

Research Application Summary

The role of agrifood systems in addressing obesity and overweight in Africa

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Abstract

Although addressing malnutrition has been a key focus area in health and agriculture, on the other hand prevalence of obesity and overweight are increasing in sub-Saharan Africa at an alarming rate. This paper was prepared to provide suggestions on strategies that could be implemented by players in agrifood systems to reduce and prevent obesity and overweight. Agrifood system players have the potential to play a more active role in addressing obesity and overweight. Obesity and overweight are driven by a number of factors including globalization, urbanization, the built environment, the food environment, physical inactivity, genetics, caloric intake, cultural perceptions of weight, and lack of knowledge. These factors can interact together leading to increased prevalence of obesity and overweight. Among all these factors researchers have pointed out that increased caloric intake without corresponding energy expenditure are the main drivers of obesity and overweight. Caloric intake is a function of the food environment. Therefore this paper focuses on the role of agrifood systems or the food environment in reducing and preventing overweight. The paper also identifies some key challenges faced in the current agrifood systems in sub-Saharan Africa and provides recommendations on strategies for preventing and reducing obesity and overweight. Addressing obesity and overweight in complex agrifood systems is not an easy task and requires collaboration of multiple players in the agrifood system.

Key words: agrifood system, obesity, sub-Saharan Africa

Résumé

Bien que la lutte contre la malnutrition ait été un domaine clé de la santé et de l'agriculture, d'un autre côté, la prévalence de l'obésité et du surpoids augmente en Afrique sub-saharienne à un rythme alarmant. Ce document a été préparé pour fournir des suggestions sur les stratégies qui pourraient être mises en œuvre par les acteurs des systèmes agroalimentaires pour réduire et prévenir l'obésité et le surpoids. Les acteurs des systèmes agroalimentaires ont le potentiel pour jouer un rôle plus actif dans la lutte contre l'obésité et le surpoids. L'obésité et le surpoids sont dus à un certain nombre de facteurs, notamment la mondialisation, l'urbanisation, l'environnement bâti, l'environnement alimentaire, la sédentarité, la génétique, l'apport calorique, les perceptions culturelles du poids et le manque de connaissances. Ces facteurs peuvent interagir ensemble et entraîner une prévalence accrue de l'obésité et du surpoids. Parmi tous ces facteurs, les chercheurs ont souligné que l'augmentation de l'apport calorique sans dépense énergétique correspondante est le principal facteur d'obésité et de surpoids. L'apport calorique est une fonction de l'environnement alimentaire. Par conséquent, ce document se concentre sur le rôle des systèmes agroalimentaires ou de l'environnement alimentaire dans la réduction et la prévention de la surcharge pondérale. Il identifie également certains des principaux défis auxquels sont confrontés les systèmes agroalimentaires actuels en Afrique subsaharienne et fournit des recommandations sur les stratégies de prévention et de réduction de l'obésité et du

surpoids. La lutte contre l'obésité et le surpoids dans les systèmes agroalimentaires complexes n'est pas une tâche facile et nécessite la collaboration de multiples acteurs du système agroalimentaire.

Mots clés : système agroalimentaire, obésité, Afrique sub-saharienne

Introduction

An agrifood system is the combination of activities and institutions involved in the production and consumption of a particular food item (Ledger, 2016). Institutions in the agrifood system include organizations that provide extension and advisory services, financial institutions, insurance providers, policy makers while the activities in the agrifood system include production, storage, processing, and distribution and consumption of the products. In the past, researchers have focused on the role of agrifood systems, particularly improved agricultural productivity, in addressing food insecurity and under nutrition (Gomez *et al.*, 2013). However, due to the nutrition transition, there is a need to look at ways in which the agrifood systems can go beyond provision of food required but also address over nutrition. The nutrition transition refers to the transition from the consumption of traditional diets high in fiber and micronutrients to diets of highly processed foods with high levels of sugar, fat, as well as diets low in fiber and diets that are less nutrient dense (Walls *et al.*, 2018). Examples of ultra processed products include pizza, potato crisps, biscuits, sugary drinks, sweets and other bakery goods (Walls *et al.*, 2018). This dietary shift has been accompanied by changes in eating behaviors and less engagement in physical activities (Walls *et al.*, 2018). The shift has also been driven by globalization. According to the Global Nutrition report (Development Initiatives, 2018) packaged food sales in Africa have increased from 54kg per capita in 2005 to 71kg per capita in 2015. The majority of these sales have been attributed to savory snacks.

Africa now faces the triple burden of having over nutrition, micronutrient deficiency and under nutrition. Malnutrition refers to deficiencies, excesses, or imbalances in a person's intake of energy and/or nutrients (WHO, 2018). The term malnutrition addresses three broad groups of conditions under nutrition, micronutrient-related malnutrition and overweight and obesity. First, under nutrition, includes wasting (low weight-for-height), stunting (low height-for-age) and underweight (low weight-for-age); second, micronutrient-related malnutrition includes micronutrient deficiencies (a lack of important vitamins and minerals); and third, over nutrition (overweight and obesity) (WHO, 2018). Unfortunately, all these three conditions can exist in the same country, community and even in the same household. In 2016, 39% of adults in the world were overweight (i.e., had a body mass index greater than or equal to 25 kg/m²) and 13% were obese (i.e., had a body mass index greater than or equal to 30 kg/m²) (Barnhill *et al.*, 2018). Obesity and overweight levels have been increasing in Africa, in both urban and rural areas and across socioeconomic levels (Ziraba *et al.*, 2009). For example, prevalence of obesity and overweight among women in Zimbabwe increased from 31% in 2010 to 35% in 2015 (Zimstat, 2010, 2015). On the other hand, prevalence of obesity and overweight among men in Zimbabwe increased from 9% in 2010 to 12% in 2015 (Zimstat, 2010, 2015). In Tanzania, prevalence of adult overweight and obesity in Tanzania is 26% and higher in women (37.1%) compared to men (15.1%) (MoHCDGEC *et al.*, 2016). In 1991 prevalence of overweight and obesity among women of reproductive age was 11% (MoHCDGEC *et al.*, 2016).

Increasing obesity and overweight levels are of concern because they increase the risk of non communicable diseases such as type 2 diabetes, hypertension, cancer and heart disease. The main objective of this paper is to suggest ways in which agrifood system players can contribute to the prevention and reduction in obesity and overweight.

Drivers and consequences of obesity and overweight

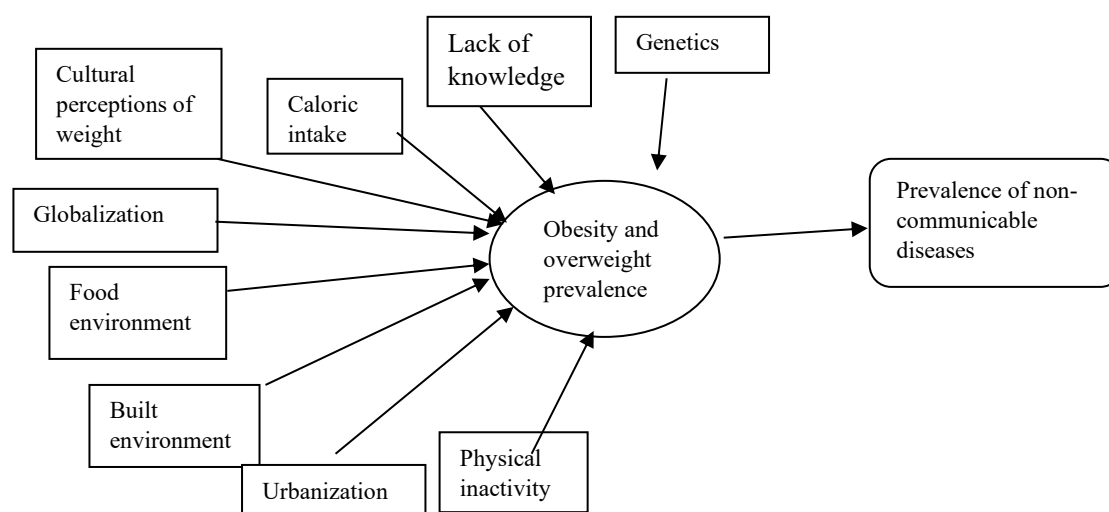


Figure 1. Drivers and consequences of obesity and overweight

Researchers have found that the main drivers of obesity and overweight (Figure 1) include globalization, urbanization, the built environment, the food environment, physical inactivity, genetics, caloric intake, and lack of knowledge (Huang *et al.*, 2009; Neff *et al.*, 2009; Ziraba *et al.*, 2009; Hawkes *et al.*, 2012; Anand *et al.*, 2015; Ford *et al.*, 2017; Barnhill *et al.*, 2018; Nguyen-Viet, 2019). These factors can interact together as well leading to increased prevalence of obesity and overweight. One of the drivers that is unique to the African context is cultural perceptions of weight. In some African cultures, being obese is associated with wealth. The more obese you are the wealthier it is presumed you are. In other cultures, because of the stigma of HIV/AIDS, a slim body is associated with being ill and being obese is associated with being healthy. Among all these factors researchers have pointed out that increased caloric intake without corresponding energy expenditure are the main drivers of obesity and overweight (Huang *et al.*, 2009; Barnhill *et al.*, 2018). Caloric intake is a function of the food environment, therefore this paper focuses on the role of agrifood systems or the food environment in reducing and preventing overweight. The food environment includes activities of food supply chain members- farmers, processor, retailers and consumers. The food environment also focuses on access to healthy food and its affordability.

Challenges of current agrifood systems in Africa

One of the major challenges faced in African agrifood systems is that there is low consumption of fruits and vegetables in Africa. A study on fruit and vegetable consumption in sub-Saharan Africa found that consumption of fruit and vegetables ranged from 27 kg -114 kg per person per year which is far below the recommended 146kg per person per year (Ruel *et al.*, 2005). The World Health Organization (WHO) guidelines recommend consumption of 400g of fruits and vegetables per day (this is equivalent to five servings of 80g of fruit and or vegetables per day or 146kg per person per year) excluding potatoes and other starchy tubers for prevention of diseases such as heart disease, cancer and obesity (WHO, 2019). The study also found that average consumption is lower for fruits rather than vegetables, with wide variations across countries (Ruel *et al.*, 2005). The value of vegetable consumption was between twofold and eleven fold higher than that of fruit in the study (Ruel *et al.*, 2005). For the poorest, fruits and vegetables are an expensive source of energy and they would rather allocate their resources to producing or purchasing starchy staples which are cheaper sources of energy for them (Ruel *et al.*, 2005).

In many sub-Saharan countries such as Zimbabwe and Malawi, meals are dominated by cereals particularly maize which has a high glycemic index (Mlotha *et al.*, 2016), which increases risk of diabetes. The glycemic index is a measure of the rate at which blood glucose levels are increased after eating food containing carbohydrates (Food Advisory Consumer Service, 2019).

Another challenge with current agrifood systems in Africa is the high level of postharvest losses ranging from 1% to 75.5% varying by commodity and country (Affognon *et al.*, 2015). Not all the food that is produced by the farmers ends up being consumed, some is lost at each stage of the supply chain. For example, because of lack of a well developed cold chain in many African countries food can go bad as it moves from the farmer to the consumer along the chain. Some is lost as the farmer waits for transportation by the roadside to the market, while some food is lost at the market as the trader waits for customers to purchase it. Agriculture products that do not meet standards required by restaurants, processors, and retailers because they are the wrong size, variety or have blemishes also have to be disposed off. In restaurants or other places where food is consumed including homes, after consumption there is also food that is discarded. At food manufacturing plants there are byproducts of the production process or components not useable for a specific process. These post harvest losses need to be reduced and more food needs to get to the actual consumer than is lost along the supply chain. It is important to address post harvest losses because they include nutritional loss, quality loss, quantity loss and ultimately economic losses.

Furthermore, the limited availability of healthy food options when one is eating away from home is another challenge. There is increasing urbanization in Africa which has led to changes in the consumption habits and lifestyles of consumers. For example, urban residents eat away from home and there are limited options for healthy snacks or other food when eating away from home. Both food that is sold on streets and in fast food restaurants tend to be highly processed and high in fats, sugars, and salt. In contrast when eating at home people can prepare their own food and limit the amount of fats, sugar and salt. People's diets are based on the foods that are produced and marketed to them.

Fourth, agrifood systems have become more complex spanning the globe. We now live in a global village and food is procured from different countries. There are few instances where countries do not import food products from other countries. Lastly, the focus on production of cereals and starches is another challenge in Africa. The majority of the research in development of improved varieties focuses on cereals and starches. Furthermore, governments devote large amounts of money to subsidies for production of cereals and starches. However, for a healthy balanced diet more funding needs to be channeled to a variety of food products as well. The subsidies in production of cereals and starches have resulted in cheaper cereals and starches being available to consumers. The subsidies on cereals and starches may have led to improved food security but they have also led to decreased nutrition security. In contrast, the high fiber, nutrient dense produce does not receive subsidies and is more expensive and out of reach for most consumers. Another result of the focus on cereals and starches is that diets are not as diverse as they could be. There are many plants, seeds, fungi and other species that could be consumed but since the focus has been only on cereals and starches consumption patterns have also focused only on those items, leading to a lack of diversity in diets.

Suggestions for strategies that can be implemented in agrifood system to reduce and prevent obesity and overweight. Agrifood systems can address the problem of obesity and overweight through providing affordable healthy food options. Suggestions are given in this paper on how different agrifood system players can contribute to the reduction and prevention of obesity and overweight.

Farmers role in obesity/overweight reduction and prevention. Farmers could work on reducing food waste and post harvest losses. For products that do not meet the strict standards of retailers or other customers, farmers can sell these at a discounted price rather than letting them rot in the field as long as they are safe for consumption. By selling the lower grade products at a lower price, farmers can contribute to affordable healthy food access for lower income consumers. Farmers should also grow agricultural produce that is high in nutrients and fiber. They can also use seed that is biofortified. Additionally, farmers should test their produce for nutrient content and pesticide residue to ensure a quality product for their consumers.

Processors role in obesity/overweight reduction and prevention. Processors can develop new products that are low in fat, salt and sugar in order to reduce and prevent obesity/overweight prevalence. Processors can also reduce portion size of the food products they sell in order to address the problem of obesity/overweight. The smaller packet or portion sizes can also be sold for more and hence the processor can cover their costs of making multiple smaller packs rather than just one bigger packet. Processors can also create labels that make it easier for a person to know whether a food product is a healthier option or not. Processors can also work with retailers in designing marketing campaigns together where they sponsor promotions for healthier food products. Obesity is increasing among children as well. Processors could voluntarily agree not to advertise food that is high in fat and sugar to children.

Processors could also use social media to share information about recipes for healthier food options. Processors could also sponsor competitions where children, parents, chefs, and any other adults responsible for food preparation compete in preparing healthy and nutritious meals. Processors can also develop recipe books that focus on reduced fat and sugar free dishes. Processors can also voluntarily provide glycemic index information on labels of their food products. Lower glycemic index foods can be used as part of a weight management program because high glucose levels lead to high insulin levels resulting in fat deposits in cells. Processors can also recommend portion sizes for each meal in order to prevent obesity and overweight.

Furthermore, processors can also increase their charitable support to nutrition education programs. Instead of charitable giving that is unrelated to their core activities, they can contribute to efforts related to nutrition education and establishing vegetable gardens.

Wholesalers role in obesity/overweight reduction and prevention. Wholesalers should ensure the product mix that they offer their customers both for households and other businesses includes healthier options. This is important because the customers will purchase what is available and this is determined by what the wholesalers stock.

Retailers role in obesity/overweight reduction and prevention. Retailers can also have promotional activities to encourage increased consumption of healthy foods. They can also require each processor or food manufacturer to also provide a healthier version of their product so that consumers have options. For example, supply of whole milk, fat free/skim milk, organic milk, reduced fat milk or even plant based milk (e.g., soymilk) as options especially for their store's private label brands. Since retailers often control the food distribution channels they can influence other members in the supply chain to supply healthier food options. The retailers can set standards regarding ingredients for processed foods, such as requiring reduced fat and salt snacks. Retailers can also work with local farmers as their outgrowers that provide a diverse food options including indigenous or traditional foods that are high in nutrients to the retailer. Retailers can also have demonstrations in store on preparation of healthy meals and allowing customers to taste the products in store. Food retailers can also ban the sale of certain products that are deemed unhealthy (i.e., those that are dense in calories, lacking nutrients, high in sugar and fat). The rise of supermarkets in Africa has led to some consumers

switching from procuring food in traditional markets to supermarkets. Some of the supermarkets focus on selling processed packaged products. Therefore, those retailers that are currently stocking only processed foods can add a section in their stores for fresh foods.

Restaurants including fast food restaurants can reformulate their menus and recipes so that they are healthier. Restaurants can also offer smaller size portions. Generally, with some menu options it can be cheaper to buy the larger portions than the smaller portions and this leads to people consuming more than they need just because the food is available and cheaper. Restaurants should offer training for their employees so that they are able to develop healthy meals. For food vendors it is an opportunity to contribute to development and distribution of healthy snacks.

Food service providers in institutions such as schools, hospitals and prison could reformulate their food servings to ensure they are providing their clients with a balanced meal. Retailers should carefully select their store locations so that there is increased access to fresh and healthier foods in areas where there have been urban and rural food deserts.

Consumer groups role in obesity/overweight reduction and prevention. Consumer groups should develop education and awareness campaigns on advantages of a healthy diet and exercise in preventing obesity and overweight. Consumer groups can develop food fairs and festivals where production and consumption of healthy food options are promoted. The consumer groups can work with farmers, restaurants, seed producers and processors in organizing the food fairs where people can learn more about healthy food options and also try samples of dishes.

Institutional food service providers. Food service providers at institutions such as preschools, primary and secondary schools, colleges, universities, hospitals and prisons have a large role to play in preventing obesity and overweight due to the number of people they impact. More training needs to be done for food service providers to be able to provide nutritious food at an affordable price to their consumers. The institutional food service providers may have to go beyond their main activities to producing some of their own food such as, the farm-to-school or farm-to-cafeteria programs in Pennsylvania, USA (Bagdonis *et al.*, 2009). They could also work on developing new recipes, recipe books and menus that are healthier options for their clients.

Extension and advisory service providers. Extension and advisory service providers should train farmers on importance of the nutrition quality of their agricultural produce. They can also teach farmers on the importance of diversification in their production and consumption.

Non-governmental organizations (NGOs). NGOs that are part of agrifood systems can have their own organizational policies where they procure only food that is rich in nutrients and fiber for their food aid programs. They can also have projects that promote production and consumption of fruits, vegetables, mushrooms, nuts and nutrient dense indigenous foods.

Policy makers. Governments in Africa can address the problem of obesity/overweight through regulation of unhealthy foods (i.e., those that are dense in calories, lacking nutrients, high in sugar and fat). For example, in 2018 South Africa introduced a sugar tax to reduce use of sugar in sweetened drinks (Saxen *et al.*, 2019). Governments can also ban junk food sales in schools or junk food sales to children. In addition, Governments can provide subsidies for farmers to increase production of diverse diets that also takes into account indigenous local foods. Processors can also be given incentives like reduced taxes for reformulating their products to be healthier. Reform is also needed in agricultural policy in Africa to have policies that promote production of diverse agricultural produce so that consumers have choices. This is important because what farmers grow and hence what people eat is driven by agricultural policy. Furthermore, Governments can use innovative programs to educate

consumers on healthy diets and importance of physical activity. For example, they could programs that entertain whilst also educating consumers.

African governments should invest more in post harvest research and extension to increase availability and affordability of the fruits and vegetables. They can also promote adoption of solar dryer to increase consumption of dried fruits and vegetables. Governments can also have educational campaigns and guidelines to promote availability of healthy foods in restaurants, food retail outlets, with street vendors and in educational institutions. Policy makers can also require more informative labeling of processed food products so that consumers know what is in the food product that they are purchasing.

Governments can also reduce import tariffs on fruits and vegetables so that imported produce is affordable to consumers. Governments can also promote development of orchards and vegetables in both urban and rural areas in order to increase consumption of fruits and vegetables. Governments can also have policies that require each household in the rural areas to have an orchard, vegetable garden or even plant at least 2-3 different kinds of fruit trees. This will assist in ensuring that each rural household readily has access to fresh fruit and vegetables. In urban areas, households should be required to have some fruits and vegetables on their property, with the amount grown varying with property size. For example, for each block of flats, residents can be allocated a piece of land for growing their produce, this can be onsite on the ground, roof, balcony or at another site allocated for the community. For those in high density areas, local government can require each stand to include space for at least one fruit tree and a small vegetable bed. Local governments should also allocate land for fresh produce markets in their urban planning.

Agrifood system approach to addressing obesity and overweight. The agrifood system is a complex network that has local, regional, and global value chains. Organizations operating in the agrifood system need to work together and coordinate strategies in activities together to address obesity and overweight. If a systems approach is not taken in addressing obesity and overweight, we might find unintended consequences elsewhere in the food system from a measure that has been implemented (Barnhill *et al.*, 2018). An individual isolated intervention is unlikely to have a substantial impact in preventing and reducing obesity and overweight prevalence (Barnhill *et al.*, 2018).

Conclusion

The agrifood system is a critical player in addressing obesity and overweight. Actions implemented will have an impact on the health of future generations. The agrifood system has an opportunity to redesign its strategies so that issues of health and nutrition are at the forefront of its agenda. Organizations involved in the production, processing, distribution and consumption of food need to consider nutritional value of food consumed. Consumers also need considered nutritional value of their foods their consuming. Nutritious food, healthy food and profits are not mutually exclusive and the agrifood system has potential to play a bigger more active role in preventing and reducing obesity and overweight.

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