

Review on the Role of Underutilized Crops in Achieving Food Security in Ghana: Implications for Policy

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ABSTRACT

Food security globally is constrained by several factors including the heavy reliance on very few key staple crops. In Africa over dependence on a few major crops remain a major challenge due to its potential impact and contribution to food security. This review explores the potential contribution of underutilized crops to the attainment of food security. The paper also explores the relevance of a specific policy provision that promotes the use of underutilized crops. In Ghana the challenge of food insecurity still remains a major concern, particularly in the three northern regions. The 2009 Comprehensive Food Security & Vulnerability Analysis (CFSVA) report revealed that food insecurity in Ghana is a challenge particularly in the areas most prone to adverse weather conditions, such as floods and droughts, which are also the poorest regions of the country. In Ghana, as in many African countries considerable attention has not been given to the impact of underutilized crops and plant species on food security. This is evidenced by the 2013 Accra Statement for a food secure Africa report, which identified most countries in Africa, including Ghana, as pursuing agricultural and food policies based on a limited number of crops or staples such as maize and rice. The review showed that Ghana currently lacks a comprehensive policy, on the use of underutilized crops. A specific policy that will ensure the promotion and use of underutilized crops in Ghana, is suggested.

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Introduction

Food security continues to be one of the major challenges facing the world today. Global food security, over the years, has been constrained by several factors including the heavy reliance on very few key staple crops, a situation that has nutritional, agronomic, economic and ecological implications (Ebert, 2014). Jaenicke & Höschle-Zeledon, (2006) notes that diversifying production and consumption habits to include underutilized crops can influence and contribute to improved nutrition and household food security. The use of highly valuable but presently underutilized crop species has been identified as an essential element of any model

of sustainable agriculture (Kahane *et al.*, 2013).

According to Chivenge *et al.*, (2015) the cultivation of underutilized crops provides greater genetic biodiversity, and can potentially improve food security. A study by IPGRI (2002) further emphasized the nutritional richness of many neglected and underutilized species and their consequent impact on food security and well-being of the poor. Stefanie & Amend, (2008) has also pointed to factors such as lack of sufficient knowledge of the potential or useful traits of these crops as well as low interest in agricultural research, as some of the reasons for the observed underutilization of these crops or plants species. Tapping into local knowledge of

farmers on such less known or less utilized crops has also been found to play an important role in the identification of such often neglected natural resources for commercialization. Dansi *et al.*, (2012), however, argue that the potential of most plant species that are cultivated for food in most countries have not been fully exploited and, therefore, are less utilized.

In many African countries including Ghana considerable attention has not been given to the impact of less utilized crops and plant species on food security. This is evidenced by the 2013 Accra Statement for a food secure Africa report, which identified most countries in Africa including Ghana as pursuing agricultural and food policies based on a limited number of crops or staples such as maize and rice. A comprehensive empirical research that provides an inventory of lesser known and less utilized crops, as well as their potential to enhance food security and broaden the genetic base of food crops in Ghana, has not been adequately explored.

Underutilized crops

The term underutilized has been used among other several descriptions including “orphan”, “minor”, “new crops”, and “neglected” to represent crops species that have potential but fallen to disuse due to various reasons (Padulosi *et al.*, 2004). Aboagye *et al.*, (2007) has described underutilized crop species as crops whose potential contribution to the national economy have not been adequately explored due to the decreased attention to their production, consumption and utilization. The Global Facilitation Unit for underutilized species (GFU) also defines them as “*those species with a potential, not fully exploited, to contribute to food security and poverty alleviation... and that tend to have the following common features: a strong link to cultural heritage; poorly documented and researched; adapted to specific agro-ecological niches; weak or non-existent seed supply systems; traditional uses; and produced with little or no external inputs*”.

The term for the purposes of this review is used to broadly refer to both neglected and underutilized crop species. These crops include species that have not been categorized as major crops, lacking adequate research and currently experiencing low consumption and utilization (Azam-Ali, 2010). The underutilization of plant species has been attributed to a number of factors; mainly agronomic, which usually ensures that the production of some plant species are contained at the subsistence level, and the non agronomic factors including social, economic, which limits the production of certain species. The cultivation of underutilized crops provides greater genetic biodiversity, and can potentially improve food security (Chivenge *et al.*, 2015).

Achieving food security in Ghana through the promotion of Underutilized crops

The concept of food security has evolved over the years following its introduction in the 1970's. The initial conceptualization of the term was mostly concerned with food supplies, both nationally and globally. This, however, changed in the 1980's to focus primarily on accessibility to food at the household and individual levels. Since then several definitions and conceptual models have evolved. The Food and Agriculture Organization has described food security as the reliable access to adequate and nutritious food that meets the dietary requirements and food preferences of all people, at all times for a healthy life (FAO, 2001).

Food insecurity in Ghana still remains a major public concern, even though the country can be said to be generally food secure. The 2009 Comprehensive Food Security & Vulnerability Analysis (CFSVA) report revealed that food insecurity in Ghana is a challenge particularly in the areas most prone to adverse weather conditions, such as floods and droughts, which are also the poorest regions of the country (WFP, 2009). The 2012 CFSVA report notes that food insecurity exist more in the rural areas compared

to the urban. The report further identified four major causes of food security in Ghana, namely poverty; seasonal challenges; high food prices and agricultural limitations. Small land size and lack of crop diversity were also highlighted as also contributing to food insecurity particularly among households in the three northern regions.

In a review that explored the potential of Bambara groundnut, an underutilized plant species, towards food security in Africa, Muhammad (2014) highlighted the high nutritional composition of the plant compared to other many leguminous crops. The legume crop, which is native to Africa, contained high levels of protein and minerals and, therefore, could play a significant role in achieving, food and nutritional security. Sprent *et al.*, (2009) in a similar review on the potential of African legumes including *Acacia senegal*, cowpea, Gum arabic, among others, indicated that a focus on such crops could potentially contribute to agricultural diversity thereby decreasing the reliance on a few crops and plant species. Bhattacharjee (2009) notes that underutilized crops have the potential of improving incomes, nutrition and food security in remote areas in developing countries. Several studies have also pointed to the enormous potential of less utilized crops (Dansie *et al.*, (2012); Ebert (2014); Chivenge *et al.*, (2015); Akwee *et al.* (2015); Galluzzi & Noriega (2014); Mabhaudhi *et al.*, (2016); Massawe *et al.*, (2015).

In Ghana, as in many African countries, considerable attention has not been given to the impact of less utilized crops and plant species on food security. There seem to be limited empirical research and documentation of neglected and underutilized plant species and their potential to enhance food security. This is evidenced by the 2013 Accra Statement for a food secure Africa report, which identified most countries in Africa including Ghana as pursuing agricultural and food policies based on a limited number of crops or staples such as maize and rice. Empirical researches that have been undertaken have primarily focused on the potential of these crops

without its direct impact on food security. In a study that explored the competitiveness of neglected and underutilized crops in Ghana, Nyadanu & Lowor, (2014) examined the nutritional composition and medicinal values of some indigenous leafy and fruit vegetables.

The study also compared the nutritional composition of Ghanaian indigenous leafy and fruit vegetables with the one of selected exotic vegetable crops. The findings showed that proteins, carbohydrates, dietary fibers, potassium, calcium, magnesium, phosphorus, vitamin A, vitamin C and vitamin E were significantly higher in indigenous vegetables than their exotic counterparts. The results highlighted the nutritional importance of indigenous vegetables and the need to promote their consumption and safeguard their genetic resources. In another study on the diversity, forms of consumption and management practices of neglected and underutilized crops, it was observed that a high diversity of neglected and underutilized species (NUS) genetic resources could be used to further enhance nutrition and food security in Ghana. These findings create an urgency to collect and conserve genetic resources of NUS in Ghana to promote their utilization and breeding of improved varieties (Nyadanu *et al.*, 2015).

Underutilized Crops and Policy Issues

Haddad & Demsky (1995) define policy as “*an explicit or implicit single decision or group of decisions which may set out directives for guiding future decisions, initiate or retard action, or guide implementation of previous decisions*”. The role of policy, therefore, is to set out clear directions and strategies to guide decisions and actions in a specific area of interest (Smith, 2002). Even though the existence of a policy does not guarantee success it is key in achieving a desired goal or intent.

In a study that examined the agriculture sector policies of countries such as Ghana, Jordan, Nepal, Papua New Guinea, Peru, Uzbekistan, Vietnam and Zambia, it was observed that the sector policies did not focus

specifically on underutilized crops or plant species (Chishakwe, 2008). The study, focused on selected agricultural sector policies from different regions in order to reflect the differences and similarities across different political, economic, cultural and social systems and also understand some of the general policy-related constraints, which countries face in promoting the use of underutilized crops. In Jordan, for example, the National Strategy for Agricultural Development emphasizes on the protection of agro-biodiversity including plants and animals but does not make specific reference to underutilized species. While the National Agriculture Policy of Nepal promotes and ensures the development of commercial crops on a large scale it also creates a situation that decreases the use of underutilized crops in localities where they are found.

The study further noted that even though the food security policies of these countries ensured that people obtained adequate food, through

increased food production, some of the policies also hinder the production of underutilized species. While the lack of specific policy provision remains a challenge some countries are pursuing research with particular focus on underutilized plants species (Chishakwe, *ibid*). In Ghana the Food and Agriculture Sector Development Policy (FASDEP II) is the key policy instrument that guides agricultural production and food security issues. The policy among other things emphasizes and focuses on selected priority crops to the neglect of underutilized crops due to their economic importance (Table 1). Aboagye *et al.*, (2007) in a similar study on national policies and legislations that influenced the use of underutilized plant species also revealed that there is currently no single comprehensive policy on underutilized crops in Ghana, even though there is some kind of consensus on their potential impact on food security.

TABLE 1

Cross national analysis of agriculture sector policies that hinder or promote the conservation and use of underutilized crops

| No | Country | Agriculture Sector/food security Policy | Goal | Identified Policy gap |
|----|---------|---|---|--|
| 1 | Jordan | National Strategy for Agricultural Development: (2000–2010) | Protects agro-biodiversity including plants and animals | <ul style="list-style-type: none"> • No specific mention of the conservation of underutilized species, although this can be inferred • This may not be the best approach if underutilized species require additional, special attention, beyond that required for more commonly used species |
| 2 | Nepal | National Agriculture Policy (2004) | Emphasizes the development of commodity-specific, large-scale agricultural production | <ul style="list-style-type: none"> • This approach is expected to produce commercial crops on a large scale • But it also has the effect of replacing the underutilized crops found in those localities with commercial crops, hybrid seeds and improved breeds |
| 3 | Peru | General Law on Seeds | Support certain vegetable species because of their economic value or for financial purposes | <ul style="list-style-type: none"> • This policy may work in favour of underutilized vegetable species with a clear monetary or financial value, • But not for species where the monetary or financial value is difficult to gauge. |
| 4 | Ghana | Food and Agriculture Sector Development Policy (FASDEP, 2002) | Prioritize and rank certain commodities, priority crops, according to their economic importance | <ul style="list-style-type: none"> • The result is a focus on major crops at the expense of underutilized ones |

Source: (Chishakwe, 2008)

Conclusion

While agriculture plays an important role in food security in Ghana, local food production has not fully met the demands of the population, hence, the need to resort to importation of food to address the constraints posed by inadequate food production. This, subsequently, has affected and continues to increase Ghana's food import bill. The increased reliance on food importation is attributable to Ghana's dependence and emphasis on a few priority staple crops such as maize, cassava, rice, yam and cowpea, without much consideration to the potential of other less known or less utilized crops as well as its inability to sustain local food production.

In Ghana interventions and programmes aimed at promoting underutilized plant species have also not been well coordinated. The current national agricultural policies do not adequately capture a clearly defined approach for the promotion of an effective utilization of underutilized plant species in Ghana (Aboagye *et al.*, 2007). The Root and Tuber Improvement programme for example focuses only on a few root and tuber crops, namely white yam, cassava and sweet potato, however, issues concerning underutilized plant (crops and tree) species have been largely ignored. Ghana's current agriculture sector policy, FASDEP (2002) emphasizes on priority crops based on their economic value to the neglect other important indigenous crops. FASDEP does not particularly address the challenge of marginalization of these indigenous crops even though their potential to contribute to food security especially among rural households is known. A specific policy provision that encourages the promotion of these marginalized crops in Ghana is therefore suggested.

REFERENCES

Aboagye, L. M., Obirih-Opareh, N. Amissah, L. & Adu-Dapaah, H. (2007) *Underutilized Species policies and strategies: Analysis of existing national policies and legislations*

that enable or inhibit the wider use of underutilized plant species for food and agriculture in Ghana.

- Akwee, P. E., Netondo, G., Kataka, J. A. & Palapala, V. A. (2015) A critical review of the role of taro *Colocasia esculenta* L. (Schott) to food security: A comparative analysis of Kenya and Pacific Island taro germplasm. *Scientia Agriculturae*, 9 (2), 101-108. Retrieved from www.pscipub.com (DOI:10.15192/PSCP.SA.2015.9.2.101108)
- Azam-Ali, S. (2010) Fitting underutilised crops within research-poor environments: Lessons and approaches. *South Afr. J. Plant Soil*, 27, 293-298.
- Bhattacharjee, R. (2009). Harnessing Biotechnology for Conservation and Increased utilization of Orphan Crops. *ATDF JOURNAL* 6, Issue 3/4.
- Bruinsma, J. (2009) The resource outlook to 2050: By how much do land, water and crop yields need to increase by 2050? *Paper presented at the FAO Expert Meeting, 24-26 June 2009, Rome, on How to Feed the World in 2050*. Food and Agriculture Organization of the United Nations, Rome, Italy. Available at: <ftp://ftp.fao.org/docrep/fao/012/ak971e/ak971e00.pdf>
- Chishakwe, N. E. (2008). The role of policy in the conservation and extended use of underutilized plant species: a cross-national policy analysis. *Global Facilitation Unit for Underutilized Species, Rome, Italy, and the Genetic Resources Policy Initiative, Nairobi, Kenya*.
- Chivenge, P., Mabhaudhi, T., Modi, A. T. & Mafongoya, P. (2015) The Potential Role of Neglected and Underutilised Crop Species as Future Crops under Water Scarce Conditions in Sub-Saharan Africa; *Int. J. Environ. Res. Public Health*, 12, 5685-5711.
- Dansi, A., Vodouh, R., Azokpota, P., Yedomonhan, H., Assogba, P., Adjatin, A., Loko, Y. L., Dossou-Aminon, I. & Akpagana, K. (2012) Diversity of the Neglected and Underutilized Crop Species

- of Importance in Benin. *The Scientific World Journal*, Vol 19 pg doi:10.1100/2012/932947.
- Ebert, A. W.** (2014) Potential of underutilized traditional vegetables and legume crops to contribute to food and nutritional security, income and more sustainable production systems. *Sustainability* 6, 319-335; doi: 10.3390/su6010319.
www.mdpi.com/journal/sustainability
- FAO (2001)** The State of Food Insecurity in the World. *Food and Agriculture Organisation*. Rome.
- FAO. (2009a)** Declaration of the World Summit on Food, Rome, 16-18 November 2009. *Food and Agriculture Organization of the United Nations*. Rome, Italy. Available at: http://www.fao.org/fileadmin/templates/wsfs/Summit/Docs/Final_Declaration/WSFS_09_Declaration.pdf
- FAO (2014)** The State of Food Insecurity in the World 2014. Strengthening the enabling environment for food security and nutrition. *Food and Agriculture Organisation* Rome, Italy.
- FAO (2015)** Regional overview of food insecurity: African food security prospects brighter than ever. *Food and Agriculture Organisation*, Accra
- FAO (2009)** *Food Security and Agricultural Mitigation in Developing Countries: Options for Capturing Synergies*. FAO, Rome, Italy.
- Galluzzi, G. & Noriega, I. L.** (2014) Conservation and Use of Genetic Resources of Underutilized Crops in the Americas:—A Continental Analysis. *Sustainability*, 6, 980-1017; doi:10.3390/su6020980.
- Ministry of Food and Agriculture** (2007) *Food and Agriculture Sector Development Policy (FASDEP II)*, Republic of Ghana.
- Haddad, W. & Demsky, T.** (1995) Education Policy-Planning Process: *An Applied Framework*. Paris: UNESCO: International Institute for Educational Planning.
- International Plant Genetic Resources Institute (2002)** Neglected and Underutilized Plant Species: Strategic Action Plan of the International Plant Genetic Resources Institute. *International Plant Genetic Resources Institute*, Rome, Italy.
- Jaenicke & Höschle-Zeledon** (2006) *Strategic Framework for Underutilized Plant Species Research and Development, with Special Reference to Asia and the Pacific, and to Sub-Saharan Africa*.
- Mabhaudhi, T., Chibarabada, T. & Modi, A.** (2016) Water-Food-Nutrition-Health Nexus: Linking Water to Improving Food, Nutrition and Health in Sub-Saharan Africa. *Int. J. Environ. Res. Public Health*, 13, 107.
- Massawe, F. J., Mayesa, S., Chenga, A., Chaia, H. H., Cleasbya, P., Symondsa, R. W. K., Hoab, W. K., Siisea, A., Wonga, Q. N., Kendabiec, P., Yanusaa, Y., Jamalluddina, N., Singha, A., Azmanb, R. & Azam-Alia, S. N.** (2015) The potential for underutilised crops to improve food security in the face of climate change. *Procedia Environmental Sciences* 29: 140–141.
- Muhammad, Y. Y.** (2014) Exploring the potential of bambara groundnut, an underutilised African legume species, towards food security in Africa. *African Journal of Agricultural Science and Technology (AJAST)*, 2, Issue 11, pp. 201-204.
- Nyadanu, D. & Lowor, S. T.** (2014) Promoting competitiveness of neglected and underutilized crop species: comparative analysis of nutritional composition of indigenous and exotic leafy and fruit vegetables in Ghana. *Genet Resour Crop Evol.* 61, No. 6 DOI 10.1007/s10722-014-0162-x.
- Nyadanu, D., Aboagye, L. M., Akromah, R. & Dansi, A.** (2015) Agro-biodiversity and challenges of on-farm conservation: the case of plant genetic resources of neglected and underutilized crop species in Ghana. *Genet Resour Crop Evol.* 62, 7.

- Padulosi, S. & Hoeschle-Zeledon, I.** (2004) Underutilized plant species: What are they? *LEISA Mag*, **20**, 5–6.
- Sprent, J. I., Odee, D. W. & Dakora, F. D.** (2010) African legumes: a vital but underutilized resource. *Journal of Experimental Botany*, **61**, No. 5, pp. 1257-1265.
- Stefanie, E & Amend, T.** (2008) Development needs diversity: People, natural resources and International Cooperation – Contributions from the countries of the south. In: *Sustainability Has Many Faces*. (GTZ) Eschborn, Germany. ISBN 978-3-925064-49-4, Kasperek Verlag, Heidelberg, Germany.
- Smith, K. B.** (2002) Typologies, taxonomies, and the benefits of policy classification. *Policy Studies Journal* **30**, 379–395.
- World Food Programme** (2009) Comprehensive Food Security & Vulnerability Analysis, Ghana, *World Food Programme*, Rome, Italy.
- World Food Programme** (2012) Comprehensive Food Security & Vulnerability Analysis: Focus on Northern Ghana; *World Food Programme*, Rome, Italy.
- World Bank** (2007). Agriculture for Development: *World Development Report*. The World Bank: Washington, DC.