



AGRICULTURE FOR IMPROVED NUTRITION OF WOMEN AND CHILDREN IN NIGERIA

THE ROLE OF RESEARCH

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Research is an essential input for growth and development. In the agricultural and nutrition sectors, scientifically sound and timely research data is required at all stages of the continuum of policy and program formulation, implementation and evaluation. The first two briefs in this series have examined key nutritional and agricultural indices in Nigeria, explored the relationship between agriculture and nutrition, and discussed key policy considerations affecting the formulation and implementation of agriculture and nutrition interventions in Nigeria. This last brief will examine the role of research in improving linkages between the agricultural and nutrition sectors for improved nutrition of women and children in Nigeria.

The Challenges of Agricultural Research in Nigeria

In a bid to achieve the goal of improving agricultural productivity and food security for its citizenry, Nigeria has since the early 1960s established numerous agricultural research institutes across the country. Some of the most notable ones include the Institute for Agricultural Research, Samaru (under the Ahmadu Bello University); the Lake Chad Basin Agricultural Research Institute, Maiduguri; the National Cereals Research Institute, Badeggi; the Institute for Agricultural Research and Training, Ibadan; the National Root Crops Research Institute, Umudike; the Cocoa Research Institute of Nigeria, Onigambari; the Rubber Research Institute of Nigeria, Iyanomo; the Nigerian Institute for Oil Palm Research, Benin City; the National Animal Production Research Institute, Shika; the National Veterinary Research Institute, Vom; the National Institute for Fresh Water Fisheries Research, New Bussa; the Nigerian Stored Products Research Institute, Ilorin; and the Centre for Genetic Research and Biotechnology, Ibadan. In addition to these, there are

numerous Colleges of Agriculture spread across the country, and most Nigerian universities also have faculties of agriculture. Nigeria also plays host to two international institutes, the International Institute of Tropical Agriculture (IITA) and the International Livestock Centre for Africa (ILCA), both in Ibadan.

This long list of research institutes bears testimony to the recognition on the part of the Nigerian government of the importance of research in the agricultural sector. However, the agricultural research sector is still plagued by challenges. The federal agricultural research budget in Nigeria declined sharply between 1990 and 1999 both in terms of quantum of allocation and in release of budgeted funds, which limited research output in the sector.¹ Insufficient investment in the numerous research institutes has led to poor staffing, obsolete and poorly maintained infrastructure, overreliance on foreign donor financing, and limited participation from the private sector.² Another challenge has been the prevailing poor documentation and limited data storage and retrieval capacity in Nigeria. Several research projects coming out of these agricultural research institutions have made significant policy recommendations, but the bulk of the



¹Voh, J. P. (1999) "Recent and prospective changes in National Research Systems in Nigeria as an effect of globalisation". Paper prepared for a Globalization Workshop organized by ISNAR, The Hague, The Netherlands.

²Idachaba, FS (1997). Instability of National Agricultural Research Systems in Sub-Saharan Africa: Lessons from Nigeria. ISNAR Research Report No.13. The Hague: International Service for National Agricultural Research.





results, findings and recommendations are yet to be synthesized into cohesive and ordered reference material. Policy makers, agriculturists and other stakeholders often lack sufficient time and resources to gather this scattered research evidence, with the result that many agricultural policies, programmes and projects are not sufficiently evidence-based.³ The third challenge is the absence of an effective agricultural extension system to translate research findings into practical techniques that can be applied by farmers.

Agriculture-Nutrition Research Initiatives

In spite of the challenges enumerated, the agricultural research institutes in Nigeria have the potential to make significant positive impact on nutritional indices in women and children. Promising practices continue to emerge in the field of agricultural research for nutrition which can be adopted and promoted among local farmers and consumers. Some initiatives that have been developed include selective breeding of nutrient rich crop and animal strains, bio-fortification of commonly consumed foods, and enhancement of nutrient availability through optimum preservation, processing and preparation methods. Bio-fortification is of special interest because it is a highly cost effective one-time investment. Bio-fortification does not reduce crop yield, and once the nutrients are incorporated through breeding,

there is no further additional cost and the nutritionally improved varieties can continue to be grown and consumed year after year. There is also no behavioural change programming required in the community because bio-fortification typically does not change the appearance, taste, texture, or cooking quality of foods. As an example, research in Mexico has shown that the protein content in maize can be increased from 10.9% to 26.6% by selective breeding of successive generations of high protein strains, and such varieties have already been released in Nigeria by the Institute for Agricultural Research (IAR), Zaria.⁴ Researchers at the International Institute for Tropical Agriculture (IITA) in Ibadan have been collaborating with other international research institutes in the Harvest Plus Maize Alliance to evaluate the genetic variability of iron and zinc concentrations in maize kernels. Preliminary results indicate that selective breeding combined with genetic modifications could be pursued to increase the kernel concentrations of these important micronutrients in maize varieties.⁵ This could greatly aid in improving the nutritional quality of this important staple for the resource-poor people of Nigeria. Breeding efforts towards bio-fortifying vitamin A in the high yielding varieties of staple crops such as maize, rice, sorghum, wheat, cassava, sweet potato, beans are being vigorously pursued across research centres all over the world, and vitamin A-rich



3 Okoye, C.U. (2004) Review of agricultural research recommendations and their policy implications in Nigeria 1993-2003. A Brief prepared for the Nigerian Economic Support Group (NESG), Lagos, Nigeria.
4 Ado, S.G, Usman, I.S. and Abdullahi, U.S (2007) Recent development in maize research at Institute for Agricultural Research, Samaru, Nigeria. African Crop Science Conference Proceedings Vol. 8. pp. 1871-1874
5 Oikeh, S. O, Menkir, A, Maziya-Dixon, B, Welch, M, and. Glahn R. P. (2003). Assessment of concentrations of iron and zinc and bioavailable iron in grains of early-maturing tropical maize varieties. Journal of Agricultural Food Chemistry 51: 36883694.





varieties of sweet potato have already been introduced in Nigeria by the National Root Crop Research Institute (NRCRI), Umudike as part of the Sweet potato Action for Security and Health in Africa Project (SASHA).⁶

Research into improved processes for crop preservation, processing and preparation can also make significant impact on nutritional status in Nigeria. Production of food staples in the tropics is highly seasonal, yet major in-season losses occur due to high temperatures, excessive or insufficient moisture, heavy disease and insect pressure, and poor post-harvest handling. The annual wastage due to harvest time glut can be prevented through processing and storage. Technologies that have been developed include improved storage silos for grains, machines for the manufacture of "garri" (dried roasted cassava); flash dryers that can be used to produce powdered "ogi" (cornflour), yam and plantain flour; and improved fish smoking kilns for the production of dried fish. Research into improved methods for the processing and preservation of fruits and vegetables such as tomato, peppers, okra, melons, citrus, and mango and banana into pastes, powders and juices are also in progress.⁷

Agriculture-Nutrition Systems Research

One area of research that is often neglected by agricultural and nutritional scientists is systems research. Systems research applies social science and population-based methodologies to examine behaviours and processes influencing food production, processing, preservation, preparation and consumption in order to identify key areas for intervention and policy input. It involves a careful analysis of the



manner in which all of the human, biological and physical elements in the food chain interact with one another and with the physical and socio-economic environment.

Examples of systems research agenda include examining the effect of gender-sensitive agricultural

programming on nutritional status of women and children; studying factors which affect the adoption of new techniques, crops or food processing technologies by farmers and consumers; analyzing the effectiveness of different models of extension services; and investigating the effect of various financial and economic incentives on food production, distribution and processing systems. Although not perceived as core scientific research, gathering and analyzing data on such operational issues is fundamental to reaching the goals of linking agriculture and nutrition for improved nutritional outcomes.

Climate Change and Agriculture

Another area for research exploration is the impact of climate change on food production and the development of interventions to mitigate its negative effects. Climate change brings changes in rainfall, temperature, relative humidity, sunshine and solar radiation, all of which affect agricultural productivity. Small rain-fed farms may fail if the rains do not arrive on time. Farmers are uncertain when to plant different crops because of changes in climate patterns. Subsistence food crops such as maize, beans, yams, cassava, rice and millet often appear in the market much later than expected due to late rains, and this can have adverse effects on the health of women and children. Conversely, unusually heavy rainfall causes

⁶ CGIAR (2009) Building the evidence base for sweet potato marketing in Nigeria. Brief available online at http://www.cipotato.org/research/partnerships-and-special-projects/sasha-program/documents/08building_evidence_base.pdf

⁷ Okoye, C.U. (2004) Review of agricultural research recommendations and their policy implications in Nigeria 1993-2003. A Brief prepared for the Nigerian Economic Support Group (NESG), Lagos, Nigeria.





severe flooding and leaching of soil nutrients, leading to crop failures. Scientists need to study the changing climate patterns and make recommendations on how the agricultural sector can mitigate their effects. Potential mitigating technologies include soil conservation techniques such as crop rotation; development and cultivation of more climate-resistant crop variants; irrigation schemes; and the effective use of climate data and forecasts and farmer early warning systems.⁸

Disseminating Research Findings

The limited use of information technology in the management of research data in Nigeria poses a challenge to utilization of research recommendations for policy formulation and program planning and evaluation. Only a limited fraction of university research translates into actual practice by farmers.⁹ Research results are typically disseminated through publications, workshops and seminars which are targeted at fellow academics. Extension workers that are the link between research and the farmers are rarely up to date with recent research findings. There is a need to create a platform for university departments of agriculture and agricultural research institutes to provide periodic updates to agricultural extension workers in state and local agricultural departments. A mechanism must also be in place by which research findings are made available for use as a basis for policy formulation. This can be achieved by following a participatory policy development process that allows for inclusion of stakeholders from the research world during policy drafting. There is also a need to harness available technology to develop library networks that link agricultural research institutes and universities through an electronic communication grid. This will facilitate sharing of information across institutions, resulting in better use of research data, reduction of the cost of information acquisition, reduction in the duplication of

research efforts and greater productivity by agricultural research scientists.¹⁰

Strengthening Research Synergies

Much has been said about the application of agricultural research for improved nutrition. It is important to note that for agricultural research to contribute to improved nutrition, the agricultural research agenda must be collaboratively set. It is the role of the public health nutrition sector to identify prevalent nutritional deficiencies and work with a multi-disciplinary team involving agriculturists, food technologists, nutritional epidemiologists, social scientists and public health personnel to design research proposals that address nutritional issues by improving the production of and access to nutritious food. This requires a commitment by professionals in all the scientific fields involved to continuously strengthen the linkages between agriculture and nutrition.

Conclusion

Research is essential to policy formulation and the design of field interventions to link agriculture and nutrition. Key areas of research activities include enhancement of nutritional content of foods through selective breeding, bio-fortification and modified processing and preparation techniques, improved storage and preservation of foods, systems research and mitigation of the effects of climate change. Functional mechanisms for effective dissemination and utilization of research need to be established and strong synergies built between the agricultural and nutrition research communities. Funding of agricultural research remains a significant challenge.

⁸Nnoli N.O et al (2006) Strengthening the capacity to provide reliable planting date forecast in Nigeria, (Ed S. S. Jagtap). Report submitted to the International START secretariat for the grant US NSF (GEO-0203288), Washington, DC.

⁹Igwe, B.U.N. (1990) Policies and strategies for commercialization of inventions and research results in Nigeria. NISER Occasional Paper 2.

¹⁰Ekpenyong, G.D (2001) Agricultural research in Nigeria: the role of institutional libraries. Information Development June 2001 vol. 17 no. 2 118-122

