Program, 2022).

Fats are providing energy, cushioning for interior organs such as liver, skin, and kidney. Fats provides satiety feeling, provides essential fatty acids, and are vital in absorption, storage, and transportation of vitamins A, D, E, K. Fats saturated are obtained from food materials such as palm oil, coconut oil, egg yolk, and are to be taken at guided levels. Better fats are the unsaturated ones, that are obtained from olive oil, groundnuts oil, seeds, etc (Michigan WIC Program, 2022). Vitamins and minerals are also vital components that are supposed to be taken by humans for healthy life. Vitamins are minerals and their nutritional roles are detailed in Tables1-3.

Table 1: Nutritional benefits of fat soluble vitamins

Vitamin	Better source of healthy food	Functions in the human body	Problem due shortage
A	Carrots, milk, apricot, kale, mango, peppers, potatoes, yam	Help in maintaining vision, maintains skin health, help in resisting infection, help in teeth and bone health	Night blindness, low resistance to infections, scaly or dry skin
D	Sunlight, egg yolk, milk	Linked to calcium metabolism, promotes calcium absorption, help in maintaining calcium level at blood level	Rickets in children (soft and deformed bones)
E	Vegetables oils, nuts, whole grains, liver, green vegetables	Protects vitamin A, protects polyunsaturated fats of the body against oxidative stress	Destruction in red cells,
K	Green leafy vegetables, intestinal bacteria	Help the body in blood clotting	Bleeding disorders, low blood clotting

Source: (Michigan WIC Program, 2022)

Table 2: Nutritional benefits of water soluble vitamins

Vitamin	Better source of healthy food	Functions in the human body	Problem due shortage
C	Citrus fruits, guava, cabbage, pea, peppers, kiwi, strawberries, broccoli,	Needed for collagen synthesis, heling of wounds, healthy gums, help in resisting infection, converts folic acid to active format, help to strengthen blood vessels	Scurvy. Details of scurvy include: depression, bleeding gums, painful joints, delay in healing of wound, poor growth, low appetite, easy bruising
B1 (thiamin)	Meats, whole grain, peanuts, fresh green vegetables, wheat germs	Linked to enzyme systems that convert carbohydrates to energy	Beriberi: confusion, low appetite, heart failure, wasting of muscle, limbs swelling
B2 (Riboflavin)	Green leafy vegetables, fish, eggs, cereals, organ meats, whole grains	Help in breaking down of fat for energy	Anemia, cracks in corner of mouth, red and swollen tongue, teary eyes, scaly skin (around nose)
B3 (Niacin)	Cereals, fish, meat, peanuts, liver, poultry	Help the body in metabolizing (catabolizing) fats, protein, carbohydrates, And help in making some certain hormones	Pellagra resulting in weakness, diarrhea, loss of appetite, sore tongue, skin rash, dementia
B6 (Pyridoxine)	Fish, meat, beans, avocado, prunes, egg, green vegetables,	Helps the body in making proteins	Abnormal functioning of brain, and skin changes

	meat		
Biotin	Meat organs, whole grain, cereals, vegetables, eggs	Help in degrading carbohydrates, fat, and proteins for energy	Poor appetite, dry skin, depression, numb hands and feet
Pantothenic acid	Organ meets, whole grains, eggs, broccoli	Help in breaking down and making of protein, hemoglobin, hormones, and cholesterol	Nausea, cramps, diarrhea
B12 (Cobalamin)	Meat, fish, eggs, milk, poultry	Help the body in synthesis of new red cells and new cells (in general), help in nervous system	Poor appetite, mental problems, anemia, poor coordination, swollen tongue

Source: (Michigan WIC Program, 2022)

Table 3: Some elemental nutrients that are beneficial to the body

Elemental nutrients	Essentiality to the body	Source from healthy diet	Problem that occur due to deficiency
Zinc	Help the body's enzymes, help in making proteins, help in using vitamin A, help in taste sensations	Fish, liver, meat, milk, nuts, legumes, grains	Poor wound healing, retarded growth, poor sexual development, reduced taste sensation
Iodine	Parcel of thyroid hormones, control energy production in the body	Seafood, iodized salt, food grown in iodized soils	Goiter, meta retardation and cretinism, poor learning outcomes
Magnesium	Formation of bones, help in muscles functioning	Whole grains, seafood, milk, green leafy vegetables,	Convulsions, tremors

		fish, meats	
Sodium	Maintain heartbeat, stimulates nerves, help in muscle contraction	Potatoes, whole grains, fruits, vegetables, poultry, bananas	Tiredness, heart failure, kidney damage, weakness of limbs, rapid heart rate
Sodium	Helps in maintaining water balance, stimulates nerves, help in muscle contractions, help in acid-based balance maintenance	Meat, fish, eggs, poultry	Vomiting, nausea, cramps, tiredness
Iron	Hemoglobin formation, myoglobin formation, oxygen transport	Green vegetables, cereals, eggs, beef, chicken,	Anemia, poor learning outcomes, weakness, irritability, growth retardation, poor attention, loss of appetite,
Calcium	Help in blood clotting, help in muscle contraction, help in nerve functioning	Beef, legumes, green vegetables, chicken	
Phosphorus	Formation of bones, formation of enzymes, formation of proteins, maintenance of acid base balance	Milk, meat, nuts, eggs, legumes, whole grains, poultry	Poor bone, poor growth, loos of appetite, paining of bones, weakness
Fluoride	Prevents tooth decay and	Water	Increased in tooth decay

	osteoporosis		incidence

Source: (Michigan WIC Program, 2022)

Behavioral Aspect of Public Nutrition at School

Humans behavior affects health of the actor and the population in most of the situations, and in turn the behavior is affected or influenced by factors known as determinants of health. The factors or determinants of health could be stemmed from the individual or environment. Therefore, the public health nutrition, that is, nutrition of school actors (students and teachers) is determined by an interaction of mixtures of determinants, which are conveniently understood through the use of theory-based approaches (Raingruber, 2010).

Health Belief Model (HBM)

The HBM has basically, the main components included, perceived susceptibility, perceived severity, perceived barriers, and as well perceived benefits. The HBM also consider cues to actions, and they are the factors that cause an individual to exercise change (Bakhtiar et al., 2024). The Table 4 describes the application of HBM to public health nutrition at schools.

Table 4: Description of the application of HBM to public health nutrition at schools.

S/N	Component	Description
1	Perceived susceptibility	The person view on contracting a disease (such as diabetes, obesity, etc) due to malnutrition, such as becoming hypertensive due to excess sodium intake through cookies, donuts, chips, etc, becoming obese and diabetic (due to consumption of empty calories such as beverages, fast foods, junk foods). The perception is mostly shaped by knowledge or belief of the person or group. Teaching the school actors and

		creation of awareness about healthy diet, and unhealthy diet will help a lot to shape perception positively.
2	Perceived severity	Perceived severity refers to believe about torment of the disease or intake of poor diet. People who believe that eating unhealthy diet (empty calories) are suffering from deadly diseases are more prone to take positive actions
3	Perceived benefits	Believing that taking healthy foods, and avoiding empty calories is beneficial to health. It provides healthy, productive, intelligent people; and save the public from morbidities (diabetes, hypertension, heart diseases, cancer, etc) and mortalities. The proponents to this assertion are guided by awareness level and will act positively mostly
4	Perceived barriers	Refers to difficulties in carrying out a healthy move towards healthy foods. Barrie's could be lack of awareness, poverty, and ability to manipulate the food

		environments. Food swamps and food deserts are typically parable barriers to healthy foods at school. Creation of awareness, better food policies, like urban agriculture, small-scale farming, plant diversity, and animal husbandry are viable solutions that confer general effects.
5	Cues to actions	They stimulate people to carry the needed option.
6	Self-efficacy	The confidence of a person about ability to properly conduct a behavior change.

Social Cognitive Theory (SCT)

SCT consists of competencies and skills, evaluative standards, expectancies and beliefs, and personal goals as components. Competencies consist of knowledge, experience and belief, therewith, referring to what a person (or people) thought will occur, if for instance unhealthy food or healthy food is consumed. Evaluative standards are the personal standards set by a person or group of individuals (standards may alter over time course). Personal goals are objectives that are intended to be attained by a person. The SCT components show that a person will make better food choices if he has good belief and knowledge, along with personal objectives; therewith, there is learning from the social environment. Observational learning is what we learnt from others in our social environment. Students observation from peers or teachers or parents taking empty calories will incite them to follow suit, unless stopped by awareness or policies (Raingruber, 2010).

Stages of Changes (SOC)

SOC or transtheoretical model (TTM) categorizes the course of action followed by a person into sections of behavior change process (Nakabayashi et al., 2020). The stages or subsections that are traced by a person in the course of performing an action that is unhealthy or healthy towards nutrition are described in Table 5.

Table 5: Stages or subsections that are traced by a person in the course of performing an action

S/N	Component	Description
1	Pre-contemplation	At this stage, there is no consideration for changing the preexisting behavior. For instance, the person has no any little determination to health consumption of empty calories or obesogenic foods. Use if awareness creation or educational approach will be helpful to stir the idle man.
2	Contemplation	At this juncture, the person has begun to make some thought in a view to make change. He has started to cast a believe that empty calories are deadly. Education or awareness was the brain behind this thought that starts pricking the conscious of the person involved.
3	Action	At this juncture, the person has already played the behavior. For instance, he has already stopped

		consuming alcoholic beverages.
4	Maintenance	The behavior has been kept without halt for a considerably significant timeframe.

Socioecological Model (SEM)

Food Security is a concept meaning that, at all time, all people, have access to physically, socially, economically, nutritious and safe, food that is right for active and healthy life. SEM theorized that a human being changes a deadly behavior (consumption of empty calories) as a result of interaction or mixture of personal and environmental forces or factors (influences). Intrapersonal factors that are influential are many, but include belief, knowledge, sex (gender), employment, poverty, biology, etc. Interpersonal factors consist of the interaction of the person with people near him such as mother, father, friends, family members, etc. Institutional factors are the next inline including the factors at school, or work place. School that allows selling of empty calories without any bottleneck, encourage obesogenic society. A school that restrict or ban sell or taking of empty calories encourage a healthy nutrition. The school could also encourage a healthy by improving it's garden, farms, and other practices to provide green environment and yield healthy foods for human consumption. Community factors include culture, norms, values, and folklores of the community regarding foods consumption. Community that alcohol as insignificant encourage an obesogenic society. Community that uses alcohol or other similar stuffs at occasions encourage members to take unhealthy foods (Raingruber, 2010: Saraca & Butnario, 2020; Franca et al., 2022).

Public policy is another step that affects health. The public policy includes laws and do's and don’ts of the government. A government that allows food industries without checkmate, will breed empty calories proliferation. Government may support farming activities to produce healthy foods, encourages proliferation of healthy markets in the environments, to make food secured. Other practices including urban farming, could be taken-up seriously by public policy in order to encourage prevalence of healthy foods (Raingruber, 2010).

Educational Implications of Food Deserts and Food Swamps

There are several implications of food insecurity or malnutrition to the children, youngsters, and adults. Some of the implications are as follows:

- Nutrients deficiencies
  Some micronutrients deficiencies related to food insecurity include, anemia, iodine deficiency, vitamin A deficiency, and zinc deficiency. Occurrence of any of the deficiencies such as anemia, iodine deficiency, zinc deficiency, and vitamin A deficiency causes low health and low cognition or academic performance, especially in children. Infectious diseases thrive well in malnourished children or adult. For instance, tuberculosis, HIV, diarrhea, malaria, neglected tropical diseases are more flourishing in person suffering from malnutrition (Barth et al., 2021; Sarkingobir et al., 2022). Only healthy people can attend schools and learn or work, unhealthy people are either at home or hospitals nursing; even if they attend schools their ability to learn properly is reduced.
- Overnutrition is a rising trend in children and young people, as well as adult, nowadays, due to unhealthy eating. Overnutrition cause type 2 diabetes, respiratory diseases, cardiovascular disease, and cancer. Effects of the obesogenic diseases or disorders hamper education of students or teachers (UNICEF, 2021).
- Anorexia is a situation whereby a person refused to eat because of the desire to lose weight. Stigmatization or thought of victimization may cause this among students.
- Bulimia, refers to " distorting of body image in which bouts of extreme overeating are followed by self-induced vomiting, purging or fasting."
- Binge eating disorder recurrence of binge eating without counter-efforts.
- As ably mentioned the most of the stuffs available in food deserts or food swamps are empty calories, they are also indeed consequential. High fat (in stuffs like fried chicken skin, chips, margarine) contents instigate overweight, which is a risk factor of obesity and other problems such as diabetes, cancers, and heart problems (Islam, 2020). High sugar content in foods (stuffs) cause diabetes, obesity, and other chronic disorders. Moreover, empty calories cause memory and learning problems, poor concentration, and micronutrients deficiencies (Sheena, 2020). Every one out of the stated effects easily cause poor academic performance (Nagothi, 2021). Moreover, empty

calories contain preservatives or additives which trigger diverse array of disorders through acute or chronic intake (Islam, 2020).

Unhealthy Foods in Food Deserts and Food Swamps

Food deserts and food swamps are more populated with unhealthy foods, such as junk foods, fats foods, ultra-processed foods or generally empty calories (Tegmire et al., 2021; Berkley, 2023). Junk foods are called with this kind of name because they have low nutritional value, therewith, they may be totally without nutrients for growth, health, and development of the body (Sheena, 2020). Empty calories have no nutritional significance, and don't supply good energy. Empty calories come from ultra-processed foods, contain fats, or added sugar, cause hunger, cause addiction, and instigate craving for more (Arya & Mishra, 2013). To Shamsol & Fisol (2023) junk food is defined as foodstuff readily available, cheap, and may be nutritious or not. They are "salty and sugary snacks," sweet carbonated drinks, candy, cake, ice creams, pizzas, chocolate, burgers, sandwiches, etc. They are characteristically known with high content of calories, trans-fat, processed sugars, salt, and additives. Equally, they are deficit in protein, fiber, vitamins, and are harmful when taken for a long course or in large doses under acute conditions (Bhagyalakshmi et al., 2022; Shamsol & Fisol, 2023). Empty calories are foods or stuffs consumed by humans, that in turn contribute calories, without giving (many) other nutrients needed by the body. Some empty calories contain added sugar, or added saturated fats, or added salt (sodium), and preservatives. Empty calories are indeed obesogenic (United States Department of Agriculture, 2015; United Way of Olmsted County, 2018), the empty calories include the following:

- Cake
- Fruit punch
- Sweetened drinks
- Cookies
- Donut
- Pastry
- Desserts
- Caramel
- Popcorn
- Soft drinks
- Chocolate
- Wine
- Beer

- Potato chips
- Beer
- Ice creams
- Pizza
- Bacon (Abonmai et al., 2022; Michigan WIC Program, 2022).

Suggestions

People at school or home or elsewhere cannot live properly without proper nutrition. At school, people (students and staff) need to eat properly for educational objectives to be achieved. However, ability to eat properly is shaped by the presence or absence of food at school environment or nearby. Food deserts are areas that have limited access to healthy foods; while food swamps are areas that have preponderance or predominance of unhealthy foods (empty calories). Thus, by whatsoever degree, food deserts and food swamps are unhealthy food environments populated with empty calories. Some of the approaches to control the situation include the followings:

Advocacy

Advocating for healthy environment at schools is crucial. Educated folks should rise and call for strengthening the right of school actors, especially youngsters to food justice, thereby forcing governments and entire stakeholders to take drastic actions.

Policies

Government should make and execute food-based good policies, such as banning of empty calories at schools or nearby, encouraging school feeding program, instructing or compelling parents to provide healthy foods to wards at school, encouraging healthy food markets at schools or nearby (United Way of Olmsted County, 2017).

Urban farming policies and procedures are important

Urban farming or agriculture is an entire name for all the farming activities conducted in the cities, including crop farming, livestock farming, fisheries, forest farming, etc. Urban farming provides farming opportunities at homes, on top of roofs, in fish ponds, at school, in rivers, on river bank, near the roads, along railway lines, in open space, on vacant plots, in containers, etc. The aim of the urban farming is to provide food, income, jobs, recreation, climate adaptation, pollution control, prevent micronutrients deficiency, reduces food transport cost, curtail food processing or packaging, curtail food deserts, curtail food swamps, encourage food oases, etc (FAO, 2001). Parables of urban farming include, beekeeping, animal husbandry, fish farming, aquaponics (agriculture combined with fish farming) (Delbridage & Ngogs, 2021; Maulana et al., 2023).

Education and awareness

People should be educated on healthy foods, food groups, and other aspects of proper nutrition. Thereof, the people should be tasked to avoid all forms of empty calories, since they almost valueless nutritionally, but very harmful. The harms and dangers of these stuffs, specific examples, and related information to the public should be given through awareness campaign and school education (Whiteland, 2023).

Small scale farming

Small scale farming is controlled by families or households or small group of farmers, involving few hectares of land. They produce higher yield, jobs, opportunities, good climate, and contribute to healthy food systems greatly (Usman et al., 2022; Bashar, 2025).

Improved or encouraged food systems

Food systems include the path of food from farm to mouth. Proliferation of agriculture through urban farming, small-scale or smallholder agriculture, and innovation and research, encourage food accessibility. Similarly, encouragement of informal local foods markets in school premises and nearby, and in urban and rural settlements markets encourage accessibility to healthy foods in the environment (Battershy, 2019; Bashar, 2025).

Conclusion

The prevalence of food deserts and food swamps in school environments poses significant health risks to students, including obesity, diabetes, and other diet-related diseases. These unhealthy food environments can also negatively impact academic performance. To mitigate these effects, schools should prioritize providing healthy food options and promoting nutrition education. By creating healthier school environments, we can support students' overall well-being, improve their health outcomes, and enhance their academic achievement.

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