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Linking Food, Agriculture, Nutrition and Development

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Overview: *There is a strong link between food, agriculture, nutrition and development. Food is a product of agriculture while the knowledge, proper utilization of food nutrients and the processes nutrients undergo in sustaining life of an individual is based on nutrition. Apart from social and economic factors, food nutrients can also be influenced by agricultural practices, posing the agronomist with additional challenge of managing environmental impacts on the quantity and quality of food nutrients during cultivation in other to achieve healthy foods. Good nutrition is capable of improving people's physical and mental development, even their capacity to learn, work and exhibit their full potentials as human beings. On the other hand, development is seen as a process that builds on itself and involves all round changes especially from individuals, social and economic aspects. Food system, social and other environmental factors have been indicted for the delay in achieving good nutrition and national development. To correct this menace, a collective effort of government at all levels, nutritionists, food technologists, agriculturists and individuals is greatly needed. However, women's strong involvement and participation in the spread of nutrition education is capable of evolving positive change in food choices, promoting dietary diversification as well as achieving sustainable food system at the household level. Improving household food processing and storage facilities will facilitate the adoption and practice of research findings and recommendations. Just as adopting environment-friendly agricultural practices may enhance the quantity and quality of food nutrients while improving crop yields. This paper gives an overview of social and environmental factors that influences human and national development; constraints that hinders the achievement of good nutrition and suggested right approaches that could transform the situation for better.*

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I. Food as a "human right"

Foods are edible substances that provide nourishment to the body which enables living organisms tostay alive. As a matter of fact, human beings have the right not only to live but to be healthy in order to attend to their daily routine.Human right to food is seen as "the right to regular, permanent and unrestricted accessto quantitative and qualitative adequate and sufficient food corresponding to the cultural traditions of the people to which the consumer belongs, which ensure a physical, mental, fulfilling and dignified life free of fear" (Special Rapporteur, 2008). Food of any kind (animal or plant origin), contain nutrients. These nutrients areimportant natural substances that maintain and sustain the life of consumers when adequately utilized.The right to food also protects the right of all human beings to be free from hunger, food insecurityand malnutrition (Ziegler, 2012).However, food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (World Food Summit, 1996). Regular consumption of adequate food nutrients helps to maintain normal body physiological processes and proper development of an individual. The International Covenant on Economic, Social and Cultural Rights (2012) recognizes the fact that the most fundamental human right is the right to adequate standard of living, including adequate food as well as the right to be free from hunger and malnutrition.

II. Agriculture and food production

The agronomists of today are involved with many issues which includes producing healthy food, managing the environmental impact of agriculture, and extracting energy from plants (http://www.imanagronomist.net/index.php). Recent crop production practices involve the use of modern technology-based farming including the use of pesticides and other chemicals to produce enough food for the growing world population. In the past, the major farming system in different rural communities were shifting cultivation and bush fallowing which require very minimal or non-use of fertilizers and organic chemicals to boost crop yield. Under these practice, soil fertility was periodically restored to cultivated land by the shifting of cultivation to fresh rested ground allowing the recently cultivated land to rest and recover. These systems of crop production were ecologically appropriate and suitable though under a low population density (FAO, 1997).

Current agronomic practice on crop cultivation seems to be more concerned with increase in food quantity rather than nutrient quantity and quality. Researches towards improving nutrient quantity and quality of food products have not yielded enough positive response in most developing countries. There is need to consider the nutritional qualities of food crops in agricultural research and applications, since reversing to the use of local cropping system may not provide sufficient food for the teaming population. Environmental contamination from agricultural chemicals and other sources may compromise people's nutritional status and health either directly or through changes in diet (Timothy and Pablo, 2002). Adopting an eco-friendly farming system that reduces external inputs (chemicals) like in organic agricultural practices will be most preferable.

Organic agricultural practice tends to work with nature to produce healthy food, sustains the health of soils, ecosystems and people. It involves farming with very little or without the application of herbicides, inorganic fertilizers and pesticide. Organic agriculture relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects (Ligita, 2010). It is healthier and safer to engage in agricultural practices that promote the management of natural resources as well as favoring the ecology such as developing agronomic methods that will improve the bioavailability of micronutrient content of foods especially the widely consumed staples (FAO, 2007).The complexity of nutrition and healthrelated implications resulting from loss of biodiversity and the use of chemicals in crop cultivationneed to be tackled to promote humanand national development.

III. Nutrition: bedrock for human and national development

Nutrition is a scientific discipline that deals with the application of knowledge for proper utilization of food nutrients and the processes nutrients undergo in sustaining life. The Council on Food and Nutrition of the American Medical Association provides a more comprehensive definition of nutrition as "the science of food, the nutrients and the substances therein, their action, interaction and balance in relation to health and diseases and the process by which the organism ingests, digests, absorbs, transports, utilizes and excretes food substances".Nutritional status is a measure of the health condition of an individual as affected primarily by the intake of food and utilization of nutrients (FAO,2004).

On the other hand, development is seen as a process that builds on itself and involves all round changes especially from individuals, social and economic aspects.The fact that people's health, physical, mental development, and even their capacity to learn, work and exhibit their full potentials as human beings is wholly dependent on good nutrition cannot be over emphasized. Nutrition plays a critical role in human resource development since deficiencies in essential nutrients lead to malnutrition, which affects an individual's mental and physical state, resulting in poor health and poor work performance (FAO, 2004). It is obvious that regular consumption of nutritious food will promote good nutritional status, good health andenable people to successfully contribute towards the development of the community in which they live.

Poor nutrition generally results in undernourishment which is capable of posing affected individuals to poor health condition, impaired productivity due to reduced physical and intellectual performance and can constrain community and national development (Scrimshano and Sangiovanni, 1997). Similarly, malnutrition is seen to erode human capacity, reduces productivity and affects survival, health, education and economy of the nation. Report of the World Health Organization (2013) reveals that loss of human productivity of any given country can affect 2 to 3 % of gross domestic production on the country's economy. According to Macdonald *et al.*(2002) investments on nutrition will accelerate development. Okwume and Eze (2010)confirm that nutrition remains an indispensable factor to national development because human contributions cannot be compromised in national development.Moreover, for a national, social and economic development programme to be successful and sustainable, the majority of the population should be able to participate in the process (FAO,2004). Theextent of human contributions towards community or national development greatly depends on the health condition of individuals domicile in such community.And diet is the most important environmental factor for maintaining health and preventing diseases (Keystone symposia, 2015).

Food products from nutrition perspective

Providing nutritious foods in a sustainable manner for future generations is predicted to be more difficult if overlooked because of the changing local and global environment coupled with poor food habit among the population of the world. This section deals with the environmental and socialfactors that affect the nutritional quality of food products. It is understandable that environmental and social factors can directly or indirectly affect the nutrients of food products but a country's food system remains the most influential factor.

Food system

Food system is the path that food travels from field to table. It includes the growing, harvesting, processing, packaging, transporting, marketing, consuming, and disposing of food. It also includes the inputs needed and outputs generated at each step. A food system operates within and is influenced by social, economic,

and natural environments each step is also dependent on human resources (Angelic Organics Learning Center, 2013).A sustainable food system integrates elements to enhance environmental, economic, social and nutritional health for all (figure 1). Proper investigation of a food system willprovides a clearer insight on how to track,and subsequently tackle environmental and social factors affecting food products for optimum human and national development.

Figure 1: Food system
Source: Angelic Organics Learning Center,2013

According to Kaput *et al.* (2015), the growing awareness that climate change and population growth is already challenging the ability of farmers to produce enough nutritious foods now and over the next decades has uncovered the need to connect basic nutrition research to the web of the food supply system. Obviously, nutritional quality of crop is greatly influenced by soils and climates where food is grown, how and where it is transported and stored. Food accessibility and price also affects nutrient intake across the socioeconomic spectrum. In fact, human physiological processes are being affected directly or indirectly by the change of nutritional quality of food from soil to table, and by the deteriorated levels of food availability and affordability.

Environmental factors affecting food nutrients

Apart from the food system other pressing environmental factors that need immediate attention in promoting good nutrition are agricultural practices and postharvest technology.

Agricultural practices

Agriculture is the set of activities that transforms the environment for the production of animal and plant foods for human use. Agricultural science includes research and development, improving agricultural productivity in terms of quantity and quality as well as transforming of primary products into end-consumer products, and prevention or correction of adverse environmental effects (Handbook of Agriculture Science, 2012).

Soil degradation is a major factor in crop production. Reduced soil fertility may produce lower yields, and too much application of inorganic manure and pesticides to boost soil texture may result in production of contaminated foods with low nutrient content, and may make foods unfit for consumption (Timothy and Pablo, 2002). Theseagricultural concepts are of great concern to the population of the world especially the poor and the most vulnerable group who obtain most of their nutrients from plant foods having direct impacts on their health, livelihoods, food and nutrition security.In planning agricultural research, the nutritional benefits of food crops should be of paramount concern to the agriculturist because of the negative influence of contaminated food nutrients on thehealth of consumers.

Interestingly, the rural farmers now understand the poor storage qualities of crops grown with inorganic manure compared to crops grown naturally. Crops grown with inorganic chemicals tends to rotten easily their taste also differs in some instances and they are cheaper in terms of cost (example vegetables).

Post-harvest technology

Post-harvest involves the processes food under goes after harvesting before it is ready for consumption. Some available technologies for food processing need to be improved upon to reduce post-harvest loses. Generally, "Food loss" is defined as food that is available for human consumption but goes unconsumed (Buzby, 2015). Postharvest loss includes the food loss across the food supply chain from harvesting of crop until its consumption (Aulakh*et al.,* 2013). Postharvest losses are due to various factors such as deterioration by microbial agents and mechanical damages, unfavorable climatic change, cultural practices, poor storage conditions, inadequate handing during transportation, poor social and economic reasons, and wrong agricultural practices (Flore, 2000), including weight loss due to spoilage, quality loss, nutritional loss, seed viability loss, and commercial loss (Boxall, 2001). Storage has been reported to play a vital role in the food supply chain, and

several studies reported that maximum losses happen during this operation (Aulakh *et al*.,2013), especially in the developing countries. This has been attributed to a lack of knowledge, inadequate technology and/or poor storage infrastructure (Deepak and Prasanta, 2017). Curtailing post- harvest lossesrequires urgent attention especially in the developing countries of the world. However, postharvest loss as a critical issue, does not receive the required attention as it should. Based on recent publication, approximately one-third of the food produced (about 1.3 billion ton), worth about US $1 trillion, is lost globally during postharvest operations every year (Gustavsson, 2011). The solutions to reduce postharvest losses require relatively modest investment and can result in high returns compared to increasing the crop production to meet the food demand (Deepak and Prasanta, 2017). Reducing postharvest loses can be achieved by providing labour saving food processing and preparation facilities at the households so as to ensure optimum utilization of available foods in abundance during the harvest season. Specific emphasis should be given to developing effectivebut low capacity processing, storage and preservation techniques and facilities for staple foods including fruits and vegetables that can be used at the household and community levels.

Social factorsaffecting food nutrients

The changes in social life activities of people living in the developed and developing countries have greatly affected household food processing and preparation. In order to promote homemade food consumption, steps to improve traditional food processing methods,developingnew recipes or diversifyingthe utilization of available foodsmust be considered. The facts still remain that homemade food cannot be compromised with any so called good food prepared outside the home in terms of cost, taste and nutritional quality. When foods are prepared in the home, health of the consumers are considered in addition to the hygienic and nutrient composition of the meals. Some social factors affecting healthy food consumption includes; food habit, poor cooking facilities, cooking skill, food preference, income, lack of nutrition knowledge, underutilization of sustainable foods, neglecting women's role in nutrition education etc.

Food habit: Most people enjoy cooking and eating without applying the principles of nutritional science. They prefer ready-to-eat foods that require little or no preparation method in other to save timethis attitude increases their preference to already made and restaurant foods that may not be nutritionally adequate for their health rather than homemade foods.The crave for already made foods could be attributed to the rigorous cultural food preparation methods that are time consuming, coupled with poor cooking and storage facilities and lack of nutrition education.

Poor cooking facilities: have continually been observed to be responsible to the shrinking proportion of homemade foods prepared from unprocessed ingredients. Most homes in the rural and urban communities lack adequate food preparation and storage facilities. This was confirmed in a report where not having adequate food preparation equipment resulted in families resorting to consuming unhealthier foods (Landers and Shults, 2008). A recent report blamed lack of functional storage and cooking appliances ranging from ovens, refrigerators, and stoves in homes on the inability to prepare healthy meals (Landers and Shults, 2008; Gentry and colleagues, 2007). The use of plant based weaning food produced from maize-mungbean supplement has been reported (Agugo, *et al,* 2013), certainly to avoid contamination this weaning food needs to be processed under a hygienic environment. Since mothers do not have the require facilities to produce the weaning food at their disposal the recommendation seems so complicated and difficult to adopt. It is important to ensure that adequate facilities are available and accessible to people for properadoption and application of research findings.

Cooking skill: Another important factor effecting unhealthy food production at household level is declines in cooking skills.Women in the rural community are only very familiar with cooking skills taught by the older women, these skills may be outdated and no longer match with the change in the available food materialsthereby influencing people's food choices negatively.People especially women need updated skills and knowledge in food preparation in other to adapt to the changing environment.

Food preferenceand income: A household that is headed by a woman famerwill certainly be consuming foods she grows, enjoys and is used to the preparation method. Her food preferences may be limited by the size and nature of her farm land, the assistance she gets during cultivation (ielabour), the storage and cooking facilities at her disposal. If she has to purchase other food components to combine the crops she produces, her income will often be the limiting factor in her choices for family meal and cooking pattern.However, simply trying to educate the poorest families about good nutrition, will not work if families do not have the money to put this knowledge into practice (UNDP, 2010).

Lack of nutrition knowledge: Increased food production and access are crucial to achieving major nutritional improvement (FAO, 1997). FAO recommends increase in the production of micronutrient rich foods as a way of improving nutritional status. In the same way, the utilization of available few traditional foods that are rich in micronutrients could be promoted through food-to-food enrichment thereby diversifying their uses and consumption. For instance, enhancing the nutrient composition of plant foods through food –to-food enrichement will in turn promote access to more varied nutritious mealsfrom available few crops.Promoting

household food and dietary diversification will strongly require proper nutrition knowledge of food nutrients among its members especially the women.

Under-utilization of "sustainable food crops": Some traditional foods are referred to as being "sustainable" because they are usually readily available, affordable and can be processed in various forms to provide varied diets to majority of people in a given location. But the issue is that many people lack adequate knowledge on the selection, combination and utilization of these available healthy foods accessible to them. The demand and utilization of traditional food crops can be promoted by presentation of improved, convenient forms of these foods, and especially the development and marketing of a wide range of snacks, low-cost, and ready-to-eat products based on these foods (FAO, 1997).These "sustainable food crops" can be processed in diverse forms including snacks to generate nutritious foods. There is no defined list of 'sustainable food crops' their existence depends on community and culture. Moreover, to ensure household food sustainability knowledge on how to identify and utilize 'sustainable foods' should be made known to people particularly women.

Neglecting women's role in promoting nutrition education: Among the affluent population obesity is indicted while underweight affects the developing countries of the world both are malnutrition problems resulting primarily from poor feeding pattern. According to FAO (2013), one of the principal aims of nutrition education is to provide people in rural and urban areas with adequate information, skills and motivation to procure and to consume appropriate diets. As illustrated by the Food Choice Process Model (2009), food choices are strongly influenced by events and experiences beginning early in life and continuing throughout the life course. Food deprivation and irregular availability of food during childhood have been found to contribute to the development of poor eating behaviors (e.g., overeating and binging and having an emotional attachment to food), as well as to less healthful food choices in general (National Academy of Sciences, 2013). Habits formed in early childhood may be very difficult to change at the later age of one's life. For the past couple of years, there have been series of suggestions, recommendations and review of approaches to providing effective and sustainable nutrition education to people of all social groups. Not critically considering the fact that most habits including food habit is formed at childhood stage. It should be noted that varieties and frequency of meal consumptions and distribution within the family is highly determined by ability of a mother to prepare food. In most households' women are seen as 'home chefs', theysee to the processing, preparation and services of food at the household level. Therefore, women's strong involvement and participation in the spread of nutrition education is capable of evolving positive change in food choices, promoting utilization of sustainable food crops and dietary diversification as well as improving food system at the household level. Approaches designed to adopt and train women as nutrition educators could serve as a long-term plan in achieving good nutrition for allin the near future.

Way Forward

Helping people eat right to stay healthy remains a global challenge and requires a collective effort of the government, nutritionists, food technologists, agriculturists, NGOs and organizations involved in food production and services including every individual. In a view to improving people's food consumption pattern in both the developed and developing countries, the following suggestions are made:

Innovation in food guide pyramid

Improvingthe practical use of the food guide pyramid will require an innovation on its application (in various languages), that will motivate users. The information communication technology (ICT) has a great role to play in realizing this mission. Development of an electronic or computerized food guide pyramid will attract people's interest as well as create awareness on the importance of food guide pyramid in promoting healthy feeding habit.The device should be such that it will include to a large extent list of staple foods (includinglesser-known and underutilized healthy food crops)in a given region, their major nutrient sources, percentage requirement of such nutrients (according to RDA and RDI) as well as some new recipes and preparation procedures.

Government policies and Implementation

Government policy on food system, nutrition training programs for women, nutrition intervention programs and improved agricultural practices can help the situation.

Food system: To achieve healthy food products the food system of any given county needs to be thorough investigated, monitored and regularly evaluated to ensure that safe and nutritious food gets to the final consumers. By so doing, sources of unsafe or unhealthy food products may be identified and corrected.

Women involvement in nutrition education**:**Providing financial support forcompulsory 4 weeks' nutrition training program for women preparing to start a new family (getting married) should be prioritized by the government like other policies especially those designed to improve the health of the population. Apart from improving women's cooking skills the program will tend to empower women as nutrition educators in their

various homes. This would support the already existing government policy on integrating nutrition education at all levels of education system (kindergarten –tertiary),and to help children form healthy feeding habit.

Nutrition intervention programs: households are usually the smallest unit of any given community or society and may be easily managed for intervention programs. Ensuring that outcome of nutrition research/project is properly introduced throughintervention programs. Research findingstoimprove people's food consumption patternshould targethouseholds to be able to understand thechallenges that could subsequently affect its adoption.

Agricultural practices: Ensuring that agricultural practices including animal production and crop cultivation are safe for both the environment and human beings. Motivating farmers at all level to adopteco-friendlyagricultural practices that can boost thequantity and quality of food nutrients while improving yields.

Monitoring and evaluating government policies

It will not just be enough to design policies on improving food system, empowering women as nutrition educators, promoting nutrition intervention programmes and eco-friendly agricultural practices,the implementation and impact assessment should be strictly monitored and evaluated by the government to ascertain the level of practice and challenges in order to make suitable adjustments.

The mass media

Awareness on the importance of good nutrition to health should be promoted through the mass media. The use of television and radio jingles in different languages to stress on the importance of good nutrition could motivate people to make a change.

IV. Conclusion

I therefore conclude on the premise that; agriculture **generates food…. adequate food intake is a pre-requisite for good nutritional status--- good nutritional status is the key to good health … while good health is a pre-condition to national development.** There is serious need to reduce levels of malnutrition, hunger and poverty so as to promote good health, good nutritional statusof the population and sustainable national development.

References

[1]. Agriculture food and nutrition for Africa (1997). A resource book for teachers of agriculture. Food and Agriculture Organization ofthe United Nations. Rome, 1997

[2]. Angelic Organics Learning Center, 1545 Rockton Rd. Caledonia, IL 61011 ph.815.389.8455"I'm an Agronomist!". Imanagronomist.net. Retrieved 2013-05-02

[3]. Aulakh J., Regmi A., Fulton J.R., Alexander C. (2013). Estimating post-harvest food losses: Developing a consistent global estimation framework; Proceedings of the Agricultural & Applied Economics Association's 2013 AAEA & CAES Joint Annual Meeting; Washington, DC, USA. 4–6 August 2013.

[4]. Boxall, R.A. (2001). Post-harvest losses to insects—A world review. Int. Biodeterior. Biodegrad. 2001;48:137–152.

[5]. Buzby J.C., Farah-Wells H., Hyman J. The estimated amount, value, and calories of postharvest food losses at the retail and consumer levels in the United States. [(accessed on 31 May 2015)].Availableonline: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2501659.

[6]. Contento, I R (2007). Nutrition education: Linking research, theory, and practice. Sudbury, MA: Jones and Bartlett Publishers, Inc; 2007.

[7]. Deepak, K and Prasanta, K. (2017). Reducing Postharvest Losses during Storage of Grain Crops to Strengthen Food Security in Developing Countries. US National Library of Medicine National Institutes of Health. 2017 Jan; 6(1): 8. Published online 2017 Jan 15. doi: 10.3390/foods6010008.

[8]. FAO, (2004).Incorporating Nutrition Considerations into Development Policies and Programmes. Brief for policy-makers and programme planners in developing countries. Rome, 2004.

[9]. FAO (2007). Organic Agriculture and Food Security. Rome:FAO.

[10]. Gerald,G. M. (1986). Traditional Agriculture and Agricultural Research in Southeast Asia: A Human Ecology Perspective, Westview Press (Boulder Colorado)

[11]. Golay, C. and Özden, M (2006)."The Right to Food: A fundamental human right affirmed by the United Nations and recognized in regional treaties and numerous national constitutions", Part of a series of the Human Rights Programme of the Europe-Third

[12]. Gustavsson J., Cederberg C., Sonesson U., van Otterdijk R., Meybeck A. Global Food Losses and Food Waste. Food and Agriculture Organization of the United Nations; Rome, Italy: 2011.

[13]. Handbook of agricultural science (2012), Hshivanna.

[14]. Huber, M., Knottnerus, J.A., Green, L, et al (2011). How should we define health? BMJ. 2011;343: 4163. doi: 10.1136/bmj.d4163.

[15]. Kaput J, Kussmann M, Mendoza Y, et al. Enabling nutrient security and sustainability through systems research. Genes Nutr. 2015;10:12. doi: 10.1007/s12263-015-0462-6.

[16]. Kaput, J., Kussmann, M., Radonjic, M., Virgili, F., and Perozzi, G.(2015).Human nutrition, environment, and health.Genes Nutr. 2015 Sep; 10(5): 36. Published online 2015 Aug 26. doi: 10.1007/s12263-015-0489-8. PMCID: PMC4549339

[17]. Kitinoja L., Saran S., Roy S.K., Kader A.A. Postharvest technology for developing countries: Challenges and opportunities in research, outreach and advocacy. J. Sci. Food Agric. 2011;91:597–603. doi: 10.1002/jsfa.4295. [PubMed] [Cross Ref]

[18]. Landers P, Shults C. Pots, pans, and kitchen equipment: Do low-income clients have adequate tools for cooking. Journal of Extension. 2008;46(1) [May 31, 2012]; http://www.joe.org/joe/2008february/rb4.php.

[19]. Ligita, M. (2010). Environmentally Friendly agriculture: Development issue in LativaSocialiniaityrimai / Social Research. 2010. Nr. 2 (19), 37–46
[20]. National Academy of Sciences (2013). Committee on Examination of the Adequacy of Food Resources and SNAP Allotments; Food and Nutrition Board; Committee on National Statistics; Institute of Medicine; National Research Council; Caswell JA, Yaktine AL, editors. Washington (DC):
[21]. Sobal J, Bisogni CA. Constructing food choice decisions. Annals of Behavioral Medicine. 2009;38(Suppl):S37–S46.
[22]. Special Rapporteur on the Right to Food (2008), Promotion and Protection of All Human Rights, Civil, Political, Economic, Social and Cultural Rights, Including the Right to Development, Report of the Special Rapporteur on the right to food, Jean Ziegler (A/HRC/7/5), Human Rights Council, archived from the original (PDF) on 6 June 2012
[23]. Van Ommen B, van der Greef J, Ordovas JM, Daniel H. Phenotypic flexibility as key factor in the human nutrition and health relationship. Genes Nutr. 2014;9:423.
[24]. Ziegler, Jean (2012). "Right to Food". Website of the former Special Rapporteur, archived from the original on 6 June 2012.

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