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Managing Food Security Policies in Kenya: A Case Study of Thailand's Corporate Outlook in The Agricultural Sector

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Kenya has come to be known as Africa's powerhouse in terms of economic growth and investment, yet the country is crippled by food insecurity, with over 10 million people suffering from chronic food insecurity and poor nutrition. This has been attributed to failed food and agriculture policies with varying scope, either through their effectiveness or their implementation process. This study seeks to determine ways of managing food security policies in Kenya, using a case study of Thailand's corporate view in the agricultural sector. The study explores the following question: What are the approaches of managing food security policies in Kenya through the counsel of corporate Thailand in the agricultural sector? This is a qualitative case study based on Food Security and Nutrition Strategies and Policies framework. The study recommends among other things the Use of technology to maximize production and control environmental conditions and linking demographic dynamics to technological advancement in food production and utilization.

Keywords: Food Security, Agriculture, Technology, Investment, Policies, Kenya

Introduction

X Food security is "when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life". This concept of food security as defined, includes both physical and economic access to food that meets people's dietary needs as well as their food

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preferences (FAO, 2008). For some time, experts have debated the capacity of the world's agricultural systems to produce enough food for an ever-increasing population (WFP, 2012).FAO has maintained consistently that, there is enough food produced to feed everyone on the planet, 1½ times over (FAO, 2011).

The study of food security is an interdisciplinary subject that is built on a number of other disciplines for instance agriculture, poverty reduction, environment, and industry. Generally, food insecurity is caused by challenges that constitute access to adequate food for example budgeting, supply and transportation, adequate resources to purchase a variety of food types, and lifestyle (Walker *et al*., 2010), household demographics and the available food (Nord and Coleman-Jensen, 2014), adaptability of a particular society to foreign foods, social responsibility and environmental protection (Barclay & Epstein, 2013), changes in food prices (Dowler *et al*., 2011), policies on land ownership and land use (Hendriks & Olivier, 2014), imbalances in production and supply patterns (Crush and Frayne, 2011), individual factors such as access to employment and resource management skills (Grutzmacher & Braun, 2008), lack of investment in small scale agriculture (Fasoyiro and Taiwo, 2012). Lack of mechanisms to provide the link between production and consumption patterns (Vink, 2012), exposure of sources of food to risks such as disasters or unprecedented economic shocks (Thomas *et al*., 2014), lack of mechanism to integrate social and environmental (Westengen and Banik, 2016).

About 795 million people of the current 7.3 billion people in the world, suffer from chronic undernourishment (FAO, 2015). East Africa is one of the most food-insecure regions of the world where 42% are undernourished. The focus of this paper therefore, is the Republic of Kenya, which is 67% food secure with 33% being food insecure; 24% have low food security and 9% were classified as chronically food insecure (Wakibi *et al*., 2014). Despite agriculture being the main source of employment for many, as well as the second largest contributor to the country's economy.

Some of the main Causes of Food insecurity in Kenya include:

(1) *Poverty:* with 20 million of its people live below the poverty line (Kiome, 2009). This is fueled by a diversity of factors such as rising unemployment, child labor and HIV/AIDS epidemic (Devereux, 2012), with undernourishment as a central manifestation of poverty (Clover, 2003). One of the main challenge is having consistent access to food of sufficient diversity of specific amounts, types and varieties of food for population groups who are at specific stages of life, to meet their nutritional needs (NFNSP, 2011).

(2) *Rising food Prices:* with poor households in Kenya using up nearly 40-60% of their income on food, making even the smallest increase in price have a

major impact. The rising food prices are affected by the country's reliance on food imports, high oil prices (fuel, fertilizer production) and production inputs (seeds) and inflation (IFPRI, 2012).

(3) *Poor market access and infrastructure:* due to underinvestment and inadequate development of rural roads and lack of proper storage and drying facilities have been blamed for low productivity and food insecurity in general. The terms of trade are also feeble and smallholder farmers can't access lucrative urban markets due to various constraints in the marketing system (Emongor, 2014).

(4) *Low income:* with GNI per capita of 1,290USD (WB, 2011), further made worse by unequal distribution of income among the population, with the country's top 10% households controlling 42% of the total income while the bottom 10% controls less than 1% (NFNSP, 2011)

(5) *The climatic conditions:* affected by extreme drought and famine as well as flooding (Clover, 2003), shorter drought cycles of 2-3 years from a period of 5-7 years in the past (Kiome, 2009), higher than average land surface temperatures in pastoral areas, depleting rangeland resources, changing and unpredictable climate from effects of climate change and decreasing land productivity (Gregory *et al.*, 2005).

(6) *Food aid:* as a means to deal with volatile local food production and wide-spread hunger (Barrett, 2001), with Kenya receiving 77% emergency food aid and 23% project food aid (Wanjiru, 2014), for a constantly above 2 million people who need food assistance or assistance to access the food (USAID, 2014). This has affected the market price of local food commodities which negatively affects the cost of production (Wanjiru, 2014) and decreased the level of support to the agricultural sector (Gitu, 2006 and Rancourt *et al*., 2013).

(7) *Rapid population growth:* with annual growth rate of 2.46% and this means the availability of land for people to work is dwindling and non-farm employment options are declining, increasing pressure for land and on the environment (USAID, 2014), danger of civil strife (IFPRI, 2011) and land subdivision to uneconomic units for example in Kisii, Central Kenya, Western and Nyanza Provinces (WB, 2011).

(8) *Rapid urbanization:* as result of rural to urban migration as people seek employment and a better life, with Nairobi's population set to nearly double to almost six million by 2025. This causes inadequate food supply to the residents, with a large proportion of urban dwellers unable to meet food needs on a sustained basis over an extended period and could deepen markedly as food prices continue to increase (FAO, 2008)).

(9) *Land use and allocation:* faces challenges in the urban fringes since agricultural land use conversions have not been done sustainably (Museleku, 2013), unsustainable land fragmentation and landlessness, as large chunks of idle land owned by the State or individuals still exist (Gitu, 2006).

(10) *Food safety:* refers to the condition and practices such as handling, preparation and storage of food in ways that prevent foodborne illnesses which could affect a person's nutritional status (Oloo, 2010). In Kenya, over 70% of diarrhea cases are attributed to ingestion of contaminated food and water, several cases of cholera have been reported, aflatoxin poisoning due to a combination of environmental conditions and poor post-harvest practices (The Standard, 2012).

(11) *Malnutrition:* in Kenya exists in various forms, including acute and chronic undernutrition, micronutrient deficiencies, as well as overweight and obesity (Muyanga & Jayne, 2008). Children and pregnant women are among the most vulnerable group to malnutrition according to a recent surveys carried out by UNICEF in Kenya. Those at greatest risk are pastoralists, who move from place to place in search of suitable pasture for their cattle or goats, with reports of families going for three to four days each week with no food and being unable to provide milk for their children due to (Brinkman and Hendrix, 2011).

Obesity has also been documented in Kenya with higher prevalence in urban areas with social and environmental factors are at play, dietary and lifestyle changes and physical inactivity (GNR, 2014).

Policy Outline

Policy is a government statement of interest to carry out an activity in response to a particular enigma affecting the public (NORRAG, 2008). Therefore, in order understand food insecurity in terms of government policy this research intends to deliberate both food and nutrition policies as well as the agricultural policies whose failures may have resulted in the causes of food insecurity issues above.

It is the policy of the government that all Kenyans, throughout their life-cycle enjoy at all times safe food in sufficient quantity and quality to satisfy their nutritional needs for optimal health, through the formulation of Kenya's FNSP, aimed at adding value, building synergies and assisting with the implementation of existing national and sectoral policies and strategies to effectively address issues of food insecurity in Kenya (NFNSP, 2011). Agriculture continues to be the driving & dominating sector of the overall Kenyan economic performance. Despite the significant role it plays in the

economy, the management of the sector has been dogged by incoherent, conflicting and inadequate pieces of policies and legislations (NFNSP, 2011).

The failed national food and agriculture policies include:

1. *Agricultural input policy*: Ineffective and unsustainable food relief programs, Poor drainage systems have ruined fields and affect farm yields, Lack of proper strategic reserve management to reduce effect of seasonal cropping and food prices. Poor information flows to farmers on appropriateness and levels of use of improved inputs, High cost of inputs make them inaccessible to farmers (Odhiambo, 2013).
2. *Food trade policy*: Overdependence on the export market which has exacerbating hunger, poverty, and import dependence. Unfair competition induced by imports of subsidized goods from other countries (MAFAP, 2005 – 2011).
3. *Employment policy:* Low private sector investment and a bloated public service. Non-remunerative prices, high costs of inputs, non-effective research and extension, scarce and expensive credit, and poor infrastructure. Accumulation of bad debts by farmers, declining farm sizes and limited use of productive technologies (NFNSP, 2011).
4. *Agricultural productivity policy*: Low productivity levels, due to unaffordable readily available, modern farming technologies (Mbithi, 2000), Poor institutions, marketing and storage facilities which have also reduce incentives to produce, The reliance on rain-fed agriculture and competition for land affecting productivity (Klopp, 2012), Lack of crop diversification, lack of access to agricultural land, Poor infrastructure for effective transport, storage, refinement, preservation, distribution and marketing (Thuo, 2011).
5. *Research and extension policy*: Poor linkage between research, extension and farmers, Poor resource base of farmers and poor adaptability of some of the technologies to local circumstances (NFNSP, 2011), Reliance on traditional technology, Kenya seed company has an unfair monopoly over KARI output, therefore reducing the distribution of high yielding varieties (NFNSP, 2011).
6. *Land use policy*: Difficulty to access and utilize land with only less than 20% of the country's land surface is high and medium potential, Lack of accurate and up to date database information on land; the core of this policy is to attract and utilize foreign aid which is unsustainable (Alila and Atieno, 2006).
7. *Nutrition policy*: Poor translation into action in form of extension system delivery in terms of informal nutritional awareness campaign. Policy tools are too general, vague and lack focus therefore targeting was poor. Vulnerable to nutrition related matters such as pregnant women, infants or children as well as the elderly increase High disease burden which deplete family resources,

Health care system not adequately equipped with personnel, equipment and supplies to provide optimal nutritional care and support (NFNSP, 2011).

8. *Food safety policy*: Production related incidences of food poisoning due to common agricultural residues, Poor hygiene and inappropriate food and livestock feed handling and storage (NFNSP, 2011). The production of nutrient-rich vegetables in urban areas using water contaminated with raw sewage, Informal roadside markets and food vendors, further contaminating food with pollution, lead and dust, Key laws that deal with food safety do not conform with current international standards and guidelines (MAFAP, 2005 - 2011).
9. *Early Warning and Emergency Management Policy:* Inappropriateness of some foods donated, Inefficiency of food aid supported programs, including lack of timeliness, high costs of delivery and administration, Cause disincentives for investment in domestic production as a result of reductions in domestic prices Unsustainability to communities that benefit from these programs (MAFAP, 2005 - 2011).
10. *Institutional and Legal Framework and Financing Policy:* Lack of finance for agriculture, Inaccessibility to credit especially for small scale farmers and women, Actual investment in the sector has been small (Alila and Atieno, 2006).

Why Thailand's Agricultural sector

Thailand has been widely cited due to its strong economic growth and development that has been based on agricultural production which is the country's backbone (FAO, 2011). It is one of rare countries that can produce surplus agricultural food products for export and the largest sole net food exporter in Asia (Isvilanonda and Bunyasiri, 2009), positioning itself as the "Kitchen of the World," with the annual value of food exports in 2014 reaching Bht1.01 trillion (The Nation, 2016).

It is noteworthy that no country can claim that it has eliminated chronic hunger and food insecurity. Therefore, no country that can present itself as an example of complete success in this regard. Successes that can be learnt by other countries may be about specific experiences of countries in improving certain, but not necessarily all, aspects of their food security, and they can be accompanied by shortcomings in other aspects, sometimes being involved even in trade-offs with competing objectives not necessarily related to immediate food security considerations (FAO, 1996).

Since Kenya's economy as well as food security concern similarly depend on the development of the agricultural sector, a study of Thailand's pattern of agricultural development may prove valuable to Kenya in dealing with food insecurity. A bottom-up approach to agricultural policy is adapted in

realization that governments do not always have adequate resources to solve all public problems and the corporate sector needs to invest in the agricultural sector in order to boost agricultural productivity (Dye, 2011).

Objective: To determine ways of managing food security policies in Kenya, using a case study of Thailand's corporate view in the Agricultural sector.

Materials and methods

The design employed was a qualitative case study that integrated documentary research, and key informant interviews on the participant's experiences as experts in food security discipline (Henn et al., 2009). Case study is an empirical inquiry is intensively descriptive, and uses flexible methods of data collection to investigate a contemporary phenomenon in depth and within its real life context (Yin, 2009). The population was drawn from key informants in the private sector or corporates in Thailand, related to food and Nutrition security in the Agricultural sector in the country, of Thai origin and average command of English. 11 key informants were chosen (Creswell, 2013), through triangulation method based on purposive and snow ball. Triangulation of sources is important because one set of sources is used to strengthen, enrich, validate the other, or provide a critical perspective to the other (Yin, 2014).

Case study data collection takes into account multiple sources of data (Yin, 2012). As a result, this study brought together:

(a) *Documentary research techniques* used to collect secondary data from reports published by different government and non-governmental organizations, journal articles, documentaries, and media sources.

(b) *Semi structured interviews* guided by the use of open ended questionnaire to allow elites to respond broadly to the issues, in ways that give them freedom to use their intellectual rigor and imagination to respond in detail and from different perspectives (Rossman & Rallis, 2012). The use of note taking and the tape recorder were used as tools for data collection upon consent.

Data gathering procedure ensured the privacy or anonymity of the participants was protected. Quality control process through member check or participant verification will be conducted by sharing with the participants, the qualitative research analyzed data and report to review for authenticity of the work and enhance study credibility and participant involvement (Creswell, 2008).

Data analysis was conducted by manual closed coding, to find the most meaningful parts of the data, and to generate concepts about the data, by

manipulating it (Gough & Scott, 2000). This deductive concept created a precoding derived from the conceptual framework (Hendriks & Olivier, 2014).

Results

Four themes emerged from the data:

(1) *Food Availability:* Which examined supply of food through production, distribution, and exchange, determined by climate, population growth, urbanization and land use.
(2) *Food Accessibility:* observed the affordability of food, affected by poverty; household income and market access; infrastructure.
(3) *Food Stability:* studied the influence of rising food prices, and crippling food aid.
(4) *Food Utilization:* examined the metabolism of adequate, safe food by individuals to meet physiological requirements.

Food availability

Climatic conditions

The corporate sector in Thailand uses the following mechanism to address climatic conditions that affect food availability.

(1) *Use of technology to maximize production and control environmental conditions:* Due to the high temperatures, use of greenhouse technology is widely used in controlling the environment and enhancing productivity in farms. Poultry and swine farms, also adapt the closed system of housing as well as an evaporating cooling system to control the environment and make it suitable for animal growth. Solar panels produce energy for agriculture and domestic consumption or to run a sprinkler and fan to cool off the farm land and animal houses through evaporation system.

(2) *Use of technology to manage, increase and utilize water supply for agriculture:* Firms have developed elaborate and reliable irrigation or sprinkling system using imported irrigation machinery. Researchers and engineers learn the system in depth and develop it locally. Corporates have tapped into underground water through boreholes and encouraged farmers to make ponds, monkey cheeks and large water reserves in order to avoid dependence on rainfall. In future, corporates will look into the technology that convert sea water to fresh water and be used for agriculture.

(3) *Use of technology to predict and manage environmental risks and disasters:* Corporates use an automated closed AGI farming system for animal husbandry and closed milling for rice farming to protect against external risks caused by climate or human error, in order to maintain yield and quality. Private sector cooperation with the Ministry of Agriculture and relevant

Agricultural institutions or universities has also been adapted and encouraging diversification of inputs to guard against shortage.

(4) *Investment in research in optimizing agricultural production:* with the aim of developing high yield seeds or species of the crop or animals that would acclimatize to the heat or change of climate without reducing productivity, resistance to insects and environmental research that aids in the natural reserve protection and preservation through the use of chemicals in the agricultural area.

(5) *Public private partnership for natural resource mapping, information sharing, agricultural planning and development*: with proper agricultural zoning information given to farmers on what land is arable, what can be grown in each area, how to overcome the challenges of climate and terrain or other factors of farming in any specific agricultural land.

(6) *Integrating climate management strategies in farming practices:* with corporates stepping up efforts to create awareness to all stakeholders and give the knowledge or information on the adverse effects of the climate change and liaise with the meteorological department to obtain reliable data that can be acted upon.

Population growth

The following mechanisms have been applied to ensure food availability.

(1) *Linking demographic dynamics to technological advancement in food production and utilization:* Reliance on technological advancement, executing proper planning with adequate technological resources for utmost efficiency, good machinery for ploughing and harvesting to mitigate agricultural risks and encourages farmers to advance agriculture.

(2) *Linking food policies to national population control policy:* one child policy, to ensure population growth doesn't surpass the food production of the country through mechanization to increase the supply and meet the demand in the market

(3) *Diversification of sources of food*: to avoid over dependency on one or few nutrient sources which can put the people at risk of food insecurity. These wide ranges of food sources should meet the needs of different age groups, with diverse nutrient requirements & health needs. Diversification of feed used for animals is key so that the livestock are not fed on what can be used for feeding the human population in case of shortage or crisis. For instance, instead of feeding poultry with corn that can be consumed, they can be fed on worms which are also fed on the corn leaves to avoid any wastage and put everything to good use and increase food production and availability as much as possible.

(4) *Learning from best practices around the world:* to find out best possible solutions through research to produce suitable and high yield products for the country's climate, geography and consumption need. CP for instance invites farmers or experts from Taiwan or Japan who have successful experiences in farming practices that are viable in Thailand due to shared agricultural similarities within the region, to aid in coming up with practices that will succeed or flourish in the country, through research, and new agricultural field management practices among others. The local contracted farmers are trained on new and better agricultural practices that increases output. Through internationally acquired knowledge, CP has used conventional breeding using GH & genomics technology as well as Genetic Engineering Transgenic, to improve yield.

(5) *Promoting diversification with a focus on pro-poor agricultural education and empowerment programs:* almost anything is eaten and many options for food are available, promoted through education or training programs which empower the poor families or households to diversify their food source, to even insects such as frogs among others which are good and cheap sources of nutrients. The farmers is also encouraged to generate income by selling animal waste such as cow dung or chicken waste, which large firms can also use to make fertilizer for their crop farms.

(6) *Investing in research and development:* through university curriculums, rural empowerment projects and programs, training establishments, non-profit foundations, and agricultural firms to increase the yield of farming or animal husbandry.

Rapid urbanization

The following mechanisms have been applied to ensure food availability.

(1) *Linking new agricultural technologies to the dynamic urban climate and generational change:* the effect of rapid urbanization which causes the work force to move from farming into the industrial or service sector in cities is encouraged to reduce the surplus of workforce in the sector to make the costs of labor low and improve efficiency and increase productivity by investing in technology which can work more efficiently with little manpower required. Through automation of animal feeding planting, weeding or harvesting. The workforce is utilized in the agroindustry sector.

(2) *Investing in agricultural technologies that are attractive to the younger generation, improve efficiency and generate high quality yields*: by investing in high-tech generation education in innovative technology in the agricultural sector and modern engineering, close cooperation with universities in US and England to help in new innovation and research to support, offers

scholarships annually to children from poor families or bright students with the aim of supporting the human intellect and developing young minds.

(3) *Increase wages and improve working conditions in rural agricultural sector:* in order to retain adequate labor force and attract the younger generation.

(4) *Changing organizational culture towards a pro-youth agriculture:* with implementing practices such as meditation, exercise & dancing as social activities, and morning talk, have made the young employees enjoy the workplace environment and effective communication.

(5) *Creating pro-poor strategies to address food needs in urban areas:* such as urban agriculture has also been spearheaded by part of the private sector that try to reach the families in the urban areas, through farming on rooftops, public areas such as government buildings, schools, temples, and other semi-public offices, urban street trees and slum projects.

Land use and allocation

The following mechanisms have been applied to ensure food availability.

(1) *Community-Private sector partnership strategy is used to increase access to, and utilization of arable land*. Through contract farming, and with the help of the government and local leaders, consolidate farmers to join small uneconomical parcels of land and teach them if they work together they will benefit more from efficiency of mechanization, only possible with large parcels of land.

(2) *Integrating food production and non-food commercial agriculture*: through education and incentives to ensure the farmer has good income without converting agricultural land for food production to growing non-food crops which guarantee higher returns or income.

(3) *Building public-private sector initiative to protect agricultural land*: through initiatives that put the government to task to ensure the land for agriculture remains so.

(4) *Research and zoning to increase yield and agricultural land maximization*: where food crops are grown where they can thrive and then exploit the productivity through high quality inputs through research. Engaging in vertical farming in glass houses or rooftops, which has ensures maximum efficiency in small pieces of land.

Food Accessibility

Poverty

This study found that corporates in Thailand contributes to food accessibility through the following ways.

(1) *Creation of employment opportunities in the agricultural sector:* through contract farming, assist farmers establish or form SME's, provides farming input such as technology, seeds or fertilizers to the farmer and this expenses is then deducted from the farmers at the point of sale and remove middle men who take advantage of farmers.

(2) *Private sector partnerships to increase economic opportunities through investments and skill development:* by appreciating human intellect and through rigorous strategies, selects farmers who have particular interest to learn new approaches, or are knowledgeable enough in the sector, through CSR activities train on income generating projects for example animal rearing, health promotion or school support programs.

(3) *Empowering poor farmers to participate in agricultural production:* by working with the government to select worst hit communities and engage with them through farming, rearing animals and basic health care services, promote farming in the schools near them by offering inputs, collaborating with the education institutions by allowing students to have practical learning experience, created day care centers for the poor families so that parents can leave their children behind as they go to work in the farms, guarantee contract farmer's

Household income

The corporates contribute to household income in the following ways.

(1) Initiating strategies to increase profit for farmers in commercial food production: through contract farming, whose contribution is to increase reliability and profitability for both contractor and contracted through technological and extension services and new marketing systems; advise the farmers on crop rotation and help them identify which cash crops they can plant to generate more income; insurance to secure the farmer against damage of the crop from delayed rains, floods, and drought among others.

(2) *Increase access to technology to boost production:* Through contract farming to disseminate research and low cost and maintenance technological investment to allow farmer internalize the external benefits of these technologies.

Market access and Infrastructure

Corporates in Thailand have promoted food accessibility through the following ways.

(1) Consolidated and coordinated private sector participation in the entire food chain: through establishing modern retailers which increases efficiency of the distribution system by coordination and other transaction costs, and reduces increased transportation costs that are caused by the centralization. They offer ready markets to farmers in the department stores namely Big C,

Tesco Lotus and 7-elleven among others; add value to a product, they sell the farmers produce as brands and can retail as superior products at a premium price.

(2) *Use of contracts to secure or increase market opportunities and food quality:* by offering ready market for the farmers produce either through pre or post orders from either domestic or international market.

(3) *Physical infrastructure development:* of proper and massive storage facilities or silos, cold rooms and preservation technology, which is adequate for the whole sector in the country, to contain large harvest, prevent food spoilage and ensure constant or continuous food supply into the market for both crop and animal products; through technology and social media, create awareness of online markets for the farmers to access different markets for their produce.

Food Stability

Rising food prices

This study found that corporates in Thailand contribute to food stability through the following ways.

(1) *Use of contracts to guarantee price schemes:* by gathering information for price setting and control the larger market price for the commodity to large scale contracted farmers.

(2) *Use of research and information dissemination to predict market trends and to stabilize food production*. By thorough and continuous monitoring of global food prices of each crop and predicts or makes responsive decisions based on that. This helps the farmers to adjust with global market changes; control local market prices through production to scale to ensure the supply and demand is balanced.

(3) *Mechanization of the food chain to minimize expenses and expand profit margins:* by supporting farmers through efficient system of mechanization to increase their economy of scale, thereby earning a small margin from selling large volumes, consequently reducing price per unit and maintain it at an all-time low.

Food aid

This study found that corporates in Thailand contribute to food stability through the following ways:

(1) *Public-private sector partnership to empower through education:* and encourage the farmers to set up farmer cooperatives between farmers and suppliers, and increase cooperation between farmers and scientists to incorporate integrated plant production systems sustainable modern agricultural techniques.

(2) *Increase public and private sector participation in food production through research and developed entrepreneurship*: to produce modified drought resistant crops and seeds that can thrive in drought areas; sustaining the school lunch programs for the families that don't have enough to eat by setting up farms and offering practical education on farming for sustainability; support formation of support groups among farmers whose members come up with projects backed or supported financially or otherwise by the private sector.

(3) *Reducing the cost of food as a strategy to discourage food aid:* through programs or initiatives that promote the sale of food at extremely low prices; support the government through funding of school milk programs

Food Utilization

Food safety

The private sector safeguards the following:

(1) *Use of technology to ensure food quality:* throughout production, processing and packaging, to meet international food quality standards, food safety, and R&D requirements; investing in post harvesting technology that aids in food or crop preservation to extend the shelf life as it stays fresh longest and reaches the consumer in good condition; avoiding GMO production and instead use hybrid technology for conventional breeding of seeds for planting which is a safer and less harmful to long term human health than GMO.

(2) *Integration of quality control mechanisms in the food chain:* through process of feed milling, breeding, feeding, processing, and adding value, branding and marketing and food retail outlets; invest in proper storage and processing equipment that checks the purity and quality of product; reduce exposure to human contamination through proper packaging; adapt traceability of product to ensure trust with the consumer.

(3) *Implementation of international food safety standards:* including GAP, Animal Welfare Compartment, ISO 9001:2008, ISO 14001, GMP, HACCP, BRC, and ISO 50001, EUREP-CAP and halal; bringing local certification (Thai GAP) of agricultural products closer in line with international standards.

(4) *Non use of chemicals in food production:* but invest in greenhouse nets with tabletop platforms to protect the crops from insects and disease from the environment and from rain that that bruises the leaves of the vegetables or create pockets in the plant that bacteria can easily penetrate. Educate farmers on the hazards of using chemicals, and provide save and acceptable ways to increase their yield, having food safety in mind.

(5) *Public –private sector partnership in public health and food safety:* by developing international WHO nutrient profiling guidelines to help tame sale of unhealthy foods in the market; funding research aimed at looking for

data on pesticide or chemicals used in fertilizers as well as to find out the food miles covered, to reduce impact on one's health as well as climate change by working with the government to zone food and encourage consumption of fresh local foods.

Health

To support health through the agricultural sector, the private sector safeguards the following:

(1) *Food production and diversification strategies and techniques are linked to nutritional demands and dynamics in society:* by developing balanced and nutritious foods with key nutrients that promote good health with the calories, portions, variety and combinations of food kept in mind as well as addressing the needs of the vulnerable with special food requirements through food fortification with nutrients such as iron, magnesium and some vitamins.

(2) *Creation of community support programs to promote nutritional health:* through projects such as providing poultry, eggs or swine where there is lack of protein as well as offer seeds for the families to plant vegetables and grains. In addition, send over agricultural experts to offer guidance in proper farming of crop and animal rearing and marketing strategies for their produce; involving kid's agricultural projects in kindergarten to raise future nutrition-minded agriculturalists to cater for the dynamic needs of the consumer; promoting breast feeding to the middle and lower class mothers by creating awareness of its benefits, which has helped tackle the issue of malnutrition and ill-health especially among the under five years

(3) *Linking agriculture to health and nutrition strategies and planning:* to collectively initiate implementation strategies to manage the Double Burden of Malnutrition, through nutrition specific interventions such as supplementation, direct food fortification or study projects of preventive measures involve the community.

Discussions

The findings of the study show strategies the corporate sector has applied to address food security in Thailand. These strategies offer lessons on how Kenya can manage food security better. This lesson-drawing emphasizes on cognition and the redefinition of interests on the basis of new knowledge which affects the fundamental beliefs and ideas behind policy approaches. From the research, it is clear that Thailand's private sector plays a dominant role in driving the food security policies whose accomplishments can be emulated in Kenya, tailored even further, so as to target the different needs of each individual or household based on their strategic needs. The following endorsements are drawn from the study findings, intended to address the key

ten (10) failed food and agriculture policies mentioned earlier, towards corporate management of food security in the country. These include: Use of technology to maximize production and control environmental conditions; linking demographic dynamics to technological advancement in food production and utilization; linking new agricultural technologies to the dynamic urban climate and generational change; community-Private sector partnership strategy is used to increase access to, and utilization of arable land; Creation of employment opportunities in the agricultural sector; use of contracts to guarantee price schemes; implementation of international food safety standards; and linking agriculture to health and nutrition strategies and planning.

The study recommends the government's participation in creating more and better private sector foreign investment opportunities for the Thai investor such as CP in the food and agricultural sector, as part of the strategy to work towards achieving the UN zero hunger initiative by 2030.

Future research can look into investigating these issues singularly and more in-depth. Failures and challenges of food security may also need to be highlighted more and learnt from as well as in-depth study of the sufficiency economy and its role in ensuring food security in Thailand.

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