

A Reconsideration of the Small--Scale Farmers' Concerns in Agricultural Biotechnology Communications in Nigeria

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Abstract

There have been several arguments that Nigeria's agricultural sector in the last 30 years is developing at ineffective and slow progress to feed demand of the increasing population. Agricultural biotechnology is being promoted to solve this challenge. But some practical evidences of agricultural biotechnology elsewhere exist in many unresolved conflicting outcomes. It remains questionable whether Genetically Modified Crop, one of the applications of agricultural biotechnology, can really sustain small-scale farming in Nigeria amidst the public demand for health and environmental friendly agricultural practices. This paper intends to establish a technical position for a critical consideration of the small-scale farmers' concerns in agricultural biotechnology and its subsequent communication in Nigeria. This study is girded by Ben Agger's critical theory perspective which approaches critical theory from the postmodernist theory and cultural studies. The study used the mixed research method for data collection. Two hundred and ninety-four (294) copies of the questionnaire were administered while six (6) Key Informant Interviews (KIIs) were conducted. Data were collected from 263 purposively selected academic and technical staff members of three National Agricultural Research Institutes (NARIs). This study found out that agricultural research and communication experts are aware of the critical position of the small-scale farmers in the food production system in Nigeria. Furthermore, agricultural research experts in Nigeria believed that small scale farmers' concerns should be critically factored into agricultural biotechnology communication. Thus, it is recommended that the NARIs should develop a strategic communication framework to integrate small-scale farmers' concerns into agricultural biotechnology communication in Nigeria.

Key words: agriculture, biotechnology, communication, farmers and concerns.

Introduction and Conceptual Consideration

There have been several arguments that Nigeria's agriculture develops at ineffective and slow progress. Meanwhile, there is little consensus on the actual cause of the unprogressive development of the agricultural sector. However, many reasons, including the unfavourable economic exchange system against the Third World and the Newly-Industrialised Countries (NICs); the unabated influence of the Western multinationals and the harshness of the world economic recession, have been articulated as some of the causes of retrogressive agricultural development in Nigeria (Lado, 1998, p.165). Some other development experts have claimed that Nigeria cannot develop at the expected speed and proportion while its agricultural activities still depends largely on crude implements compared to those of the advanced nations where high technology drives the agricultural sector. These arguments notwithstanding, if rapid development will take place in Nigeria's agriculture, a change in its agricultural technology direction is significant so as to avoid a simultaneous damage of the natural resources and indigenous knowledge of livelihood.

The view that African knowledge is of little value to development experts and agricultural technology advancement, because it is 'primitive', is partial. There are evidences that indigenous technical knowledge is relevant and significant to the sustainable development of African agriculture. In Nigeria, Olukosi (1976, p.109) have demonstrated how intercropping for instance, was a trusted and proven agricultural technique but had been actively discouraged by extension workers as inefficient and wasteful. Critical examination of the practice has shown that under certain environmental conditions, it is the most ecologically and economically efficient method which reduces risk through crop diversification (Lado, 1998, p.166). Some retrospective analyses, in recent years, have shown that the debates on the challenges of Nigeria's agriculture have not shifted considerably from the condemnation of indigenous knowledge and the ineffectiveness of traditional agricultural practices.

Two great technological revolutions, that is, the Green Revolution and the Gene Advancement have influenced the world agricultural system and practices (Azadi et al. 2015, p.195). While the Green Revolution applied the science to increase agricultural growth through breeding techniques to produce high-yield varieties, the Gene revolution is propagating biotechnology, especially the genetic alteration of crop, plant and animal DNAs to increase agricultural produce in order to combat food insecurity and hunger among the increasing human population (Fuglie, & Nin-Pratt, 2012, p.16).

The gene revolution has continued to gain attention and attract many unresolved arguments especially in the utilization of “Genetically Modified Organisms or Crops” to fast-track the production time and also improve the nutritional composition of crop and animal produce. Some Genetically Modified crops have been speculated to possess traits that could help them tolerate pests and drought, thus, making it possible and more profitable for small-scale farmers and farmers living in countries and regions where the climate change effects are expected to be more unfavourable to plant and animal production. Although the GM technology is being promoted as a significant catalyst to the overall sustainability of agricultural food production systems globally (Speiser et al. 2013, p. 23), some empirical evidences have alerted countries in the Sub-Sahara Africa to many unresolved concerns about the sustainability of agricultural biotechnology. In the Sub-Sahara Africa, the small-scale farmers are technically in the centre of the debates for or against agricultural biotechnology. These farmers are critical to the overall design of agricultural technologies and the communication to drive their adoption. Their concerns are expected to be captured in all the processes of agricultural biotechnology development and dissemination. The Nigerian experience of agricultural biotechnology communication leaves much to be desired. While it can be argued that the small-scale farmers understand that planting GM crops will attract foreign investment through international trading of surplus produce, it remains questionable, whether the small-scale farmers, who constitute almost 80% of the rural population in Nigeria trust that their concerns (health and environmental) are factored into agricultural biotechnology. Of course, these farmers deserve the most comprehensive information about this technology in order to make the right choices.

Objective

This paper intends to establish a technical position for the consideration of small scale farmers’ concerns in agricultural biotechnology development and its communication in Nigeria.

Literature Review

Ninety-two percent of the food requirement of the world is accounted for by crop production (Borlaug 2000, p.4). For instance, the increase in crop production during the Green Revolution radically affected food supply to the world’s poor, but there are also evidences that such revolution has killed some indigenous knowledge of environmental survival.

The latter impact of the Green Revolution has been argued to have increased hunger and poverty among the rural dwellers, mostly in the Sub-Sahara Africa. In Nigeria, the government is collaborating with international development policy makers, philanthropists and scientists to set up programmes to impact national and global hunger and poverty. In most cases, the intention of many of the development collaborations is to find a cure for some of the most devastating diseases plaguing humanity, especially in the poorer regions due to food insecurity. Agricultural development through advanced practices and technology is attractive to Nigerian government. Accordingly, agriculture has been argued “to play a key role in the economic development of less developed countries” (Vroom, 2008, p.145). Nigeria considers agricultural development in its economic diversification plans. It has equally supported at international discourses that the advancement of Nigeria’s agriculture through modern technology will help the country achieve many of the Sustainable Development Goals which include food security and poverty eradication.

It is therefore not surprising that Nigeria is one of the African countries that have plans for agricultural biotechnology adoption to produce enough food and improve the livelihood of its people.

It is important to note that agricultural biotechnology visions of an organised global agricultural modernization is not new; though some of its applications have expanded to include gene alteration and modification for specific results. Agricultural biotechnology goes back in time at least a couple of decades to the first ideas of the Green Revolution which introduced high yielding varieties of several cereals. The revolution was majorly about productivity increases and growth of incomes of small-scale farmers in less developed countries. However, the precise benefits of the revolution are still grounds for debates even as Africa is again one of the ‘destinations’ of agricultural biotechnology with genetically modified crops from private research organizations from advanced nations.

Various types of questions could be raised in response to how far and fair this pro-poor agricultural development system to small-scale farmers concerns was. About 450–500 million smallholder farms are said to operate up to 2 ha of land under very difficult conditions (Hazell, Poulton, Wiggins & Dorward (2007, p.12) around the world. A high percentage of these small- scale farmers are found in Asia, followed by the number of small scale farmers in Africa.

Historically, smallholder farmers’ contribution to world food production will continue to increase especially in Asia and the Sub-Saharan African nations, for some years to come

(Eastwood, Lipton & Newell (2010, p.43). So it is appropriate and necessary to consider these farmers' concerns when agricultural biotechnology applications are developed and communicated.

Anthony and Ferroni (2012) reported that in "2010, a record 148 million hectares of land were planted across the globe with biotech crops (p.281). Again, James (2010) said that "about 15.4 million farmers worldwide have been reported to have planted insect or herbicide resistant biotech crops in 2010" (p.14). The author went further to explain that 14.4 million of these small- scale farmers were from developing countries. It is possible that this trend of adoption will continue, and may outpace economic growth in industrialized countries; yet, many controversies over some health and environmental concerns in agricultural biotechnology have not been settled in the context of the peculiarities of Africa. There exist some divided opinions among the diverse communities in Nigeria over the safety of genetically modified crops for food.

Meanwhile, the Nigerian government's position on the appropriateness of agricultural biotechnology applications for the development of the nation's agricultural system is no more passive. Nigeria is among the several nations that have ratified and are putting in place the required facilities for the activation of the Biosafety Protocol as a precursor to the mass adoption of agricultural biotechnology. To the international community, the establishment of National Biosafety Frameworks (NBFs) by African countries (including Nigeria) was a worthy sign of progress in the bid for Africans to embrace agricultural biotechnology (Sinebo & Watanabe, 2005, p.187). The complexities in the value chain of technology transfer include some considerations for each country's realities. In Nigeria, small-scale farmers face economic difficulties that make it almost impossible for them to procure new technology without government interventions. It is therefore plausible to affirm that the simple purchase of transgenic seeds by a small-scale farmer in Nigeria constitutes a sustainable biotechnology transfer or agricultural development. The economic ability and social confidence to continuously procure and use an adopted technology is a basement for sustainable agricultural development. Therefore, it is important that agricultural biotechnology capabilities and acquisition are well established within indigenous knowledge. It will then be logical to argue that the existence and sustenance of many related activities promoting the total value of goods and services produced by farmers to improve human welfare, quality of life, and social well-being is sustainable agricultural development.

Agricultural development via biotechnology cannot be said to be sustainable, where, though the technology ultimately reduces food insecurity by producing more than enough crops or livestock but there are concerns that these produce may trigger some irreversible environmental and health challenges.

Consequently, sustainable agricultural biotechnology must not only provide the small-scale farmers with enough food to eat, but would also provide them with reasonable income to take care of household needs. These notwithstanding, the technology will equally improve the health and the farming environment. According to USAID (2009), “sustainable agriculture is an integrated system of plant and animal production practices that will, over the long term, not only satisfy food, feed, and fiber needs but also enhance environmental and human health” (p.10). It is however important to state here that sustainable agriculture may not necessarily involve the cultivation of genetically modified crops. Land ruin, limited water availability, dwindling biodiversity, declining agriculture genetic diversity, and climate change are the five critical challenges that sustainable agriculture must resolve (ANRT, 2004, p.6). The impacts of sustainable agricultural practices will greatly be felt among the rural population where political and socioeconomic development is still low. For example, an integrated agricultural practices will help the small-scale farmers reduce the use of chemical inputs, enable health rural communities while promoting social values (Pretty & Hine, 2001, p.11). Logically, agricultural biotechnology, irrespective of its potential to produce more yield, will not automatically be categorized as a sustainable technology if it cannot enhance human nutritional needs and still preserve environmental quality and the health of the present and future generations.

The debate for the adoption of agricultural biotechnology to improve farming activities in Nigeria should focus on the appropriateness of the technology to different climate conditions, in geographic, socio-economic and cultural contexts. For illustration, it is critically important that an improved or pest resistant seed to be introduced to the small-scale farmers in Nigeria will not poison some insects which are also local delicacies. Harvesting and consuming these local delicacies (such as grasshoppers) after planting the improved seed may be counter-productive. These concerns are clear and generally straightforward but are not often considered while new technologies are developed especially by foreign institutions. These concerns have though formed the classic arguments for research institutes to critically involve indigenous communities and users in the production and final communications of new agricultural technologies.

While small- scale farmers are often considered illiterates who do not possess refined ideas about modern “agricultural technology”, their natural affiliation to indigenous knowledge should not be taken for granted in the agricultural development plans of Nigeria. Their low consideration for modern agricultural technology should not be a ticket to heap on them what they do not desire by external agents. Indigenous knowledge and perspectives must be taken seriously, if truly, agricultural biotechnology is meant to help the farmers upscale their practices and live a better life. In modern development approaches, the small scale-farmers’ concerns are usually critically considered, using the participatory research and communication principles.

There are academic discussions on the need to transform the traditional extension system of the ‘Training and Visit’, to a more interactive, dialogical and participatory approach (Vroom, 2008, p.144). A frequently cited work in this regard is the 1996 Brian Wynne’s study of Cumbrian sheep farmers. In that study, Wynne involved the small-scale farmers in the decision making process of technology design and technical framework development through well facilitated dialogical discussions. The critical argument of Wynne’s research was that scientific insights might not be more useful to solving certain problems than other types of views (including indigenous knowledge and skills). Thus, the existing tension between scientific and indigenous knowledge is often exhibited through the debates to ‘modernize’ Nigerian agriculture, and the efforts to ‘conserve’ local knowledge. This tension has provided an interesting locus to why agricultural biotechnology communication in Nigeria is reconstructed to capture small-scale farmers’ concerns. The big questions before this study are how and whether the small-scale farmers’ concerns are integrated into agricultural biotechnology development and the dissemination programmes as part of the mandates of the National Agricultural Research Institutes (NARIs)?

Theoretical Framework

This paper is guided by Ben Agger’s critical theory. Agger had approached critical theory by investigating the postmodernist theory, the Frankfurt School of thought, the feminist theory and cultural studies in general. According to Agger (2006, p.10) “critical theory emanated as a tradition of critical thinking as an emancipatory social philosophy”. To Agger, critical theory is a unification of thoughts as well as the analyses and critique of types of reason and rationality which started in the middle of the 19th century. Accordingly, the starting point for critical theory has always been in the Carl Marx’s theory of the law of value. From another

perspective, critical theory is a critique of the political economy as demonstrated in its capability and limitation in the explanation of the value-form in relation to its social and ideological consequences (Schweppenhäuser & Haug 2012, p.197). Generally speaking, critical theory explains why man should not be a manipulable subject in the production process of the society. The goal of critical theory as used in this paper is to argue for the transformation of the society so that man's actions no longer flow from a mechanism but from his own decision. Analogically, the Nigerian small- scale farmers will not be controlled by agricultural biotechnology but they can use the technology if they are convinced it could redefine their agricultural practices with less risks.

Research Method

This study used the mixed research method for data collection and analysis. Consequently, the study integrated the quantitative and qualitative information at all levels. Two hundred and ninety-four (294) copies of the questionnaire were administered while six (6) Key Informant Interviews (KIIs) were conducted. In this mixed research method, triangulation constitutes the second phase of data analysis in order to estimate the error inherent in quantitative information collected through questionnaire. The 294 copies of the questionnaire were distributed to purposively selected academic and technical staff members of three National Agricultural Research Institutes (NARIs). The respondents were purposively selected from the total workforce of the research institutes based on their job duties which involve agricultural research, report writing, and agricultural communication (extension). The respondents for the KIIs were purposively selected management personnel with not less than ten years' cognate experience with the institutes. In total, three hundred (300) respondents were purposively selected but only two hundred and sixty-three (263) actually participated.

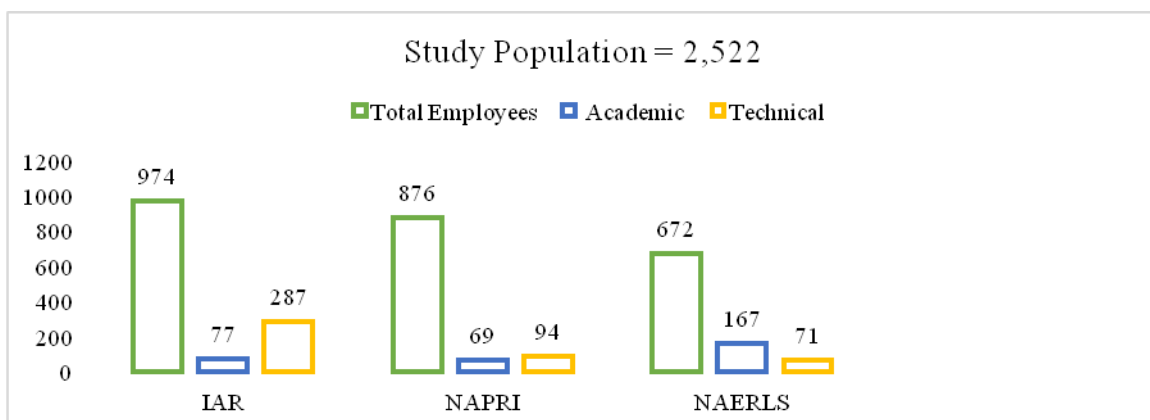


Figure 1: Population size of the study showing total employees as well as the academic and technical employees for each NARI.

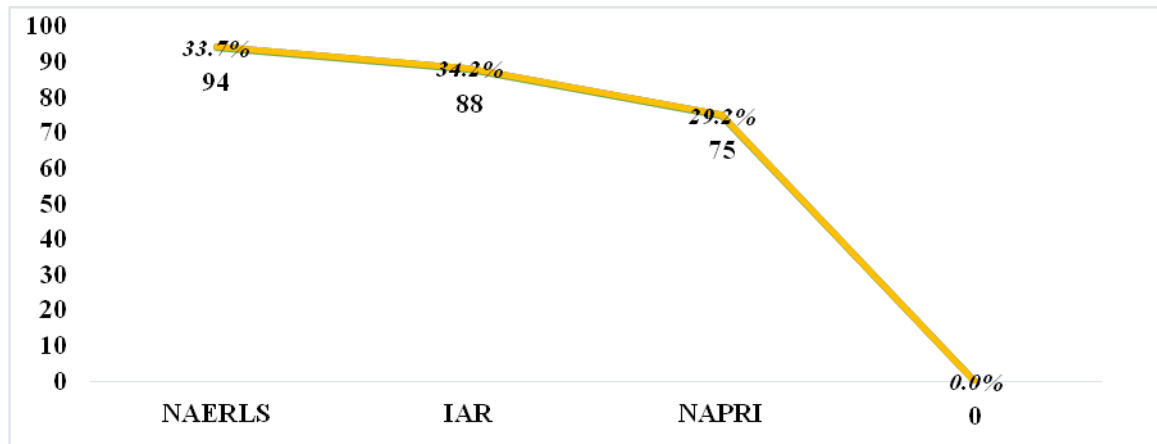


Figure 2: Number and percentage of actual respondents for each research institute

Discussions

Figure 3 below shows that most of the respondents, that is 67.3% (173 people) have high knowledge of the importance and relevance of the small-scale farmers in agricultural biotechnology communication process in Nigeria. About 21.4%, that is, 55 people, have average knowledge while 8.9% (23 respondents) have low knowledge of the relevance of small scale farmers in agricultural biotechnology communication process in Nigeria. This result shows that the respondents do not have same degree of knowledge of the relevance of small scale farmers in agricultural biotechnology communication in Nigeria but at the same time pointed out that a good number of the respondents have high knowledge of the small-scale farmers' relevance in Nigeria's agriculture. Most of the respondents with average and low knowledge of the influence of the small-scale farmers in agricultural biotechnology communication in Nigeria have not spent more than 10 years in the service of their institutions. Hence, it could be argued that additional years of cognate experience may improve the knowledge of this category of respondents about the relevance of small-scale farmers in technology adoption in Nigeria.

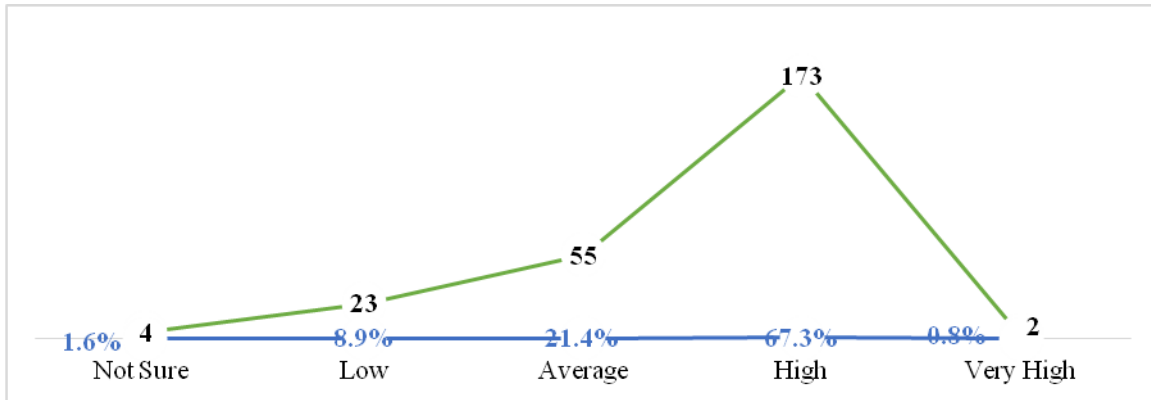


Figure 3: Knowledge of the relevance of small-scale farmers in agricultural biotechnology communication process in Nigeria

Furthermore, the high knowledge of the relevance of small scale farmers among the respondents means they were aware of these farmers concerns about agricultural biotechnology. The results from the questionnaire in Figure 3 were corroborated by two executive directors of the selected NARIs. According to one of them:

Generally, our major focus is to empower the small-scale farmers. Though our mandates are not restricted to them alone, but we pay special attention to small-scale farming. Our technologies, generally are geared towards utilization by small-scale farmers. This is because these farmers form the majority of our farming population. You realise that agriculture provides about 60% of employment in Nigeria. And of this 60%, close to 70% of the production, is made up of small -scale farmers (M. Faguji - Interview -24th March, 2020).

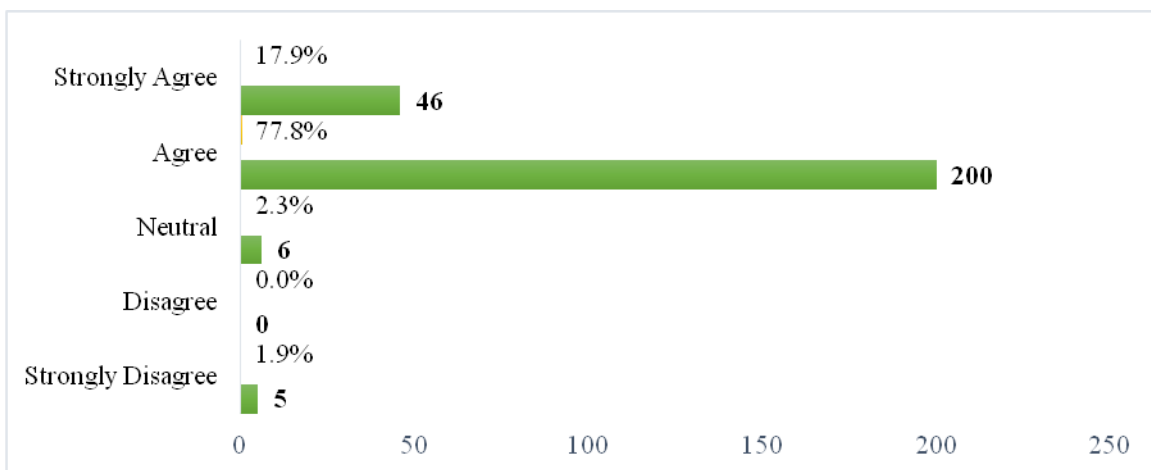


Figure 4: Small-scale farmers' concerns should be critically integrated into agricultural biotechnology communication content in Nigeria

From Figure 4, most of the respondents, that is 77.8% (200 people) agree that the small-scale farmers' concerns should form part of agricultural biotechnology communication in Nigeria. About 5 respondents which is 1.9% strongly disagree that small-scale farmers'

concern should be part of agricultural biotechnology communication in Nigeria. It was assumed before the data collection for this study that because the small-scale farmers constitute the highest number of farmers in Nigeria, and besides, they hold a strategic position in agricultural technology transfer and adoption, it will be important to put their concerns into critical perspective in agricultural biotechnology communications content development. This assumption was supported by all the principal officers that were interviewed. Furthermore, majority of the respondents agreed that though the NARIs use the extension communication approach as advocacy to convince small-scale farmers to adopt agricultural biotechnology, this communication approach can be improved to accommodate the dissemination of both the potential and concerns about the technology. In the views of the Director of NAERLS during a KII session:

...we will be using the advocacy communication approach for the farmers to understand what we are bringing to them before accepting it. For instance, we will let our farmers know that there are improved versions of the cowpea which are not necessarily GM, and the one that is GM product with the information that these are the advantages and disadvantages of both of them so that our farmers can have a choice (M.K. Othman – Interview-26th March, 2020).

From these results, it can be logically submitted that experts in agricultural research and communication believe that small-scale farmers' concerns about agricultural biotechnology should be considered while developing the content of their communications. The underlying factor for this understanding is that these farmers are critically important in the food production system of Nigeria. Again, it is necessary that these farmers know exactly what they are adopting so that they can make less risky choices by making sure that the technologies they adopt are healthy and environmentally sustainable.

Findings and Recommendations

This study found out the following:

- i. There is the need for the NARIs to improve on their mandates which focus the small-scale farmers' agricultural development needs through research, technology development and appropriate communication of agricultural information.
- ii. The small-scale farmers are critical in the food production system and agricultural biotechnology adoption plans in Nigeria.
- iii. The small-scale farmers have concerns especially with respect to the role of indigenous knowledge in the discussion of possible health and environmental challenges of agricultural biotechnology in Nigeria.
- iv. These farmers' concerns should be critically considered in agricultural biotechnology communications by National Agricultural Research Institutes in Nigeria.

Consequent upon the listed findings, the study recommends the following set of actions.

- i. The National Agricultural Research Institutes (NARIs) should develop a more participatory communication and research system to identify farmers' concerns about agricultural biotechnology.
- ii. The NARIs should develop a strategic communication framework to help integrate small-scale farmers' concerns into agricultural biotechnology communication.

Conclusion

Nigeria is one of the developing nations that have intensified national efforts for the effective implementation of the United Nations' development agenda through some sustainable economic diversification plans. Despite some demonstrable progress in agricultural development interventions to save the country's moribund economy, there are still evidences of hurdles, though surmountable, for Nigeria to achieve most of the United Nations' Sustainable Development Goals with special interest on food security, safe water, healthy people, zero poverty indices and productive population. These challenges require urgent strategic communication approach that will equip the small-scale farmers with adequate and context relevant information for the appropriate adoption of advanced technologies such as the agricultural biotechnology.

In this study, a set of academic dispositions towards agriculture, national development and technology adoption for sustainable development was first established. Thereafter, the existing situation of how agricultural innovations are communicated to small scale farmers in Nigeria are presented. Through a critical analysis of the 'existing situation', it was argued that Nigerian small scale farmers deserve to know more, including the possible effects of agricultural biotechnology. The current farmers' knowledge of only the potential of agricultural biotechnology to increase and improve productivity is fragile. Nigeria cannot afford to mass adopt agricultural biotechnology when there are still many unresolved 'controversies' about health and environmental implications of the technology. As it is, Nigeria must guard against the repetition of some of the past agricultural development interventions turmoil which were predicated to poor or inappropriate information or communication approaches to technology dissemination.

The continuous reliance on a non-participatory extension system by the NARIs to push agricultural biotechnology to small-scale farmers in Nigeria will undermine the efforts of the small-scale farmers to fully buy into agricultural biotechnology based on trust. Secondly, it is argued in this study that the prevailing high food prices could expose small-scale farmers' households to persistent manipulations from internal or external development agencies. It is

understood in this study that national progress so far towards agricultural developmental goals could easily be disastrous if small-scale farmers' concerns and indigenous knowledge do not find workable place in the advocacy for agricultural biotechnology in Nigeria. Thirdly, Nigeria and many other developing nations are being confronted by increasing climate change threats which in future are expected to make farming and livestock production very difficult for small-scale farmers who mostly on rain fed agricultural activities. The changing pattern of rain fall and duration may require that small-scale farmers in Nigeria merge their traditional skills with the adoptable biotechnology applications to surmount food security challenges related to climate change.

The identified challenges above should be timely and adequately addressed in alignment with indigenous knowledge by the Nigerian government; or else the advocacies about the potential of agricultural biotechnology to double small-scale farmers' productivity and improve people's nutritional intakes may become a development myth. This may equally mean that Nigeria's efforts to diversify its economy through advanced agriculture may suffer a big setback when some realities about the health and environmental impacts of agricultural biotechnology begin to emerge in the nearest future. Therefore, it is imperative that small-scale farmers' concerns are critically considered in agricultural biotechnology communications by the NARIs. This is so as the advocacy for the adoption of agricultural biotechnology, especially the GM crops, continues to be intensified through collaborative communications by international agricultural biotechnology research agents, the National Agricultural Research Institutes, the National Biotechnology Development Agency (NABDA), some NGOs, the public and the private media organizations. This is a pointer to the need for urgent inclusive communication strategy to improve public position for a trusted sustainable development agenda which is far greater than just an accelerated adoption of genetically modified crops to satisfy the immediate objectives of some national food security plans.

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