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# ACHIEVING FOOD SECURITY THROUGH EFFICIENT WAREHOUSING: CASE STUDY OF INFRASTRUCTURE FOR POVERTY ERADICATION PROGRAMME (IPEP), GHANA

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**ABSTRACT:** *Research acknowledges that more than 50% of food crops produced in Ghana do not reach the final consumer due to Post-Harvest Losses. Particular attention was then needed for integrated food production and efficient warehousing to achieving food security - during and after bumper harvests. However, warehousing as a means to ensuring food security has received little attention in contemporal studies serving as a gap in literature. The paper addresses this by highlighting Ghana IPEP initiative to suggest ideal cultural practices to aid efficient running of IPEP warehouses to achieving food security in Ghana. This research took a form of a thorough review on several literatures relevant to this discourse. The paper finally proposes introduction of 'unique identification system as well as double supervision' as part of key practices to achieving efficiency in IPEP warehouses. There is therefore a need for an experimental study to attest the influence of the said practices on achieving warehouse operational efficiency- within and /or without the IPEP.*

**KEYWORDS**: Food security, warehousing, Cultural Practices, IPEP, Ghana

## INTRODUCTION

Africa's food security and nutrition situation is worsening despite global reduction in food insecurity. The continent has been experiencing several episodes of acute food insecurity, causing immense loss of life and livelihoods over the past decade. African countries have collectively made the least progress toward achieving the Millennium Development Goal of reducing hunger by half since 2015 and close to one-third of its population lives in chronic hunger, currently (FAO, 2010). The issue of food security emerged in 1970s when acute food crises occurred at the national and global level. Many countries mostly underdeveloped still faces the menace of food scarcity and malnutrition. According to FAO (2003), about 850 million people are undernourished or chronically hungry in the world, out of which, 830 million people are from the developing world and 212 million people are from Sub-Saharan Africa. 231 million people are facing same problem in India, out of which, 175 million people live in the rural areas (FAO, 2008).

Many people lack adequate foods rich in nutrients needed for a healthy and productive life. Nearly 240 million people in sub-Saharan Africa or one person in every four lack adequate food for a healthy and active life; food prices and drought are pushing more people into poverty and hunger (FAO, 2010). The region as a whole remains susceptible to frequent food crises and famines which



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are easily triggered by even the lightest droughts, floods, pests, economic downturns or conflicts. In the face of this bleak situation, major efforts are required by national governments and the international community to bring about reductions in malnutrition and micro nutrient deficiencies (FAO, 2001). Increased food production and access are crucial to achieving major nutritional improvement. More foods should be produced that are rich in all the essential micronutrients, available in sufficient quantities and accessible to people all year round. This requires collective effort of people working in agriculture, fishery, forestry, small animal husbandry, industry, marketing, communications, women's participation, home economics and nutrition. The wide application of proven technologies and approaches in these fields, as well as the development of new concepts, will contribute to solving nutritional problems. The results of research must be transmitted to farmers, and efforts must be made to build on farmers' indigenous knowledge. Consumers, too, need to be involved and educated on how to prevent nutritional deficiencies (FAO, 2001).

Access to stable and sustainable food supplies is a precondition for the establishment of food security at the household level. Greater and more sustained yields from the farming system will increase the potential access of the household to an adequate diet. Similarly, farming practices that improve the regular flow of a variety of different foods into the household throughout the seasons enhance food security for its members (FAO, 2001; Agyare-Kwabi, 2003).

National food production is crucial to national survival and buoyancy in Africa. It is the vital tripod stand of national-food security, agro-processing and agro-exports; and hence-national-self-reliance, employment and foreign exchange generation. In all aspect and considerations, the essential target of national food security is the assurance of readily available food supplies in adequate quantities and quality within the purchasing power of even the poorest consumers all the year round – a target that hinges heavily on enhanced production, processing, storage and distribution (FAO, 2001;Agyare-Kwabi, 2003).

Food security involves the availability of safe, nutritious and acceptable food for people. One of the many ways by which food insecurity could be ameliorated is in the area of food processing and value-chain addition, adequate storage and effective distribution system, for instance, in composite flour utilization in the making of baked foods, thereby reducing the cost of such products (Olaoyeet al., 2006;Olaoye and Onilude, 2008;Adeyeye and Akingbala, 2015). But the shortcoming of Africa seems to be with in-depth knowledge and resources for processing and storing self-produce for long term. As a result the region suffers massive imports each year.

It is reported that in 2017, Ghana imported a total of over 135,000Mt (about 112 million birds) of frozen chicken from European Union (EU), which is 76% increase over the 2016 EU import**.** Meanwhile, the national potential poultry output was estimated at 4.4 million birds. In January 2017, a report from Oxford Business School revealed that only 34% of rice consumed in the country is produced locally, whiles 66% are imported. Although the country's domestic production has increased by 12 percent over 2010-15 periods, domestic consumption also increased by double that rate over the same time frame. In effect, Ghana imports between $300 million and $500 million of rice annually. The report further states that, between 1999 and 2008 rice consumption grew from 17.5 kg to 38 kg per capita and was expected to reach 63 kg per capita by 2018. There is



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more to be done - achieving food security and avoid food shortages which could lead to extreme hunger and poverty on national spectrum.

Global population is expected to reach more than nine billion by 2050, according to FAO. Agricultural production will need to grow by 70 percent if it is to keep the world's population fed and healthy, yet about 10 percent only of this growth will come from availability of new lands which means that 90 percent will need to come from intensification of the current production. Ensuring that this intensification is sustainable will require enormous investments for primary agriculture, storage and processing infrastructure – to stay abreast of the population growth (FAO, 2002).

Ghana takes a step to mitigate food insecurity treats. At the 37th World Food Day by the United Nations under the theme, "Change the Future of Migration-Invest in Food Security and Rural Development", the President unveiled his intention to begin warehousing some produce as he revealed that the objective of the Warehouse initiative was to increase production of staples like maize by 30%, rice by 25%, sorghum by 28 % and soya bean by 25%, as a proactive measure to food security. The programme was said to be part of the larger component of government's Infrastructure for Poverty Eradication Programme (IPEP).

Scholars have spoken since the revelation of IPEP warehouse initiative among which is the recent article of Amissah (2018). The article reiterates that Ghana's food security dependent upon having a Sustainable Agriculture therefore; government must partner the private sector to help achieve food security in Ghana. However, the problem of Ghana seems not so much on crop production but efficient storage systems to attain food security. Ghana loses about 318,514 tonnes of maize annually to post-harvest losses (Tran, 2016), which represent about 18% of the country's annual maize production. Research conducted in 2013 by the Urban Association Limited (TUAL) on post-harvest losses of selected food crops in 11 African countries included Ghana. TUAL revealed that almost 50% of food crops produced in the country does not get to the consumer. In 2017, studies found more than 50% of food crops produced in Ghana do not reach the final consumer due to Post-Harvest Loss (PFAG, 2017).

Studies have proven that the country lacks capacity to even secure her present productions in consequence, huge outputs are being lost. This shows that although Amissah is on point, the immediate need for Ghana as it stance now are storage facilities to efficiently accommodate the current and coming production for effective threading in the supply Chain. The author then argues for urgent rollout of the warehouse initiative.

The built form of warehouse structures throughout time depends on many contexts: materials, technologies, sites, and cultures (Haris and Cyril 2006). Apparently warehousing as a means to ensuring food security has received but little attention in contemporal studies. It is imperative to admit that more food production does not necessarily mean more food for consumption in the near future. Therefore particular attention is needed for integrated food production and proper storage (warehousing) to enhance food availability and security during and after bumper harvests. The present study highlights the government IPEP warehouse initiative and suggests ideal cultural practices to aid efficient running of the warehouses towards achieving food security in Ghana. This



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study contributes to global literature on food security. It's again helping not only Ghana government and her policy makers with further insight on the need to intensify efforts on IPEP warehousing, but also other countries that may wish taking similar step.

## Types of warehousing

Onochie (2000) has pointed three classes of warehouses as private, public and bonded warehouses. Private warehouses are owned and operated by distributors and big manufacturers and merchants to fulfill their own storage needs. A big manufacturer, wholesaler or distributor may have a network of his own warehouses in different parts of the country. Cruz and Mune (2009) defined bonded warehouse as licensed by the government to accept imported goods for storage until the payment of custom duty. These types of warehouses are mostly located near the ports. They are either operated by the government or work under the control of custom authorities. Duru and Stone (2008) aver that a public warehouse is a specialized business establishment that provides storage facilities to the general public for a certain course. It may be owned and operated by an individual or a comparative society. It has to work under a license from the government in accordance with the prescribed rules and regulations. Michael (1999) sees public warehouse as duty – paid warehouse. Public warehouses are very useful to the business community because most business enterprises cannot afford to maintain their own "good" warehouses due to huge capital investment involved. The consequence has always been spoilage of excess produce and losses in times of surplus supplies. Direction of the government presupposes her endorsement to public warehouses under the Poverty Eradication Programme (IPEP), Ghana. Next section discusses the generic concept of food security as being achieved with efficient warehousing.

## Concept of Food Security

The concept of national food security has been made obvious in various studies. According to United Nations (2008) food security is a state where both the availability and accessibility of food are ensured and it is enough to cover food demand of the people. Food and Agriculture Organization (FAO) argues on a wider view that Food Security is a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO,2001). Food security goes beyond a mere availability and accessibility of food. World Food Summit (1996) confirms that 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 productive and healthy life. In synopsis, Food security is "when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life" (World Food Summit, 1996; WHO, 2014). This posits basic ingredients of Food Security therefore anything short of that constitutes food insecurity.

There are four food security indicators – food availability, food accessibility, food consumption and sustainability (see. figure 1). Food availability is mainly based on the production factor. Higher the production, higher is the food availability. Access to food is another major factor, which includes market access, market price and institutional support. Access to food means that it is well distributed according to the demand. Food insecurity takes place when the demand grows higher



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than the supply. Both food availability and its proper distribution may attain food security. It is observed that food insecurity is not only due to population growth and low production of crops but also due to mismanagement in the food grain distribution system. Fair distribution of food grains is assured if having efficient warehouse structures for management of food and releasing at the right time. Braun et al. (2003), Chappell and LaValle (2011) and FAO (2011) have noted that the current global food production is sufficient to feed the world if it is distributed according to their needs.Food consumption that includes nutritional adequacy and local preferences is dependent on population size and food habits of the people. If these factors are adequate, then economic, social and environmental sustainability can be attained. Efficient warehousing is also pivotal to helping authorities identify the feeding habit and preference of the people by keeping foods nutritious under well secured conditions. The chart illustrates total concept of food security;

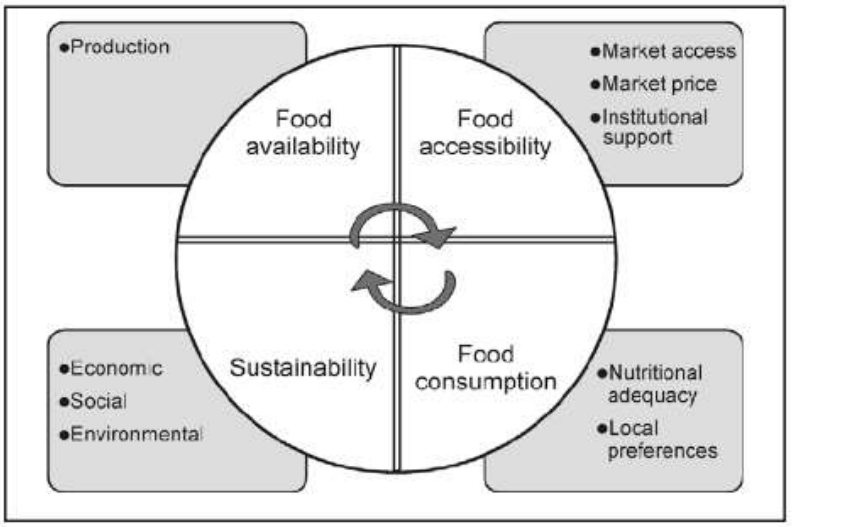


Figure 1: Food security indicators (Vishwambhar, 2017)

The practical understanding of food security in the context of this study suggests that even a small holder farmer must be able to produce quality food, make them accessible, and be able to store surpluses under proper condition and conveniently sell at the right time for consumers to patronize for a healthy life. Proper condition here involves keeping the farmer's produce healthy and nutritious until they are made available to the final consumer; also ensuring safe and easy access of the inventories by rightful farmers whenever they need. Farmers will rarely face post-harvest menaces' and that appears the direction of the government warehousing. Section 3.1 discusses the IPEP program and its emerging warehouse initiative.

**Infrastructure For Poverty Eradication Programme (IPEP), GHANA**

The IPEP is one of the flagship programmes of the government that aims at eradicating poverty and minimizing inequality especially in the rural and deprived communities through the provision of basic infrastructure. The programme provides the framework for disbursing special fund of cedi equivalent of one million US dollars annually to each of the 275 constituencies in the country to



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be invested in priority initiatives' such as one village one dam, one district one warehouse (www.msdi.gov.gh), under the auspices of Ministry for special Development Initiatives.

Inauguration of the IPEP was felt in April 2019 during launching of programme for "Planting for Food and Jobs". The President reinforced government's intention to construct a 1,000 metric ton capacity warehouse in each of the 216 districts in Ghana – "1-District-1-Warehouse". Purpose of the warehouses is to store produce, and provide storage for the anticipated surpluses under the "Planting for Food and Jobs" program. (www.ghana.gov.gh).

**Benefits of IPEP Warehouse Project and Features**

Construction of the warehouses was said not to only minimize post-harvest loses, but to improve marketing of agriculture produce which is part of the Global Food Security Strategy (GFSS) for Ghana. The warehouses are to address poor farm-level practices, poor handling, and poor storage activities that exposes farm produce to moulds, rodents and other pests therefore each of them is set to be fitted with modern equipment, including drying or freezing systems. "The warehouses will be certified to enable them participate in Warehouse Receipting System, being implemented under Ghana Commodities Exchange project. This system will promote financial inclusion of our smallholder farmers. The farmers will be able to deposit their farm produces in these warehouses, and use them to address their financial needs in various ways under the Warehouse Receipt System," It's believed that with successful implementation of the Warehouse Receipt System, many smallholder farmers will no longer have to sell their farm produce immediately after harvest, especially during periods when market prices are generally low. This will further help address challenges of price volatility. The warehouses are also to promoting Ghana's non-traditional exports in that farmers will be able to store their farm produce in the most efficient and effective manner to enable them export, create employment and earn foreign exchange, the president said (www.ghana.gov.gh). The IPEP initiative looks promising on the face of its enumerable benefits cited. But over the years government initiatives' have suffered efficiency on implementation. Therefore various cultural practices best to achieving operational efficiency in this current program is also worth discussing for due consideration.

**Achieving efficiency in warehouse operation**

Correct operation of warehouse facilities enables the realization of their logistics tasks at appropriate and acceptable customers' quality level. Consequently, it determines validity, cost-effectiveness and need of their functioning in supply chains.

Conventional warehouse process is associated with receiving, storage, picking and shipping of material goods, in suitably adapted places for this purpose, and under certain organizational and technological conditions. Therefore warehouse process includes such sub-processes as receiving, storage, picking and shipping. Nevertheless, it is a very general approach, and warehouse process may take many different forms, and include multiple sub-components (Jacyna-Gołda, 2015).

Review study of Michal Klodawski et al (2017) looked into 'the Issues of Selection Warehouse Process Strategies'. They conclude that even Selection of particular warehouse strategy usually



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depends on basic warehouse tasks, structure and size of customer orders, handled logistics units, costs of materials handling in particular sub-processes (both financial and time costs), availability of storage space and labour resources, etc. Therefore the probability of selecting a particular strategy and practice (for efficiency) is dependent on technical and organizational factors. There cannot be singularistic approach to ensure efficiency in warehouse operation though the key attention falls on the functional areas always.

In GAWDA (Gases and Welding Distributors Association) Magazine, Dan (2008) article dubbed "Do's And Don'ts of Efficient (And Safe) Warehouse Operations" had earlier streamlined three functional areas to ensure efficiency i.e. during inventory receiving, material handling and the warehouse safety - in a more generalist approach. Justin (2019) screen down the practices to highlight on four functional areas from the time of receiving inventories, inventory management, shipping out and the warehouse safety. Arguably the later scholar also engaged the discussion from corporate end of running a warehouse and highlighted practices around "shipping" from the warehouse.

Literature offers almost same guidance to seeing efficiency in corporate warehouse operation. Scholars propose practices around the functional areas including receiving, storage or handling, shipping and the warehouse safety. It can be said that depending on the purpose and kind of warehouse being kept further strategies and practices may be ideal as a buildup to optimize efficiency at the warehouse.

## RESEARCH METHODOLOGY

The major consideration for this review falls in the range of durations from 2000-2019. The other which is basic for this desertion has been also included below this interval range. But they are limited in number as there was no much consideration of warehouse efficiency against food security in late 2000s. Searching mechanism used were 'keywords reflecting food security and warehousing efficiency across the globe and narrowing down to Ghana using google scholar, research gates, academia.edu etc including relevant articles to identify the relevant gap on the studying topic.



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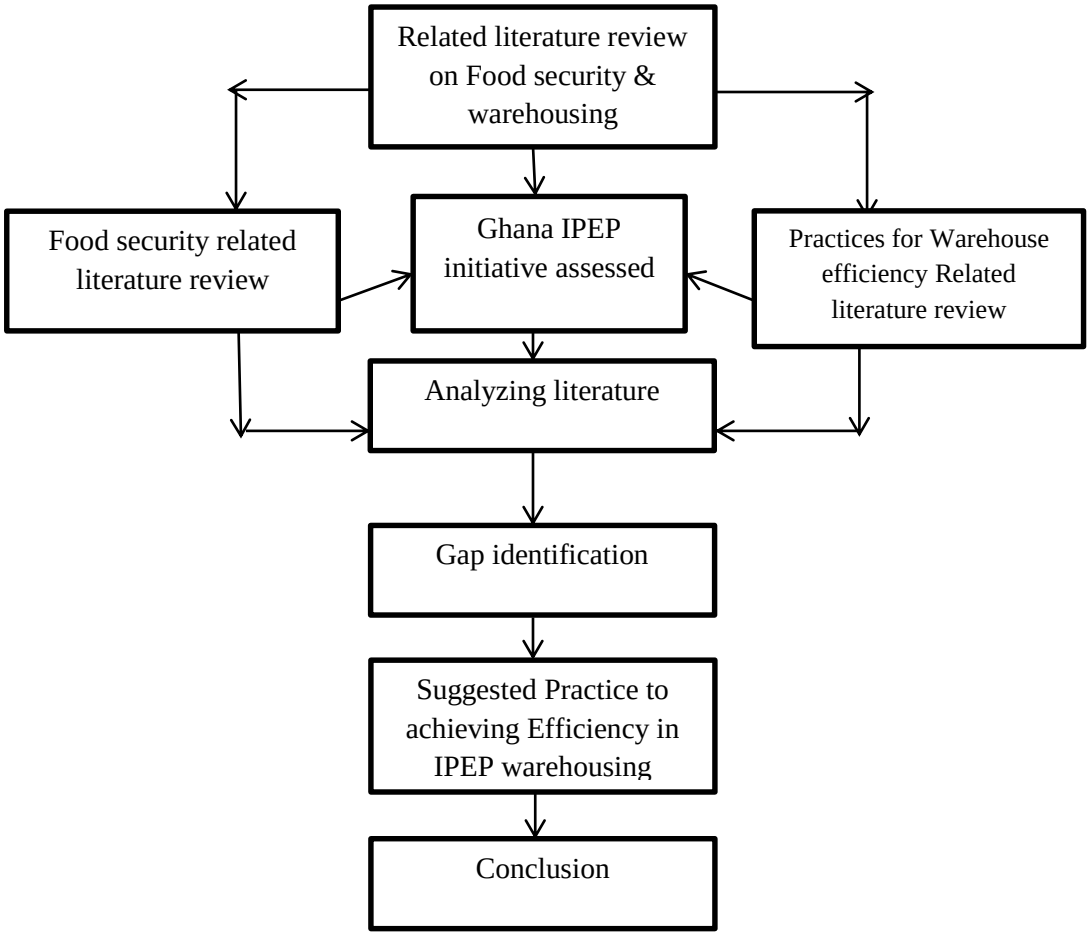


Fig 2. Pictorial depiction of Research methodology [how data was organized]

Figure 2 indicates the categorical distribution of research domain (areas) related to Food security & warehouse efficiency based on the research areas.

**Suggested practice to achieving efficiency in IPEP warehouse**

Drawing on the recent review of Justin (2019), the present author suggests ideal practices in context of the IPEP warehousing initiative. The following pragmatic underpinnings should be scrutinized for due consideration by authorities;

- **On Receiving Inventory ( i.e. The Farm produce)**

The receiving dock is the first place the authorities can start ensuring efficiency at the IPEP warehouse. A receiving clerk should be in charge of receiving and securing all produce submitted by the farmers and should also collect all transport documents e.g. waybill from the carrier or farmer at the time of delivery. A receiving log should be maintained to ensure that all inventory expected for the day has been received. This log can prove valuable for reference purposes by



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auditors, other relevant departments and in filing claims with carriers and suppliers (farmers) when the need arises. All inventory received by the transport or shipping clerk should be moved from the receiving dock to its appropriate place or bin in the warehouse to prevent damage and deter theft.

- **Inventory Management**

The movement of inventory throughout the warehouse should be done by experienced materials handlers with certifications or licenses to operate forklifts and boom lifts. These materials handlers should be able to move from one section of the warehouse to another with ease. All goods received at the warehouse should be kept in its proper location without congestions. Keeping the goods in a proper bin or location enhances operation of inventory system like FIFO (First In, First Out, inventory system) where relevant to apply. The FIFO system reduces the chance of obsolete inventory sitting in warehouse bins, according to Justin (2019).

- **Transporting or shipping**

Authorities should ensure that the inventories being shipped or transported out of the warehouse facility is secured until it is loaded onto the carrier's truck. The warehousing authorities should consider a risk-based approach to shipping dock procedures; put more security on food supplies that are of higher value or are easier to steal. A more intense effort should be made to secure inventory on shipping docks where the risk of theft or spoilage is highest. Offering insurance cover on such goods can help and encourage the farmers. Only authorized personnel should be permitted to access the shipping dock. The warehouse Authorities can enforce this through the use of identification and swipe cards to access certain areas of the warehouse and shipping docks to ensure that inventory is secured until time for shipment or removal from the warehouse. As with the receiving period, all documentation received from the carrier should be collected and the shipments should be recorded in a shipping log.

- **Safety**

The safety of warehouse employees should be paramount on the facility manager's checklist. Aside providing employees with essential safety gear, management should adhere to the best practice of not permitting horseplay on warehousing equipment. As mentioned in the inventory movement section, all equipment operators should be certified and licensed, and tested for competence on a regular basis. Adherence to best safety practices will help keep the facility free from unnecessary legal action and prevents the assessment of fines and penalties from stakeholders including the National Labour Commission.

The IPEP program is a national agenda hence the warehouses are to serve 1000s of farmers' interest. On the note the author further introduces these two practices for due analysis and consideration;



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- **Identification**

There will be a need for adoption of unique tracking codes. This will help create clear disparity among homogeneous supplies from various farmers. Moreover successive supplies of a particular farmer can be given different codes to the knowing of the farmer. The coding will augment the former practice at the time of receiving the inventory. Each farmer should be given unique identification number to enable their easy access to their produce at the time of need.

- **Supervision**

The government may contract external supervisors that will also do regular checks on the warehouses operation and its management before Annual audit is carried. This will be double supervision system. It can help keep the warehouse authorities on their toes to maintain and enhance the efficiency of the facility as well as its conformance to best practices only.

## CONCLUSION

In conclusion the author has conducted a review on pragmatic approach to achieving food security through efficient warehousing considering past and recent studies. The research focused on IPEP initiative being set by the government of Ghana under the auspice of Ministry of special Development Initiatives'. There is a growing discussion on how Ghana could attain food security and scholars have been emphasizing on sustainable agriculture (e.g Amissah, 2018). Studies on warehousing for food security are limited; especially achieving efficiency in IPEP warehousing initiative of the government, serving as a gap. This paper demonstrates some fundamental practices to be reckoned with in effort of achieving efficiency in the IPEP warehouses. The author proposes 'double supervision' and unique identification systems' as further ideal practices to ally blatant realization of efficient warehousing under this national initiative. There is a need for experimental studies to attest the influence of the said practices on achieving warehouse operational efficiency-within and/or without the IPEP. This will help contribute to theoretical understanding in the framework of food security and warehouse efficiency.

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