Journal of Scientific Research & Reports
7(4): 305-312, 2015; Article no.JSRR.2015.212
ISSN: 2320-0227

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Overcoming the Challenges of Implementing the 40% Cassava Bread Policy in Nigeria

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Author's contribution

This study was carried out by the author EIO alone.

Article Information

DOI: 10.9734/JSRR/2015/16706
Editor(s):
(1) Surapong Pinitglang, Department of Food Science and Technology, School of Science and Technology, University of the Thai Chamber of Commerce, Thailand.
Reviewers:
(1) Kolawole O. P., IITA -Ibadan, Nigeria.
(2) Prabhakara Ra Pamidighantam, CSIR Central Food Technological Research Institute, Resource Centre, Hyderabad, India.
Complete Peer review History: http://www.sciencedomain.org/review-history.php?iid=1128&id=22&aid=9313

Policy Article

Received 11th February 2015
Accepted 27th February 2015
Published 19th May 2015

ABSTRACT

Due to the combined effect of urbanization and changes in lifestyle, consumption of bread in Nigeria has increased significantly over the years. On 15 July 2012, the Federal Government of Nigeria (FGN) announced the cassava bread policy mandating flour mills and bakeries to include 40% cassava in bread. The policy was aimed at reducing the country's food import bills, enhance the utilization of local crops, create opportunities for business and employment and genuinely boost the rural sector. Nigeria had previously implemented 5 -10% cassava inclusion policies that failed. Hence, this paper identified some of the challenges of implementing the 40% cassava bread policy and suggested ways of overcoming some of the challenges including policy inconsistencies, legal framework, feedstock challenge, environmental and waste management challenges, pricing challenge, logistical challenge, QA/QC and acceptability challenge, challenge of bread improvers, technological and electricity challenges.

Keywords: Bread improvers; cassava bread policy; policy inconsistency; wheat.

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1. INTRODUCTION

On 15 July 2012, the Federal Government of Nigeria (FGN) announced the cassava bread policy mandating flour mills and bakeries to include 40% cassava in bread. The policy was aimed at reducing the country's food import bills, enhance the utilization of local crops, create opportunities for business and employment and genuinely boost the rural sector [1]. Nigeria currently imports about 4 million tonnes of wheat annually valued at ₦ 635 billion ($1 = ₦160). Form 1999 – 2010, Nigeria spent $ 6,792,934,000 for the importation of wheat [2]. Meanwhile, Nigeria is the largest cassava producing nation in the world. The country produced 45.7 million tonnes in 2006 [3] and 54.4 million tonnes in 2011 [2]. About 90% of the cassava produced in Nigeria is used for the production of traditionally fermented foods especially garri and fufu. With less than 10% of industrial application for the production of starch, chips, animal feed, glucose and fructose syrup and high quality cassava flour (HQCF). For instance, of the 34 million tonnes of cassava harvested in Nigeria in 2001, 84% was used for direct food production, while 16% was used industrially. The breakdown of industrial utilization showed that 10% was processed into chips for animal feeds, 5% into fructose syrup for the beverage industry while the remaining 1% was processed into HQCF, starch and hydrolysate used in the pharmaceutical industry [4,5]. Cassava alone contributes about 45% of agricultural GDP in Nigeria for food and domestic purposes, but low in industrial processing and utilization [6]. Details of cassava based industrialization can be found in Nweke et al. [7], UNDP/FGN [8], FGN [9] and Philip et al. [5]. Other potential uses of cassava include on production of liquid glucose or high fructose syrup for instant soup industry. Low fat Extruded foods from starch are gaining popularity as break-fast cereals and baby foods.

The 40% cassava inclusion in bread policy could create HQCF demand of 1.3 million tonnes annually requiring 4.8 – 5.2 million cassava tubers [1,2]. Implementation of the policy could stimulate demand for cassava, encourage the utilization and processing of cassava, eradicate glut and spur industrialization of the rural areas, while saving ₦ 254 billion in foreign exchange. Implementation of the policy could create about 1.4 million jobs in 4 years [10]. Notwithstanding the benefits of the 40% cassava policy, there are some challenges that must be overcome, such as policy inconsistency, legal and administrative challenges, feedstock challenges, technological challenges, pricing and logistical challenges. Elemo [2] listed some of the major challenges of the cassava bread to include pricing, technology, demand and supply and acceptability. This paper is focused on addressing these challenges for the sustainability and success of the policy.

2. THE NIGERIA CASSAVA BREAD POLICY AND INCENTIVES

The Federal Government of Nigeria is committed to the inclusion of 40% cassava into flour for the production of composite flour for making bread and other confectionaries. Due to interest by successive governments, the cassava bread policies have changed over the years along with regime change (Table 1).

Nigeria commenced the implementation of the 40% cassava bread policy with effect from 15 July 2012, though starting with 20%, which would be gradually increased to 40%. The policy provided for a changeover period of 18 months for flour miller and bakers to switch to composite flour. Some potential benefits of the policy includes savings of the Nigeria's foreign exchange earnings of ₦ 254 billion per annum, reduction in the severity of coeliac disease via gluten dilution, utilization of locally available crops, thus eliminating glut, creation of massive employment in both farm operation and flour milling leading to an improved source of income and livelihood [1,4,11]. Incentives of the cassava bread policy include;

- Waivers on the importation of bread improvers, cassava processing and flour milling equipment
- 12% tax reduction on cassava flour utilization for flour millers
- Provision of free starter packs of composite flours and bread improvers for 100 kg of bread for smallholder bakers
- Provision of 100 kg fertilizer at 50% discount and 15 bundles of improved cassava varieties for free to smallholders cassava farmers
- Additional 65% duty on wheat flour importation to the initial 35% duty (total duty 100%) and 15% duty to the initial 5% duty on wheat grain (total duty 20%)
- Creation of cassava bread development fund to be funded by the excess money realized from the importation of wheat, which shall be used for training, research, development and demonstration

- Training of about 400,000 master bakers in Nigeria
- Provision of loans to cassava processors for the purchase of equipment
- Ban on the importation of cassava flour

3. OVERCOMING THE CHALLENGE OF POLICY IMPLEMENTATION

Certain challenges could impede the implementation of the 40% cassava bread policy. If these challenges are not addressed, it could derail the policy as witnessed in previous cassava bread policies (Table 1). Hence, this subsection is focused on addressing potential challenges that could impede or derail the implementation of the 40% cassava bread policy.

3.1 Policy inconsistencies

The inclusion of cassava flour in bread policy is not new in Nigeria. Successive regimes have tinkered with the policy over the years (Table 1). For instance President Shehu Shagari (1979 – 1983), Ibrahim Babangida (1987-1995) and Olusegun Obasanjo (1999 – 2007) pursued 10% cassava policy, which was pronounced and abandoned at different times. Following lobbies from flour millers, President Umara Yar' Adua (2007 – 2010) reduced the proportion of cassava in the composite flour to 5%. Elemo [2] reported that the policy was reduced to 5% in 2005 and was temporarily abandoned in 2007. President Ibrahim Babangida completely banned wheat importation for 4 years (1987 – 1991). The present administration of Goodluck Jonathan is therefore ambitious in pursuing 40% inclusion, when the country was unable to sustain 5 – 10% cassava inclusion in bread. The next presidential election is slated for 2015, and owing to previous inconsistencies in the policy, many investors are doubtful of the sustainability of the current 40% cassava bread policy [6]. It is therefore, suggested that the FGN should implement the policy gradually by first achieving and sustaining 10% before implementing 40% within a period of 10 years.

3.2 Legal Framework

The 40% cassava bread policy and previous versions have limited legal backing. It is a policy that the executive arm of government is pursuing that has not been backed by the legislative arm or passed into law. At the federal house of representative, the cassava bread bill was ignorantly stepped down [20]; claiming cassava bread could exacerbate diabetes, when scientific evidence proved otherwise [2,21]. It is suggested that the executive should resubmit the cassava bread bill to the national house of assembly after addressing the concerns raised by the legislators. A legal backing could give investors confidence.

3.3 Feedstock Challenge

Implementation of the 40% cassava bread policy could create the demand for 1.3 million MT of HQCF, which would requires 5.2 million MT cassava tubers, which represent 9.6% of the 54.4 million MT produced in 2011. Recall that 90% of cassava produced in Nigeria is used for food, with only 10% for industrial applications for the production of ethanol, chips / animal feeds, starch, HQCF, sweeteners / syrups and hydrolysates. When HQCF takes 10% of the national cassava harvest, there could be shortfall of feedstocks for other industrial applications. To overcome this challenge, Nigeria need to increase agricultural productivity through increase in yield and area planted. To achieve increased productivity, there is the need to adopt modern farming practices such as the use of improved seedlings, agrochemicals and fertilizers.

3.4 Environmental and Waste Management Challenges

As previously mentioned, the implementation of the 40% cassava bread policy could create a demand of 1.2 million tonnes of high quality cassava flour (HQCF) [20], which translates to 4.8 – 5.2 million tonnes of cassava tubers/annum. Because the demand of HQCF could compete with other uses of cassava particularly in the production of garri and other fermented food, it was therefore suggested that the yield and area of cassava planted in the country should be increased. Increased area of cassava farm could lead to destruction of virgin forest and attendant biodiversity, which could also contribute to climate change as a result of deforestation. Agricultural intensification could result in the use of agrochemicals particularly fertilizer, herbicides, insecticides and other pesticides. The damaging effects of pesticides on the environment are well documented such as pollution of surface and groundwater, impacts on non-target organisms and high global warming potentials of agrochemicals.

Huge volumes and diversity of wastes are typically generated during cassava processing including solid, liquid and gaseous emissions.

Hence, processing increased quantities of cassava tuber for HQCF production could lead to increased production of cassava wastes. For instance, results have shown that for a given unit of raw cassava, garri yield is about 34% while generating 30%, 19.8% and 16.2% of solid, gaseous and liquid wastes respectively [22]. For a given unit of cassava, only 25% is converted to HQCF while the rest end up as wastes. Also, peelings alone accounted for about 10 – 22% of the raw cassava tuber [7, 22–24].

Cassava waste waters have high chemical oxygen demand (COD) in excess of 32,000 mg/L, high biochemical oxygen demand (BOD) (16,000 mg/L), suspended solids (15,000 mg/L), low pH (3.8 – 4.2) [22,25]. Cassava has high cyanide content in the range of 10.4-274 mg/L [26], but cassava peels have free cyanide content of about 140·90 ppm [27]. Depending on the species of cassava, about 40 – 70% of the total cyanide in cassava is expelled along with the wastewater [28], which have been reported to cause a large concentration of cyanide in the soil receiving garri processing effluents [29]. Adeyemo [26] and Arimoro et al. [30] reported the impacts of cassava effluent on the productivity and abundance of fish and benthic invertebrates. Cassava processing effluent has also been shown to cause death to plants and domestic animals including goat and sheep [28]. Cassava wastes are typically not treated in Nigeria, but free discharged into the environment. As a result, fermentation odours are common in major cassava processing communities in Nigeria. Foul odours could be perceived even at a distance of over 90m from the point of cassava effluent discharges [28]. It is therefore suggested that cassava wastes be well managed and converted to compost and biogas [31], bioethanol [24,32], bio-oil and other bio-products [33–35] using fermentation, pyrolysis and gasification technologies.

3.5 Pricing Challenge

Before the 10% cassava bread policy collapsed in 2007, the factory gate price of imported wheat flour was ₦ 50,000, while that of HQCF was ₦75,000. Hence, the flour mills found HQCF unattractive and technically inferior to wheat for bread making. Due to enforcement of the 40% cassava bread policy, the price of imported wheat has more than doubled increasing to ₦140,000, while that of HQCF has remained at ₦75,000. A recent assessment revealed that ideal factory selling price for cassava flour should be increased to ₦81,250 [2]. It is therefore recommended that HQCF showed be sold at ₦81,250 at the factory gate. Flour mills now have commercial incentives to use HQCF.

3.6 Logistical Challenge

Cassava is mostly cultivated and processed by SMEs in Nigeria. These SMEs are scattered around the country of nearly 1 million km^2. Cassava is bulky and highly perishable. To be able to process cassava into HQCF, it must be processed within 24 hours of harvest. Hence, lots of logistic are required to carry cassava tubers from farms to HQCF processing centers and from there to the flour millers and bulking centre. Typically, transportation cost could add about 25% to the cost of goods in Nigeria [4].

3.7 QA/QC and Acceptability Challenge

During the implementation of the 10% cassava bread policy, some quality challenges were noticed with the cassava flour processed by SMEs such as odour problems, discoloration, presence of sand, fermented flour, short product shelf life [8]. It is therefore recommended that cassava tubers should be processed within 24 hours of harvest. Also, there is a strong consumer preference for 100% wheat bread. Hence, lots of sensitization is needed for Nigerians to change their perception for them to accept cassava bread.

3.8 The Challenge of Bread Improver

At 10 – 20% cassava inclusion in bread will not require bread improvers, but at higher percentages, bread improvers will be required. Research has shown that when cassava tubers are steeped/pre-treated with 20% citric acid for 24 hours prior to milling, produced good quality bread even at 30% substitution. Generally, bread improvers used at higher cassava substitution can be grouped into emulsifiers, modified starches, chemical additives, hydrocolloids, lipids, enzymes, protein and amino acids (Table 2). Most of these bread improvers are not produced locally, but imported. It will be unreasonable for Nigeria to reduce the importation of wheat and start importation of improvers. It is therefore suggested that the bread industry in Nigeria should focus and use the improvers that can be developed locally such as modified starch, lipids, oil seeds and emulsifiers that can be produced from oil palm.

Table 1. Changes in cassava bread policy in Nigeria

Regime	Wheat policy/year	References
Shehu Shagari (1979 - 1983)	10% cassava bread	[1,4,11,12]
Ibrahim Babangida (1985-1993)	Ban on wheat importation (1987)for 4 years	[1,3,4,11,13,14]
Olusegun Obasanjo (1999 – 2007)	10% cassava inclusion in composite wheat flour	[1,4,11,15 – 18]
UmaruYar'Adua (2007 -2010)	5% cassava inclusion in composite wheat flour	[1,4,11,12]
Goodluck Jonathan (2010 – date)	40% cassava inclusion in bread making (starting with 20% and gradually increasing to 40%)	[1,4,11,19]

Table 2. Bread improvers required for high percentage cassava bread

Types	Examples
Enzymes	Amylase, lipase, hemicellulase, cellulase, glucanase, xylanases
Hydrocolloid and gums	Xanthan gum, guar gum, carrageenan, agar, carboxyl methyl cellulose
Emulsifiers	Glycerylmonostearate, sodium lauryl lactyylate, casinate, lecithin
Lipids	Margarine, vegetable oil, algal oil
Animal proteins	Egg, milk
Oil seeds / proteins	Soya, peanut, cowpea, Bambara groundnut
Chemicals	Acids (ascorbic acid, lactic and acetic acids), oxidizing agents (potassium bromate, calcium peroxide), reducing agents (sorbic acid, sodium dioxide, sodium metabisulphate)
Vitamins	Vitamin A, vitamin C, Vitamin B

Modified from Ohimain [4,36]

3.9 Technological Challenge

Most of the HQCF produced in Nigeria are processed by SME using flash dryers. Though, Nigeria has acquired the technology for the production of flash dryers, but the technology has not been well tested / proven. Operations of the locally fabricated flash dryers are problematic. Challenges often reported by operators include frequent break downs, lack of spare parts, fuel consumption inefficiency [1,4]. A recent survey shows that out of the 127 flash dryers assessed, 97 were non functional [36]. The previous cassava bread policy collapsed in 2007 mostly due to the inability of the locally fabricated flash dryers to meet the HQCF demand of the flour mills. This challenge can be overcome when the government fully installs the planned 18 HQCF plants imported from China.

3.10 Electricity Challenge

Electricity supply in Nigeria is insufficient, with only about 40% coverage, which excludes many rural areas where cassava processing plants are mostly located. Besides, electricity is also unstable and of poor quality. Hence, most manufacturers rely on self-generated electricity, which has greatly increased the cost of production. The government should therefore prioritize the extension of electricity to communities hosting cassava processing plants.

4. CONCLUSION

Due to the combined effect of urbanization and changes in lifestyle, consumption of bread in Nigeria has increased significantly over the years. Unfortunately, wheat is a temperate crop that will not perform well in tropical countries like Nigeria. Hence, the Nigerian government has over the years spent huge foreign exchange for the importation of wheat from western nations especially the USA. In order to overcome this challenge, the country released and implemented 40%cassava inclusion in bread policy. However, several challenges need to be overcome for the policy not to fail like previous attempts. Hence, this paper suggested ways of overcoming some of the challenges of implementing the 40% cassava in Nigeria including policy

inconsistencies, legal framework, feedstock challenge, environmental and waste management challenges, pricing challenge, logistical challenge, QA/QC and acceptability challenge, challenge of bread improvers, technological and electricity challenges.

ACKNOWLEDGEMENTS

The author wishes to thank Sylvester C. Izah of the Niger Delta University for the editorial work.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sciencedomain.org/review-history.php?iid=1128&id=22&aid=9313