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REGIONAL WORKSHOP

ON

"TECHNOLOGY OPTIONS AND FOOD GRAIN PRODUCTION IN SUB-SAHARAN AFRICA: FUTURE PERSPECTIVES AND LESSONS FOR THE 21ST CENTURY AFRICA"

ABIDJAN, COTE D'IVOIRE : 26-28 APRIL, 1995.

KEYNOTE ADDRESS

BY

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TECHNOLOGY TRANSFER OPTIONS AND AFRICA AGRICULTURAL RESEARCH SYSTEMS: THOUGHTS FOR A 21ST CENTURY STRATEGY*

By

J. A. EKPERE**

MR. CHAIRMAN,
HONOURABLE MINISTER,
REPRESENTATIVES OF THE AFRICAN DEVELOPEMNT BANK,
MEMBERS OF THE DIPLOMATIC CORPS,
DISTINGUISHED AGRICULTURAL RESEARCH SCIENTISTS,
LADIES AND GENTLEMEN:

PROLOGUE

Let me predicate my short address to this very important Workshop, this morning, by first conveying to you all, the goodwill, warm and sincere greetings of His Excellency Dr. Salim Ahmed SALIM, Secretary General, Organization of African Unity, Addis Ababa, Ethiopia. As supervisory organizer of this Workshop, let me extend my personal warm welcome to you all. Permit me to extend, on your behalf, to the President and Peoples of the Republic of Cote d'Ivoire, our sincere appreciation for their warm welcome, unparalleled hospitality since our arrival in this beautiful African city of Abidjan and the excellent facilities placed at our disposal for the effective implementation of this Workshop.

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* Keynote Address to the Regional Workshop on "Technology Options and Food Grain production in Sub-Saharan Africa : Future perspectives and Lessons for the 21st Century". Abidjan, Cote d'Ivoire, April, 26-28, 1995.

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At a time when our sub-region is bedeviled with a lot of problems, not the least of which is food self-sufficiency and food s ecurity, a Workshop to discuss technology transfer options to meet the challenges of food production in the 21st Century, could not have come at a more opportune time. The National Agricultural Research Services and International Agricultural centres have worked relentlessly over the last three decades developing improved agricultural technologies with a view to increasing food production. Formative assessment of these efforts suggest that the desired food increases remains a mirage. One explanation has been in ineffective technology transfer approaches.

INTRODUCTION

A foremost African Scientist, recently stated the obvious when he indicated that "success in the sustainable economic development of any nation is practically impossible outside of the development of science and technology capacity and the practical application of it to the required extent[1]". While agreeing with his assertion, I want to pitch my remarks this morning to complement that section of his opinion which speaks to "the practical application of technology to the extent possible". This is because, the practical application of an appropriate technology "to the desirable extent and with accompanying proportionate benefit" is only possible with the promotion, acquisition and skillful use of the given technology all of which subsume a transfer process.

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(1) Professor G.O. EZEKWE, October, 1993, "A National Science and Engineering Infrastructure: The Agenda for a Self-Reliant Growth for Nigeria". The Nigerian Academy of Science, October, 1993 Lecture, LAGOS, PP.1.

The rate of technological growth, investment in research and development and overall capacity to absorb borrowed, locally developed and/or imported technology has been identified as one of the contemporary constraints impeding the successful implementation of development programmes in Africa. This position is substantiated by an expert opinion that, "over the years, Africa has achieved a high record in infrastructural development; of roads, airports, seaports, communication, educational institutions, health institutions, power supply, water supply..... dams for irrigated agriculture etc. But these installations and establishments, as necessary and indispensable as they are, have by and large served mainly as general purpose assets and facilitators of trade and of consumer goods production. They only form a part of the wider infrastructure which is required for the entrenchment of a scientific capacity and the local production of the capital goods needed for a self-reliant industrialization. That they are not a sufficient infrastructure for national economic take-off and sustainable growth is demonstrated by the fact that despite our possessing them, we are not able to replicate them without reference to excessive and costly importations, nor are we able to service them without resorting to imported materials and spare parts". Let me hasten to add however, that the undesirable situation occasioned by the above analysis of the African industrial sector is being addressed by its National and Sub-Regional Centres for Engineering Design and Development of Technology. Perhaps the major weakness of these agencies is their technology transfer components which has made the transition from research to practice, difficult to achieve.

In Agriculture, it has been argued that the problem of low productivity within the sector is due more to low levels of adoption of available technologies complicated by ineffficient application due mainly to poor skills in manipulating the technologies. Both problems relate directly to ineffective and inefficient technology transfer mechanisms rather than total absence of appropriate technologies. It has been suggested that National Agricultural Research Centres could benefit immensely from the world stock of available agricultural technologies if they can organize an effective technology transfer capability, backstopped by a well managed adaptive research system. Without meaning to de-emphasize basic research, this statement underscores the importance of technology transfer and necessary absorption/adaptive capacity for nations with low resource endowment.

There is historical evidence that the dawn of science with contribution from research, documented information, communication and trade is a major stimulus for technological innovation. In Africa, indigenous research and development has always been regarded as a necessary pre-condition for effective technology transfer. This is because a well planned and implemented research and development capability provides not only a firm base for adapting foreign and indigenous national technologies, it facilitates their absorption and more importantly, their exploitation by further technical development. The transfer of technologies accross national boundaries or between enterprise sectors within a single country is an essential factor in growth and development - industrial and agricultural.

It provides the desired mechanism for moving from one stage of development to another, as well as the means for forcing change. It provides the finance necessary to support further technological change, while enhancing the competitive effects of lower cost techniques.

A CONCEPT OF RESEARCH, TRANSFER AND TECHNOLOGY TRANSFER

Kaimowitz[2] and his associates in a recent analysis identified key conceptual definitions in the study of technology transfer. They opined that the "the terms research and technology transfer have both functional and institutional meanings. In their functional usage, they describe certain activities in the process of technology development and delivery".

In the case of research, these activities include discovery, exploratory development and technology consolidation. Discovery is conceived as the process of collecting information and/or searching for relationships between variables, the specific usefulness of which, is as yet, undetermined. Often, this is also referred to as basic research.

Exploratory developemnt is the identification, exploration, understanding and control of the interaction between a proposed technology and the physical, economic, or social environment in which it will ultimately be used. This can be thought of, as applied research.

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(2) Kaimowitz, D.K., Snyder, M. and Engel, P., 1989. "A Conceptual Framework for studying links between Agricultural Research and Technology Transfer in Developing Countries" Linkage Theme Paper No.1, The Hague : ISNAR.

Webster[3] defines technology as "a technical method for achieving a practical purpose". Roling[4] describes technology as "the software and hardware available for controlling the environment for human purposes. The software, he says, consists of methods and skills while the hardware is made up of physical objects, such as tools, equipments, genetic material etc." The development of technology can be based on the advance of science and hence, on the application of research findings. Fresco[5], indicates that technology is the means by which inputs are transformed into outputs. For the purpose of this discussion, Technology can be operationalized as an idea, a product, an input, information or a way of doing things. It may be physical, tangible or abstract. Technology consolidation is the process of translating the knowledge obtained previously in basic or applied research into specifications for the new product or information and of the end-user for whom the technology will be appropriate. The information or new materials is formulated in the format which will be used in its delivery. While consolidation has some aspects of adaptive research, it goes beyond that. It also includes all the work involved in determining how to present and package a technology and identifying exactly who might be interested in using it.

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(3) Webster Dictionary - 5th Edition

(4) Roling, N. (1989). "The Agricultural Research-Technology Interface: A Knowledge Systems Perspective" ISNAR Linkage Theme Paper No.6, P.7.

(5) Fresco, L.O., (1986), "Cassava and Shifting Cultivation: A Systems Approach to Agricultural Technology Development". Royal Tropical Institute, Amsterdam, The Netherlands.

Technology production is the process of physically producing the materials (physical inputs or information materials) in sufficient quantity for distribution to intended clients and of making these materials available to those responsible for technology delivery.

Technology delivery is where the technology is actually packaged, promoted and distributed. This normally occurs through a multiplicity of channels and events. The target groups get little bits and pieces of information, some of it complimentary and some contradictory, from many different sources and they assess and integrate this information over time in their decision process in relation to technology acquisition and use.

Monitoring and evaluating utilization involves the assessment of whether prospective end-users have acquired and decided to fully or partially, adopt, adapt, or reject the proposed technologies, and the reasons for those decisions. The technology transfer process covers technology production, the delivery of technologies as well as the monitoring and evaluation of their utilization.

All, or at least, many of these activities occur simultaneously during the development and delivery of a new technology. While both common sense and the literature implies that there is some logical progression between them (McDermott[6]) , there is no reason to assume that all technologies must pass through a fixed set of stages in a chronological sequence.

(6) McDermott, J.K., (198'), Making Extension Effective: The Role of Extension/Research Linkages", in Agricultural Extension Worldwide, Edited by Rivera, W. and Shiram, S. New York : Croom Helm.

For instance, work may begin with exploratory development, rather than discovery. it may also be technically appropriate for new research to be undertaken in relation to a technology that is already in the process of consolidation.

The term research and technology transfer is also used to denote the units or individuals that specialize in this activity. Thus, we have Research Centres, Researchers, Technology Transfer Workers, etc.

The correspondence between the two usages is far from perfect. A great variety of different groups and institutions besides just "Researchers" are involved in discovery, explanatory developemnt and technology consolidation. Researchers are also involved in technology production and delivery as well as other activities in the process. The essence of this short analysis is to call attention to the process of technology development and transfer in the abstract and disabuse our minds from believing that the process is simple and involves discrete individuals and disciplines operating independently of each other.

MR. CHAIRMAN,
DISTINGUISHED SCIENTISTS,
LADIES AND GENTLEMEN:

The concepts and ideas we are gathered here to attempt to understand and discuss in the next two days is, an admixture of complex issues, requiring reflective thinking and participation of both natural, physical, biological and social Scientists.

There is evidence that the unacceptably low rate of technology development and ineffective technology transfer process in Africa is, not accidental, but te result of a cumulative effect of policies and actions of all actors in the process - governments, donors, National Agricultural Research Systems, International Agricultural Research Centres, Regional and Sub-Regional Research Institutions, Universities and the private sector. They all share in the responsibility for the food crisis confronting Africa. There is therefore a need to jointly seek a new orientation to the problems of increased food production and face up to the challenge of the 21st Century. The process will be evolutionary, long term in perspective and will require persevering commitment and a willingness to re-examine the traditional approach to agricultural research technology development, packaging and transfer.

This Workshop has been designed to address the twin, but inter-related issues of Technology Options for Food Grain Production and Technology Transfer Systems. It is my hope that in discussing technology options, due consideration will be given to dwindling fortunes of Africa, in the acquisition of exogenous technologies requiring the application of high inputs for success. This Workshop should consider a long-term vision of appropriate technology development predicated on low input use by poor resource farmers. The emphasis should be on indigenous food grains of importance in the dietary requirements of the population rather than exotic grains.

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The objective should be towards the maintenance of sustainable agricultural production systems that are environment friendly, rather than systems that are exploitative of the environment, resulting in ecological degradation. Your deliberations must focus on the optimal process and content for improvement and achievement of the best fit technology options for food grain production, as well as the key mechanism to support their implementation in the 21st Century.

The challenge of Technology Transfer to meet the food grain requirements of the 21st Century is exacerbated by the low level of research on the technology transfer process itself. There seem to be an implicit assumption in the technology development delivery and transfer sub-system that technology development is a research activitiy and that technology transfer is the practical follow-up or a pseudo-research activity involved in technology delivery. Consequently, assessment of various approaches to technology transfer has been normative and descriptive, devoid of critical research analysis and therefore, lacking in predictive scientific basis for failure and success. The knowledge base for research - technology transfer linkages, suffers as a consequence. In this Workshop, you will be discussing on-farm research verification trials and assessing the efficiency and experiences of current approaches of extension services and technology transfer systems. I implore you to be more scientific, methodical and critical in your assessment, ensuring as much objectivity as possible.

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MR. CHAIRMAN,
DISTINGUISHED LADIES AND GENTLEMEN:

The task before us in the next few days is a difficult one. Let us face it with the seriousness that it deserves. Our deliberations should be seen as a major contribution to knowledge and practice on how Africa will cope with the food grain problem in the 21st Century. I have no doubt that with the collective wisdom of us all, the objective of this Workshop will be accomplished. While wishing you a successful Workshop, I thank you for your attention.

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