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Promoting Rural Women's Capacity Building for Food Safety of Cassava Food Products in South-West Nigeria

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Abstract
Cassava (ManihotesculentaCrantz) food products are the cheapest, popular, fermented, processed and commonly consumed food products at household level in Nigeria. Demand for cassava food products is increasing in south-west Nigeria markets because of recent economic recession in both urban and rural communities. However, meeting the growing demand would not only require a transformation for subsistence but importantly for food safety in production and consumption. Associated with the processing and consumption of cassava products are series of problems and constraints among which are the variable quality of the end products and poor shelf life as well as Food borne Disease (FBD) and malnutrition. The health effects, as well as the economic costs, of unsafe foods are eminent and the impact on health, trade, and development is considered enormous as cases of FBD and malnutrition cases occur each year costing billions of naira. These have been challenging for rural women because the majority of them handling cassava food products do not have the required food safety skills. It is here that capacity building comes in for whoever is handling the food products as different knowledge, skills and attitudes are required. Most of these issues may be addressed by empowering rural women, who are major downstream cassava food processors supplying consumers in both rural and urban areas, with the necessary skills through extension services. This presentation outlines the summary ofthe research on ways of promoting capacity building for food safety in cassava food products, aims at contribution of extension activities in order to identify the training needs incapacitating rural women in cassava food processing, marketing and consumption, as well, highlights the policy implications for further improvement in safety measures taken in cassava food products. It was observed that in the three identified cassava food products, the processing stages were not hygienic as the cassava paste at the final stage for sales were packaged or stored in not so clean nylon, fiber sacks or bags and that there are often delays in processing the roots. One of the main conclusions is that extension services in south-west Nigeria are weak and inadequate. It is recommended that a coordinated and flexible down-up community approach to Rural Development and Extension is required to help rural women achieve quality and safe food productivity and improved household welfare.

Keywords: Capacity Building, Extension Services, Cassava Food Products, Food Safety, Rural Women

INTRODUCTION

Cassava called *ManihotesculentaCrantz* (botanical name) is a popular crop of the roots and tubers as well as a perennial crop that grows in tropical and subtropical areas of the world. It was introduced in the mid-1550s to Africa by the Portuguese and is today one of the staple foods in Nigeria and other tropical Africa countries. It is the 3rd largest source of food carbohydrates in the tropics, after rice and maize, and is capable of growing on marginal soils because of its drought-tolerant nature. It is not only rich in carbohydrates, but also contains calcium, vitamins B and C, and essential minerals, though nutrient compositions of the crop are dependent on the age of the harvested crop, soil conditions, climate, and other environmental factors during cultivation. Cassava undergoes various processes from farming to harvesting, post harvesting handling to storage; it is important as a major source of income for rural households (George, 1994; Sanni, Akingbala, Oguntunde, Bainbridge, Graftham & Westby, 2005;and Internal Livestock Research Institute (ILRI), 2017).

Nigeria is currently the largest producer of cassava in the world with an annual production of over 34 million tonnes of tuberous roots. Cassava is one of the most widely cultivated food crops, widely eaten by all though processed differently and normally being processed into various products and is largely consumed in many processed forms in Nigeria. Its use in the industry and livestock feed, is well known, but is gradually increasing, especially as import substitution becomes prominent in the industrial sector of the economy. Cassava is not only a food crop but also a cash crop. As a cash crop, cassava generates cash income for the largest number of households in comparison with other staples. As a food crop, cassava has some inherent characteristics which make it attractive, especially to the smallholder farmers in Nigeria (Blanchard, Dahinya, Poulter& Taylor, 1994; and ILRI, 2017).

Furthermore, its roots are storable in the ground for months after they mature. These attributes, combined with other socio-economic considerations, are therefore recognized in the crop as lending cassava to a commodity-based approach to poverty alleviation (Adeniji, Ega, Akorada, Adeniyi, Ugwu & Balogun, 2003; and FAO, 2013).

The identified important cassava food products in most main producing states of Nigeria are "gaari", "laafun", and "fufu". Recent researches are ongoing at the International Institute of Tropical Agriculture (IITA) on mechanized processes for cassava food production on an industrial scale. However, the products are still produced traditionally (Oyewole & Sanni, 1995; Phillips, Taylor, Sanni & Akoroda, 2004; and Thomas & Philips, 2015).

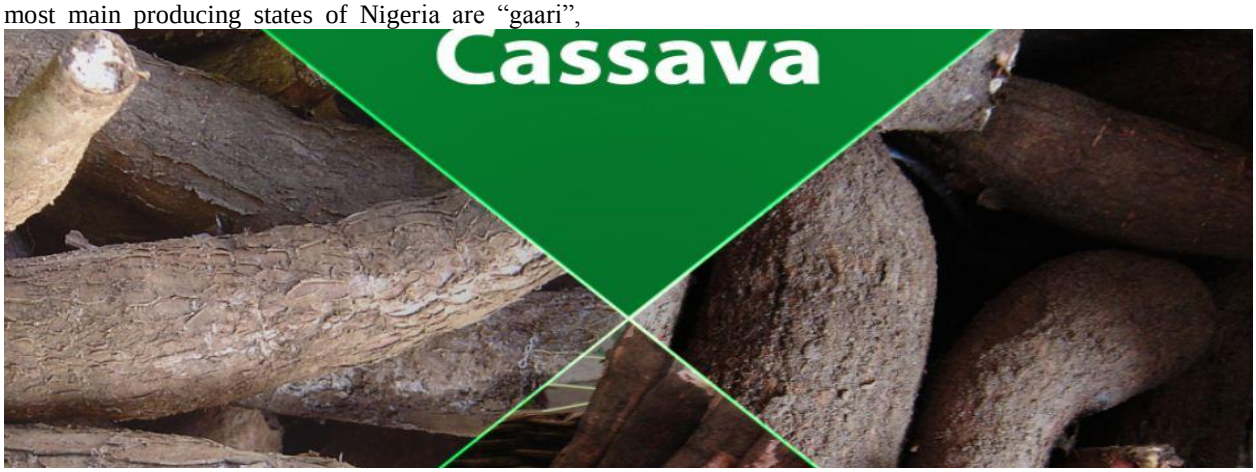

Figure 1: Picture showing cassava tubers
Source: Delia (2015). Food safety in LMI countries.12 (9), 10493

Food safety and Capacity Building Defined

What has promoting rural women's capacity building got to do with food safety? Food safety is synonymous with food hygiene embracing anything in the proce3ssing, preparation or handling of food to ensure it is safe to eat (Griffith, 2006). Food safety can be defined as "the maximum frequency and or concentration of a micro-biological hazard in food at the time of consumption that provides the appropriate level of health protection"(Clayton, Griffith, Price & Peters, 2002). Some scientists think of food safety in terms of hazard and risks Food safety refers to hazards, whether chronic or acute that may make food injurious to the health of consumers. It is not negotiable (Mustapha, Adelakun & Oyewo, 2016).

Food safety is, of course, a fundamental social value in its own right and a persistent challenge worldwide, substantially affecting public health, food security and the productivity of the population. The World Health Organization (WHO) estimates that globally 420,000 people die and 600 million fall ill annually from food borne hazards. The highest incidence per capita is in Africa – totaling an estimated 91,000 deaths and 127 million illnesses annually – with the heaviest burden of disease falling on children under five in rural areas in particular. Certainly, much need is to be done in empowering rural women who are mostly affected in Africa to reduce the prevalence of such illness and mitigate its public health and economic impacts (WHO, 2015; and Taylor, 2018).

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Across the developing world including Nigeria, unsafe food remains a threat not only to food security but also to public health. Each year, 91 million people in Africa fall ill due to Food Borne Diseases (FBDs); of these 137,000 will die, including children and elderly, according to WHO (Hailu, 2018). The full burden of FBDs in developing countries is not known but experts believe the countries bear the brunt of FBDs (Kaferstein, 2003; and WHO, 2013). This is plausible given that levels of hazards are often reported high (Delia, Makita, Kang'ethe & Bonfoh, 2010); prevalence of potentially food borne pathogens are found in hospital and community surveys of people with diarrhea (Fletcher, McLaws & Ellis, 2013); there is a lack of clean water for washing food and utensils and around 750 million people do not have access to clean water (WHO/UNICEF, 2014); and, use of human sewage or animal waste for agriculture production is common (Nguyen, Nguyen, Murell & Dalsgaard, 2007); inadequate policy and legislation; multiple organisations with overlapping mandates; out-dated, fragmented or missing legislation; inappropriate

standards; lack of harmonisation and alignment of standards; failure to cover the informal sector; limited civil society involvement; and, limited enforcement (Alcorn & Quyan, 2012; and FAO/WHO, 2005).

Hailu (2018) noted that food safety has become an important pre-condition for access to global food markets and, increasingly, for high-value domestic markets in developing countries and also noted that few studies have been conducted into specific impacts on national and households economics, but that evidence indicated that poor food safety places a heavy burden on trade and health, amounting to billions of monies. A single food hazard, aflatoxin contamination, is estimated to cause annual losses of over 600 million euro in loss export trade from Africa, Hailu (2018) added. Thus, in strengthening assurances, rural women who are often involved in cassava food processing could be adequately empowered in increasing their effectiveness of capacity building for sustainable development.

United Nations Environment Program (UNEP) (2002) described capacity building for sustainable development as building abilities, relationships and values that will enable organisations, groups and individuals to improve their performance and achieve their objectives. Capacity building was also described as initiating and sustaining a process of individuals that can equally refer to change within communities. Capacity building as a means to promoting sustainable development is broad and can encompass a multitude of activities(UNEP, 2002). There are several reasons for building women capacity in production. These include the facts, according to Seager& Olson (1992), Quisumbing (1994) and FAO (2013) that one, over two/third of them are still illiterate and the disparity continues to be larger in rural areas where educational attainment is lower and persists despite high private values of reform to women's school and social returns to women's education in the society and two, that women do not get an appropriate share of extension advice and other services. In order to forestall this issue, Okello (2019) stated, enabling easy access to extension services through the use of various information and communication technologies is key, as the intended result is women empowerment and ultimately community development.

Statement of Problem

Attention to food safety has also stemmed from its relevance to the Sustainable Development Goals (SDGs) adopted in 2015 by the United Nations General Assembly. The first three of the seventeen SDGs – *reducing poverty, achieving food security, and improving health* – address Africa's most fundamental needs and are all intended outcomes of Africa's agriculture-led development strategy, for which food safety is foundational. Food safety is not the most important factor in achieving any one of these key SDGs, but it directly and significantly affects achievement of all three of them (Haliu, 2018).

Some recent initiatives have addressed local public health impacts of food safety problems – most notably the impact of aflatoxin-contaminated maize, groundnuts and other staple commodities including roots and tubers, on child nutrition and stunting and the long-term burden of liver cancer among adults. But much of the recent interest has been driven by food safety's role in Africa's economic development strategy, on which the health and well-being of Africa's people ultimately depends (Westby, Reilly & Bainbridge, 1997; and Delia & Watts, 2017).Food safety has been neglected in developing countries including Nigeria, where most efforts to reduce diarrhoea have focused on water, sanitation and hygiene. However, these interventions and improvements still leave a large proportion of diarrhea disease un-managed and evidence is growing that FBD may be an important contributor to health burdens (WHO/UNICEF, 2014). As well, as rightly observed by Clayton et al, (2002), although the number of food handlers receiving food safety training is increasing day in day out, a high proportion of FBDs outbreaks still occur as a result of poor food handling.

In addition, there is limited evidence on effective, sustainable and scalable food safety interventions. Given the adverse effect of FBDs on both urban and rural communities, better impact assessment of interventions to improve food safety is a priority. There are opportunities to improve food safety through technologies, value chain innovations and restructuring of food safety governance, but the feasibility and effectiveness of these is not well understood. However, the widespread concern over food safety in most developing countries and the growing evidence of the associated health burden and economic costs, make it likely that this area will receive greater attention in future (Delia, 2015).

Significance of the Study

If rural women will not be able to connect to expanded market opportunities, not able to be promoted in their capacity building for food safety, starting at household and global levels, they will not be able to escape the cycle of poverty, which is why this presentation is the subject of importance to this research. In the pursuit of sustainable food safety to promote capacity building of rural women in cassava food products, sight must not be lost on the importance of food safety and not just for reasons of health.

In addition, this report carried out in the major cassava producing states in southwest Nigeria would

provide an easy reference for other agro-ecological zones and their states to share experiences which may be useful for future intervention projects or programmes or strategies and extension services in health and agriculture in the country.

Limitation of the Study

This study covered only one out of six geographical zones, comprising of six states in Nigeria. The study has its limitation to most rural communities in the states where cassava is largely cultivated and processed. The stakeholders who are mostly women in the zones are the unit of analysis of the study.

Area of study: This study was carried out in Nigeria. Nigeria covers 924,000 km ^{2} on the west coast of Africa with vegetation ranges from tropical forest in the south to the Sahel savannah in the north. The country comprises of Federal Capital territory and 36 states divided into six geo-ecological zones. The country has a population about 120 million out of which 65% is rural -based growing at a rate of 2.83% per annum. The country has a vast land mass out of which 71mil. hectares (77%) are considered cultivable but about 32million hectares. (45%) are cultivated (Adeniji, et al., 2003).Broadly speaking, the cassava-growing belt falls within three agro-ecological zones of the southeast, southwest and the central areas of cassava zones of Nigeria. Out of the three cassava zones, southwest Nigeria was chosen for the study (www.mapcarta.com/southwest). Southwest Nigeria is a largely agrarian society as 70% of the population resides in rural communities one of the six (6) geopolitical zones comprises of six states (Oyo, Lagos, Osun, Ekiti, Ondo and Ogun, predominately of Yoruba tribe) (www.readings.finelib.com) (Figure 1). Cassava (Manihot*esculetaCrantz*) is one of the food crops cultivated accounting for almost 80% of all food energy consumed in the zone (Chang, 2016).

Figure 1: A Map of Nigeria Showing South-Western States, the Study Area

Research design: A participatory research approach was adopted to encourage all the participants' collaboration and to ensure project sustainability. One key element of this design is "learning by doing" which often results in capacity building among the participants.

Population of the study: The population was drawn from all rural women who are either involved in processing and or marketing of cassava food products as occupation to form a unit of analysis for the research. The population also entails all extension agents directly working with rural women in the selected rural communities in southwest Nigeria.

Sample and sampling procedure:

Table 1: Selected rural women and extension officers for the study

S/N	Selected States	Selected Most Rural LGAs	No. of Registered Depots	No. of Respondents Chosen	No. of Extension Officers Chosen
1.	Ogun	14	58	29	2
2.	Osun	16	69	35	2
3.	Oyo	13	86	43	2
	Total	43	213	107	6

Field study 2016 -2018

Multi stage sampling was adopted for the study. Out of the six states, three states were randomly selected for the study. Using the lists of Local Government Areas (LGAs) that Agricultural Development Programme (ADP) staff members in the Ministry of Agriculture & Rural Development in each selected state identified as their best cassava LGAs that also constitute large areas rated being good for cassava production, 94LGAs were identified out of which 43 most rural LGAs were selected for the study. In the LGAs, 213 were registered cassava processing depots from which 107 (50%) were randomly selected and finally, the woman leader of each depot represented the respondents for the depot with a total of 107 respondents for the study. In addition, two (2) each of the extension agents in the LGAs were purposively chosen based on the number of years of experience in the field(www.nigeriazipcodes.com) (Table 1).

Research instrument: The research took three phases
Phase 1: Observation, personal interview and focus group discussion with the participants to obtain data on processing activities with key issues to obtain information on activities and training needs in safety measures to process cassava food products The results from phase 1 were presented and the training needs were identified for action plans to be developed.
*Phase 2:*Training workshops were organized for the selected participants in collaboration with the Ministry of Agriculture and Rural Development, Ministry of Women Affairs, and Ministry of Finance in the selected communities.

Phase 3: All the selected extension agents were consulted to understand the current status of the extension and support services in place for rural women involved in cassava food products in relation to food safety and their specific role in it.

Method of Data Analysis

The information collated from phase 1 to 3 were then summarized and discussed as follows:

DISCUSSION

Phase 1: Processing activities and the identified training needs: The identified important cassava food products in southwest Nigeria are "garri", "laafun" and "fufu" of which a generalized traditional scheme for processing are still in use in the zone. According to Oyewole & Sanni, 1995; Sanni, Akingbala & Westby, 1998; and Taylor, 2018, nothing much has been done to vary the processes. In most of the depots visited, "fufu' is produced mainly by rural women and girls, sharing out more than 80% of the activities involved – from peeling to soaking to breaking the softened roots to sieving to packaging and selling. Findings indicated that the traditional processing of 'laafun" is similar to "fufu" while that of "gaari" defers in roasting instead of either sun drying after breaking of the softened roots as explained above.

Figure 2: Picture of women and girls processing cassava product in a cassava depot in southwest Nigeria

A broad observation was that in the three identified cassava food products, the processing stages were not hygienic; the peeling was done by hands; the roots were soaked in either steams, earthen pots or any dirty and rusted bowls; the softened roots were broken with dirty hands; while the cassava paste at the final stage for sales were packaged or stored in not so clean nylon, fiber sacks or bags for sales; most of the vessels used are local and dirty (Figure 2).

Other observation were in support of Sanni, Wesby & Akingbala (1998); and Taylor (2018) that production is largely home-based; there are often delays in processing the fresh roots, in taking long time to process manually after harvesting the roots; poor shelf life and time consuming in marketing due to poor transportation from the depots to the consumers.

This fact was affirmed by Osewa (2016) that marketing produce in Nigeria is complicated by many hidden factors related to supplying produce to markets, the only available transport is by truck and highway; rail service is virtually non-existent in Nigeria and that reliance on highway transportation means roads are heavily travelled and are in need of regular maintenance and upgrading, good quality roads are few and maintenance irregular and that this made the products considered unsafe and poor in quality. For any action plan to be developed to capacitate the participants in food safety of cassava products, two areas of training needs were then identified:

i. Mechanization (modern practices instead of local practices): The study revealed that rural women were confronted with many challenges and that most of these challenges may be addressed by empowering them with the necessary skills and knowledge through education and training /extension services in their communities. In an attempt to identify the participants' needs on the challenges or issues confronting them, they were asked to mention the specific areas of challenges in processing, marketing and consumption of cassava food products. More than half (72.2%) of them indicated that they were using local practices during soaking stage of processing as water in their areas was scarce except during raining season where they were able to collect run-off in their villages and made use of streams and riverbed for the activity.

ii. Dissemination of information on modern practices for safe consumption: As well, on the question on the kinds of training/information the participants and extension agents had received or given respectively, from which extension agents or to which sets of rural women, and what are their training needs, the harmonized responses indicated training needs or information on labour-saving of cassava tubers, fermentation using clean sources of water, de-watering and sedimentation of filtration of the grounded cassava fibers in low-cost containers and safe packaging of the products to marketing stage.

In summary, both rural women and extension agents would one, have capacity building needs in mechanization and two, capacity needs in improved shelf life to make the products safe for consumption. In the like manner, Chikare, Ani, Atoma & Tijjani (2015); Anthony (2016) and Krosno (2017) however noted that what are needed to make safe, hygienic and high-quality cassava food products are space for processing the cassava; a store; a facility for safe disposal of waste materials; processing equipment

(knife, bowl, drying platform, grater, press and milling machine); trained machine operators along with casual workers for peeling, washing, grating, pressing, drying, milling, sifting and packing. One may be able to hire a press and grater locally and local fabricators of processing equipment are also available in some areas and at times, local extension officers or agricultural researchers may possess them as Anthony (2016) observed (Figure 3).

Figure 3: Picture showing one of the new inventions introduced to save time and improve cassava food safety in cassava processing in a depot

Phase 2: Organised training workshops in the selected communities: The activities involved during workshops to build the capacity of the participants to improve their performance in safety measures were in the processing, marketing and post-harvest management of cassava food products. All these were highlighted as follows:

Although all the 107 women leaders in the depots selected for the study were invited for training workshops organized at headquarters of their LGA secretariats only 97 (90.7%) of them completed the training sessions. New invented labour-saving machines that reduced the drudgery of tasks largely performed by the participants developed by IITA, with the assistance of extension agents, were used in the workshops. Other utensils including new and clean bowls, ladles, pots, sacks, etc were introduced in the depots; and water from community bore-holes was mandated to be used in all the depots.

The participatory workshops were in line with Vanclay (2004) and Internal Livestock Research Institute (ILRI) (2017) principles and objectives to enhance compliance to food safety regulations by small-scale enterprises in roots and tubers processing. The skills and knowledge gained from the training could be important in addressing food safety challenges that may arise from lack of competencies to good hygienic and manufacturing practices (ILRI, 2017).

Phase 3: Current status of the extension services in place for rural women involved in cassava food products in relation to food safety and their specific role in it: Focus group discussion with the selected extension agents in the zone indicated that discernible progress has accrued from the extension systems in their zones as they affirmed that this is reflected in the adoption of some improved varieties of cassava, development of technologies for various farm operations, improved management practices and improved linkage between research, extension and farmers had improved. However, they were of the opinion that there are still some constraints with the extension delivery strategy. Other areas of challenges that the participants mentioned confronting them in disseminating adequate extension services on food safety in cassava food products to rural women were in tandem with the opinion of Quisumbing, Brown, Feldstein, Haddad & Pena (1995), Sanni et al.(2005), Delia (2015) & Chang (2016) include:

i. the shortage of human resources necessary to implement the Training and Visit extension management system as for most ADPs, the target ratio of EAs 1:1 000 farmers could not be realized. This had a negative impact on the effectiveness of the coverage of the various cells/circles in a given locality.

ii. inadequate supply with inputs such as training materials and extension mobility is also insufficient to enhance the attainment of their roles.

iii. insufficient formal feedback to the ADPs, limited spread of extension messages to women farmers and that only a few contact farmers are able to pass on the information to other farmers on a regular basis, which means that only a few farmers are being exposed to new technologies from research.

iv. recent economic changes have caused input prices to rise more rapidly than product prices, reducing profit margins for small-scale processors of cassava products.

v. the technological options offered by extension agents do not fit into the farming system in the zones and the socioeconomic conditions under which the rural women are operating.

In essence, rural women do not get an appropriate and adequate share of extension services if the above challenges and constraints are confronting the extension agents in their provision of extension services on food safety in the zones.

Policy Implications for Further Improvement in Safety Measures Taken in Cassava Food Products

Nigeria governments at all levels are currently implementing National Agency for Food and Drug Administration and Control (NAFDAC) policy, policy of an agency in charge of protection of the public health of citizens by assuring the safety of foods and drugs. For most Nigerians, this agency's approval gives a sense of security and a feeling of

confidence that the products are safe for consumption. As well, this arrangement enables the agency to organize targeted and focused capacity building training programmes for various groups who are involved in foods processing, storage and marketing (www.buzznigeria.com).

In addition to the old and existing research institutions, a pluralistic approach in extension services are introduced in most institutions, in which agricultural extension services are derived from modern sources in mechanization not only to eliminate drudgery in cassava food processing but also to promote capacity building in food safety. Also, the Government recognizes the critical role of the public and private sectors, that is, governmental and non-governmental organisations, in pro-poor agricultural development and growth, especially the provision of support to build capacities of rural women who are involved in cassava food processing, storage and marketing.

CONCLUSION

Recognizing the role of extension services could lead to promoting rural women's capacity building for food safety of cassava food products in South-west Nigeria. At present, extension services in South-west Nigeria are weak and inadequate. Thus, more qualified extension agents with adequate skills and knowledge in cassava food processing, storage and marketing could be employed to facilitate disseminating technological information in promoting capacity building of rural women in their occupation. Also, a coordinated and flexible down-up community approach to Rural Development and Extension (RD&E) is required to assist rural women achieve food safe food productivity and improve their household welfare.

REFERENCES

Adeniji, A. A., L. A. Ega, M. O. Akorada,A. A. Adeniyi,B. O. Ugwu&A. Balogun (2003). ***A*** Country Case Study toward A Global Strategy for Cassava Development. Department of Agriculture, Federal Ministry of Agriculture and Natural Resources, Nigeria, 1-10

Alcorn T. &Y. Ouyang (2012).China's invisible burden of food borne illness. Lancet. PubMed 379, 1-4

Anthony, O. (2016). Cassava production and processed products made from cassava. http: anthonyblog.com retrieved on 26/01/2019

Blanshard, A. F. J., Dahniya, M. Y., Poulter, N. H. & Taylor, A. J. (1994). Quality of cassava foods in Seirra Leone. *Journal of the Science of Food and Agriculture.*64, 425 – 432.

Chang, H. C. (2016). Capacity building of small-holders sweet potato in Papua New Guinea. hptt: hchang@une.edu.au. Retrieved on 22/01/2019.

Chikare, J. U., A. O. Ani, C. N. Atoma & A. R. Tijjani (2015). Capacity building: Key to agricultural extension survival. ***Scholar*** Journal of Agricultural &Vetenary Services. 2 (1), 13-21.

Clayton, D. A., C. J. Griffith, P. Price & A. C. Peters (2002). Food hazards, beliefs and self-reported practices. Journal of Environmental Health Research. 12 (1), 25-30.

Delia, G. (2015). Food safety in Low and Middle Income Countries (LMICs).***International*** Journal of Environmental Research and Public Health**.** 12 (9), 10490-507

Delia, G., K. Makita, E. Kang'ethe&B. Bonfoh (2010). Safe food, fair food: Participatory risk analysis for improving the safety of informally produced and marketed food in Sub-saharan Africa. ***Rev. Afr. Santé Prod. Anim.*** 8, 3–11.

Delia, G. &C. Watts (2017). Global food safety: Challenges and dynamics.***International*** Journal of Environmental Research & Public Health. Multi-discplinary Digital Publishing Institute (MDPI). 52 - 60.

Food and Agriculture Organisation (FAO)/ Word Health Organisation (WHO) (2005).***Final*** Report of Regional Conference on Food Safety for Africa, 3–6 October 2005. Food and Agriculture Organisation of the United Nations; Rome: Italy.

Fletcher, S.M., M. L. McLaws&J. T. Ellis (2013).Prevalence of gastrointestinal pathogens in developed and developing countries: Systematic review and meta-analysis. J. Pub. Health Res**.** 2, 42–53.

George, M. (1994). Variety response of cassava roots to bulk fermentation with a mixed culture innoculum. Journal of Root Crops**.** 2, 117 – 122.

Griffith, C. J. (2006). Food safety: Where from and where to. British Food Journal.108 (1), 6-12.

Hailu, M. (2018).Tracking food safety and agricultural trade in Africa. ***SPORE. Scaling*** a High Priority for Agriculture. (191), 3-4.

Internal Livestock Research Institute (ILRI) (2017). Managing food safety and quality in processing for Roots, Tubers and Banana (RTB) value chains in sub-Sahara Africa: Call for applications. ***BioScience Africa.***13,24.

Käferstein, F. (2003). Food borne diseases in developing countries: Etiology, epidemiology and strategies for prevention. International Journal of Environment, Health and Research. 13, 161–168.

Krosno, R. Z. (2017). The Contribution of Agricultural Extension Services to Achieve Food ***Security.*** Lublin: University of Life Science. 1-10

Mustapha, I. O., M. A. Adelakun & S. O. Oyewo (2016).Innovation in Food Service and Safety. Hospitality & Tourism Management Association of Nigeria (HATMAN). *Book of Proceedings. (*Eds) C. E. Ogunlade& L. Awoseyin.15-26.

Nguyen, T.H., V. D. Nguyen,D. Murrell&J. Dalsgaard (2007). Occurrence and species distribution of fish borne zoonotic trematodes in wastewater-fed aquaculture in Northern *Vietnam. Trop. Med. Int. Health.*12, 66 – 72.

Okello, D. (2019). Increasing income and productivity by empowering women farmers' access to information.***ICT Update:*** A Current Awareness Bulletin for ACP Agriculture. Issue 90, 16-17.

Osewa, O. (2016). Cassava production in Nigeria and the main producing states. www.reading.finlib.com Retrieved on 29/01/2019

Oyewole, O. B. and L. O. Sanni (1999). Lactic fermented foods in Africa and their benefits. *Food control.*1-2.

Phillips, T. P., D. S. Taylor, L. Sanni & M. O. Akorada (2004). A Cassava Industry Revolution in Nigeria. Rome: FAO, 43.

Quisumbing, A. R. (1994). Gender differences in agriculture productivity. *A Summary of Empirical Evidence, Education & Social Policy Discussion Paper.* Washington D. C.: World Bank,(36), 1-4.

Quisumbing, A. R., L. R. Brown, H. S. Feldstein, L. Haddad & C. Pena (1995). Women: The key to food security. *Food Policy Report of the International Food Policy Research Institute (IFPRI).* Washington D. C.: FAO, 3-8.

Sanni, L. O., J. O. Akingbala, A. O. Oguntunde, Z. A. Bainbrigde, A. J. Graftham & A. Westby (2005). Processing of fufu from cassava in Nigeria: Problems and prospects for development, 1-22. www.researchgate.net/ pub Retrieved on 30/01/2019.

Sanni, L. O., A. Wesley, & J. O. Akingbala (1998).Processing of fufu from cassava in Nigeria: Problem and prospect for development.www.researchgate.net/publication. Retrieved on 16/03/2019.

Seager, J. & A. Olson (1992). Women in the world: An international atlas. (Eds.) Jazainy, I., M. Alamgor& T. Panuccio. *The State of World Rural Poverty: An Inquiry into its Causes and Consequences.* New York: University Press for the International Fund for Agricultural Development (IFAD).

Taylor, M. R. (2018). Capacity building and African's food system: Building the foundation for success. *The Consumer Goods Forum.*www.theconsumergoodsforum.com. Retrieved on 22/11/2018.

Thomas, K. A. & O. N. Philips (2015).Assessment of selected rural communities of Oyo state, Nigeria. *Journal of Food, Agriculture, Nutrition & Development (ajfand),* 15, (4), 2-18.

United Nations Environment Program (UNEP) (2002). Capacity building for sustainable development: An overview of UNEP activities. *UNEP Division of Technology, Industrial & Economics (DTIE), Economics & Trade Branch (ETB),* 1, 11.

UNEP(2006).Ways to increase the effectiveness of capacity building for sustainable development. *Discussion Paper.*www.eunep.ch/etb, 1-6. Retrieved on 08/02/2019.

Vanclay, F. (2004).Social principles for agricultural extension to assist in the promotion of natural resource management. *Australian Journal of Experimental Agriculture.*44 (3), 213-222.www.researchgate.net. Retrieved on 23/11/2018.

Westby, A., Reilly, P. J. A. & Bainbridge, Z. (1997). Review of the effect of fermentation on naturally occurring toxins. *Food Control.*2-6

World Health Organization (WHO) (2013). Health in the Post-2015 Development Agenda: NEED for A Social Determinants of Health Approach, *Joint Statement of the UN Platform on Social Determinants of Health.* Geneva, Switzerland: World Health Organization

WHO/UNICEF (2014). Progress on Sanitation and Drinking-Water—2014 Update. World Health Organization and United Nation Children's Fund; Geneva, Switzerland.

www.buzznigeria.com NAFDAC: Full meaning, functions, and the tasks of safeguarding. Retrieved on 20/06/2019.

www.readings.finelib.com Map of Nigeria showing the south-western zone of Nigeria. Retrieved on 25/01/2016.

www.nigerianzipcodes.com/4188/list of towns and villages in south-west Nigeria.Retrieved on 25/01/2016.

www.mapcarta.com,southwest Nig. Retrieved on 28/01/2016.

www,fao.org/docrep/007. Cassava industrial revolution. Retrieved on 23/02/2016.