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CAUSES AND IMPLICATIONS OF THE SLOW PACE OF TECHNOLOGY TRANSFER AND ADOPTION IN RURAL AGRICULTURE

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ABSTRACT
The major problem facing most developing countries today is the need to transform their agricultural industries from one depending on traditional inputs with low productivity to one based on modern input with higher productivity. The study was set up to examine the causes and implication of slow pace of technology transfer and adoption in rural agriculture. Based on this major objective, the paper among other specific objectives, examines the role of extension agent in technology transfer and adoption, identify factor militating against technology transfer and adoption, unveil the implication and proffer appropriate strategies and recommendation. The causes of slow pace of technology transfer and adoption were identified to include ineffectiveness of extension delivery system, lack of adequate liaison between extension and research, lack of trained personnel both in quantity and quality, inadequate financial support, complexity of the new technology, incompatibility, in relation to the existing ones, high coat Of adopting the new technology among others. The slow pace of technology transfer and adoption were also found to have negative implication in rural agriculture and the nation's economy as a whole because of the resultant low agricultural productivity. Based on these, the paper therefore concluded by recommending that Agricultural Extension Research Liaison service (AERLS) should be established, provision should be made for the expansion of man—power training facilities, high priority should be given to the development of appropriate innovation and technology that must be economically viable, culturally compatible etc. Hence this paper posit that, if all these are implemented the ugly trend would be reverse for the better.

Key words: technology transfer, adoption, rural agriculture

INTRODUCTION
Despite tremendous efforts in many developing countries to improve the quality of life in rural areas; only vague ideas, and not precise information, as to how effective these new services are. still persist. The basis with which rural farmers consider rational for accepting new technology transcend high yield and economic returns (Dittoh and Ogunfowora (1985). Developing countries have seriously set out to acquire, adapt and apply technologies derived from scientific knowledge, since the importance of the contribution of science and technology adoption and transfer has never been in doubt. However, the difficulty has always been embraced in their application, which also limits economic progress. The major problems facing most developing countries today are the needs to transform her agricultural industry from one depending on traditional inputs with low productivity to one based on modern inputs with higher productivity which enables her to meet the rising expectations of her people, and to correct the social and economic imbalance created by lopsided development between her rural and urban areas which has invariably encouraged the migration of youth and others from rural areas (David, 1968). This imbalance has been attributed to lack of appreciation of the important roles which extension, research and rural development can play

in the overall economic development. The dissemination of useful and practical information related to agriculture, practical application of such knowledge to help rural farmers analyse their problems and bring improvement in a systematic way through carefully planned organized programmes. On the other hand, research, a systematic investigation, is aimed at discovering facts and principles needed for the solution of identified problems and for the improvement of existing ideas (Odigboh, 1985).

Ironically, the most fundamental findings from research have often failed to reach those involved directly or indirectly in commercial or subsistence agriculture, that is, the peasant farmers due to the present weak institutional linkage of the research — extension — farmer linkage system. It is in view of this fact, that advances toward the remotes causes and the implication of the slow pace of technological transfer and adoption in rural agriculture became inevitable, as it gives the basis for the development and formulation of strategies which will be tailored toward reversing this ugly trend.

Nigeria Rural area and Agricultural Productivity

A typical rural area in Nigeria can be seen and conceived as a geographical entity of people living together by same traditional norms and values which transcends from common ancestry and were general interest supersedes common or individual interest and is mostly found in the interiors (Williams, 1970). Due to the unavailability and non presence of government establishments, social amenities and prevailing general and structural poverty, the only means of livelihood for a typical Nigerian rural man is farming. It is also true that about 98% of the entire food and agricultural raw materials found in the urban centres are from the rural areas. Due to the importance of the rural populace (Farmers) in agricultural productivity for the country, there is need for a complete change of strategy and approach, if the rural areas are to contribute their quota to agricultural productivity and development. The present approach and policy which sees the rural areas as the source of surpluses for the urban areas should be substituted with a rural development strategy with the rural man as the centre piece (Idachaba, 1980).

This new approach should recognise the rural people as human beings capable of producing surplus food for the urban centres but also equally entitled to good quality of life since they (rural people) remains the main source of agricultural production for the nation. This incentive become necessary because many of our rural areas are lacking in most of the essential facilities that aid agricultural growth and productivity. This has been chiefly responsible for the rural migration with the result that very few active men and women are left in the rural areas to continue with farming and consequently, there is a result decline in agricultural productivity. Moreso, due to this negligence, most rural areas in Nigeria are characterized by inadequate health facilities, bad sanitary conditions and poor sources of drinking water, a network of bad roads, communicable diseases and inadequate rural electrification. A progressive rural structure is all that is therefore needed to expedites the flow of goods, information and agricultural support services between each farm and the wider society (Mosher, 1969).

Status of research and extension in rural development

The status of research toward rural development is a re-assessment of the effectiveness of their findings (technologies) and the research a extension— farmer, linkage in the rural settings (Idachaba, 1980). At the research stations or the researchers really bringing out viable technologies? Can these technologies adapt easily in our locality, and how complex are

they? etc. The extent of application of research findings by the rural farmers depends largely on these and on the activities of the extension agent which serve as a middle man and link between the research stations and farmers. However, technological innovation transferred from research centres to rural farmers through the village extension agent (VEA) has played tremendous role in the development of the rural viz enchanced agricultural productivity and development of sustainable standard of living (Obinne, 1991).

The concept of extension is often seen as service which assist the farmers through educational procedures in improving their farming methods and techniques, increasing their production efficiency and income and improving their level of living. The focus of Extension is to help rural people solve their own problems through the application of scientific knowledge in a voluntary out of school educational programme. According to Savile (1965), the aim of agricultural extension is to teach rural people how to raise their standard of living with the minimum of assistance from the government and by their own efforts using their own resources. It encourages progressive growth through leadership, self help and civic pride (Leagans, 1971). The question often raised here, is, have these laudable objectives of Extension been achieved in rural areas?

Extension agents have adopted the methods individual, group and mass media in contacting their clientele (the resource poor farmers) in the rural settings. Stiff ice to say, that the individual contact method usually adopted has often failed to achieve much desire result due to the poor extension farmer ratio of 1:2000 which prevails in most Nigerian rural settings due to shortage of extension. With this poor ratio, it is quite obvious that, nothing meaningful can be achieved in terms of adoption rate. Moreso, most rural areas have no Village Extension Agents (VEAs) and as such, there is absolutely no technology transfer in this regards. In addition the use of the mass media method in the dissemination of information most often fail to yield positive result. This is because often at times such messages (technology) cannot be applied due to inability to read, understand and decode by farmers which makes communication difficult (FAO, 1974).

On the other hand, the educational level of the extension agents is also of great importance in influencing adoption rate by rural farmers. Are they well trained? Can they decode easily or understand and handle the technologies from the researchers? How effective are they in impacting these to the farmers? Are they willing to remain and work in their area of assignment? What is the government doing to encourage their activities?

However, an assessment of the status of extension in rural development clearly shows that much has not and is yet to be achieved in terms of rural development which is the basis of extension objective. The major objective of this paper is to identify the causes and implications of the slow pace technology transfer and adoption in rural agriculture. However, in specific terms, the seminar would to examine the role of research in adoption of new technology in the rural areas; examine the role of extension agent in technological transfer and adoption in rural settings; identify factors militating against technological transfer and adoption in rural agriculture.

The role of researchers in the development of viable technology

Systematic research is the basis upon which a modern agriculture is built. Through research, the productivity of existing resources is increased and even more important, it becomes possible to utilize and increased quantity of new and traditional resources at higher levels of productivity and profitability than previously (Okigbo, 1975). Agricultural research consist of investigations of the farm business and the growth processes of plants and animals so as to

facilitate development of inputs of materials and management practices which maximise production and gives greater control over the environment.

Thus, the development of adoptable technologies or small scale farmers, especially in developing countries like ours, requires an understanding of farmers conditions and priorities. It is widely accepted that new knowledge must be discovered and improved technology developed in order to change the archaic farming systems and patterns found in rural agriculture. However, what is generally of major concern to many people is that many researches and experiments are conducted under conditions so unrealistic that their results can find no wide application under our farming conditions. For agricultural researches to have great impact on the development of a sound viable technology for the country, agricultural research workers must therefore learn to choose their research activities in the rural areas where physical facilities and financial resources are inadequate, within certain restricted limits imposed by the pressing social and economic needs of the society which they are out to serve (Mellor, 1970).

For a viable technology to be developed from agricultural researches, the basic problem of agricultural research must be solved. Firstly, to ensure that research programme must be oriented to the national needs of the country's agriculture, second, because of the inevitable limitations in manpower and financial resources, is to decide on the order of priority among projects that are worth – while, Moreso, research programme must be dynamic and be able to adjust to the changing needs and pattern of agriculture in the country (Idachaba, 1980). In summary research levels of basic, developmental adaptive and test demonstration are important in developing a viable technology for the country. This can only be achieved if such research programmes are oriented to the national needs of the country and exhibits a dynamic characteristic to meeting the changing needs and preference of the farming populace.

Finally, technological adoption by farmers relies heavily on the effectiveness of the VEA operating in the area. Therefore, for a viable technology to be developed and sustained, technology from research stations must be adequate transferred to the rural users' (FAQ, 1974).

Role of extension agent in technology transfer and adoption

The role of the extension agent 1n technological transfer is of great importance to the sustenance of viable technology F or the country. First of a11 it is been looked at the perspective of the extension agent personal characteristic (Obinne, 1991). This is because the effectiveness of extension agent is largely determine by how much the agents are willing to sacrifice, their area of specialization and the incentives given to the VEA by the government to enhance their functionality.

It is worth mentioning that the willingness to work by extension agent is greatly determined by availability of adequate working incentives such as good housing, good remuneration, enhanced mobility and teaching aids, fringed benefits etc. These are necessary to enhance VEA performance. Extension agents are also expected to be able to perform their functions adequately with good persuasive ability which will convince the farmers. Moreso, the use and adoption of adequate teaching methods is seen as a necessary tool needed to enhance Extension agent performance (Dittoh and Ogunfowora, 1985).

A good understanding of technological innovation from research stations by extension agents is another essential tool for effective technology transfer as such innovations can be decoded and related to the farmers (users) in a more simpler and ideal terms. Strengthening

the extension services in the states greater financial provision and inputs supply by the federal government since at present, extension services are virtually non—existent in the states because many of them cannot provide the necessary resources to make them function properly. Adequate technological transfer can only be made possible if the Research—Extension—Farmers linkage is effectively strengthened by strengthening the extension services.

Reasons for slow pace of technology transfer and adoption in rural agriculture

The major reason or cause for the slow pace of technology transfer and adoption in rural agriculture is the collapse of agricultural extension services. At present the extension service is very weak and lacks direction. In spite of the good programmes being introduced by the Federal Government to the states, when one goes down to the grass—roots one would find that government activities are at a very low level; farmers are very much on their own.

Several studies conducted on the problem by Olayide et a1,1980; Idachaba et al, 1980) Okigbo et al 1981; Idachaba, 1981) have all identified the slow pace of technology transfer to include:

- Lack of adequate liaison between extension and research.
- Lack of trained personnel both in quantity and quality so that the few that are available are spread too thinly to be effective. For instance, the extension worker farmer ratio which should be about 1:800 now stands at about 1:5000 or above.
- Inadequate financial support. In most cases the amount allocated is only barely available to pay for the salaries of the staff. This therefore limits the volume of work that can be successfully carried out with the farmers.
- Lack of effective communication system for delivery of research results to the extension services and to the farmers. At present, since there are not enough extension agent in the states to carry this cut and this has resulted in poor linkage between research and extension. It is mostly because of this weakness in the linkage between research and extension vis—a—vis the farmers that research finding or technologies have often delayed or even failed to reach the farmers.

On the aspect of slow pace of technology adoption by rural farmers, evidence available also showed that natal farmers, very sensitive, do respond to change, provide that firstly, it does not conflict with their ti honoured values and secondly, that it pays. Study by Williams (1973), shows that profit was tae Main reason for the slow pace of technology adoption in rural agriculture. He stated that lack of profit (production, costs were high in relation to ascent prices I or the products) was the main reason given by poultry and maize farmers for not doing 5O Another reports by Phillip and Ahmed (1974) showed tan the reasons given by farmers for not adopting improved agricultural technologies were that:

i) They could not afford it
ii) It would not bring more income
iii) They could not understand it.
iv) Their farms were too small.

The main reason given by the farmers who did adopt the practice was that they felt they could make more money and a few others did so because extension agent had advised it. The study showed that most of the cotton and rice growers opted to go back to their old methods of planting, when the new improved varieties were planted by traditional methods, they did not

produce better yields and the new technology of planting and the cultivation were too labour demanding and did not prove profitable. Ulmali (1972), Concluded that for a farmer to adopt a new practice, he must perceive in it distinct advantages over existing practices, he must be able to get needed resources easily and at the right time and he must have a suitable market produce.

Ultimately, these reasons stated above were also grossly seen by Idachaba (Opcit), as causes of slow pace of technology transfer and adoption. He further stated other causes to include the complexity of the new technology; the incompatibility of the new technology in relation to existing ones; the high cost of adopting the new technology; the Non—profitability of adopting the new technology; the ineffectiveness of the extension delivery system; the relative disadvantage of the technology over existing ones amongst others.

These interwovingly have cause the slow pace of technology transfer and adoption in rural agriculture. It is also worth mentioning that overwhelming influence of customs and traditions of farmers towards the adoption of improved technology is a major cause of slow pace of technology adoption.

Implications of slow pace of technology transfer and adoption in rural agriculture

No progress towards common goals can be made under a low level of response of technological changes. The current food and agricultural crises can be very easily attributed primarily to slow pace of technology transfer and adoption. Generally, issues concerning wide—spread hunger, low food productivity, high death rate, rapid population growth, poor people, low standard of living, high cost of living, lack of social infrastructure, high level of illiteracy, high crime rate, structural poverty, high cost of good and agricultural products, among others are all-shortcoming and implications found to be associated with slow pace of technology transfer and adoption in agriculture (Mosher, 1969).

It also implies that many or most of the research recommendations, technical packages extension messages and technology impacts, billed for rural agriculture that were expected to have revolutionalized agricultural production and transformed standard of living of the rural farmers have been poorly utilized, such that its benefits rarely materialized. This slow pace of technology adoption in rural agriculture has hindered the progress pathway towards agricultural development and epitomized the symbols of "benefits that never materialized". The also by implication thus suggest that, the idea of technology transfer perse can only be a pattial solution to the problems facing agricultural development.

Finally, the slow pace of technology adoption and transfer in rural agriculture has further crippled the dwindling fortune of the agricultural sector and the economy of the nation as a whole.

CONCLUSION AND RECOMMENDATIONS

The paper has been revealed that the causes of slow pace of technology transfer and adoption include lack of adequate liaison between extension and research; Lack of trained personnel both in quantity and quality, Inadequate financial support to the research — extension programmes; Lack of effective communication system for delivery of research results to the extension services and to the farmers. The study sees this collapse of agricultural extension services as being the major cause of the slow pace of technology transfer. On the adoption rate by the farmers, the cost of the new technology complexity, incompatibility of the new technology in relative disadvantage of the technology over existing ones amongest others as the major causes of the slow pace adoption rural farmers. It also revealed that low standard of

living, high cost of living, social and structural poverty, high crime rate, high cost of food and agricultural products, high rate of rural migration, low raw materials production and crippled economy etc as resultant effects.

Due to the causes of slow pace of technology transfer and adoption so identified as well as the implication to the rural agriculture and the Nigeria economy as a whole, the following measures designed to accelerate the pace of transfer of technologies and farmers adoption are recommended. Firstly, because of the importance of communication of research results to the farmers in a form that can be utilized by them, Agricultural Extension Research Liaison Services (AERLS) should be established to function in association with agricultural research institutes so that they can form the badly needed linkages between research institutes, the extension services and the farmers. Secondly, specific provision be made for the expansion of man—power training facilities at the junior and intermediate levels. Thirdly, strengthening of extension services by the states and Federal Government by greater financial provision and inputs supply. Finally, high priority should be given to the development of appropriate innovations and technology that must be economically viable technically feasible and culturally compatible with the farming systems of our farmers.

REFERENCES

Byer, L. and Rue L. W. (1980) *Management Theory and Application*. New York.

David, K. (1968) Factors Affecting Farmers' Response to Extension in Western Nigeria C. S. N. R. D., Report No. 30 P. 5. Michigan State University East Lancing Nichigan USA.

Dittoh, S. and Ogunfowora, O. (1985): Farm Management, The Small Farmer and River Basin Development, Projects. Paper presented at the 2nd Annual National Conference of Farm Management Association of Nigeria, August 4 – 7 Bellows University, Zaria.

F. A. O., (1974): Agricultural Credit for Africa (Country Report), Nigeria. Regional Seminar, Accra.

Idachaba, F. (1979): Food Policy in Nigeria – Towards a Framework of Analysis. (Agricultural Research Bulletin Faculty of Agriculture and Forestry, University of Ibadan.

Idachaba, F. S., Umebese, A. F., Mabawonku and Adegboye, R. O. (1980): Rural Infrastructures in Nigeria: Mimeo. Department of Agricultural Research Policy in Nigeria. International Research Institute Research Report No. 17 Washington D. C.

Leagans, J. N. P. (1971): *Extension Education and Modernization*. (Cornell University Press, Ithaca, New York.

Mellor, J. W. (1970): *Economics of Agricultural Development*. Cornell University Press, Ithaca, New York.

Mosher, A. J. (1969): *Creating of Progressive Rural Structure*. Agricultural Development Council, New York.

Obinne, C. P. (1991): Adoption of Improved Cassava Production Technologies by Small-Scale Farmers in Bendel State. (Journal Agricultural Science & Technology 14. P. 15).

Odigbo, E. U. (1985): *Mechanization of Cassava Production and Processing*. University of Ife Press.

Okigbo B. N. (1975) Research Policy for Agricultural Development with Special Reference to Tropical Africa" Paper read at the meeting of Common-Wealth Ministers on Food and Rural Development. London, March 4 – 12, 1975. PP. 219-231.

Olayide, S. O. Idusogie, E. O. & Olatunbosun, D. (1980): "New Dimension in the Administration of Agriculture in Nigeria" in P. Collins (ed) *Administration for Development in Nigeria.* Africa Education Press, Lagos, Nigeria.

Phillip H. C. & Ahmeh, M. (1974): *Attacking Rural Poverty*. Baltimore, USA Johns Hopkins University Press.

Umali, B. F. (1972): SOCIO-Economic Factors Hiding Development of Effective Agricultural Credit Program in Nigeria. (Paper presented at a Symposium on Rural Development. University of Ife, November, 22nd – 23rd.

Williams S. K. T. (1973), Rural Poverty to Rural Development: A Strategy for Development in Nigeria. Inuagural Lecture, University of Ife Press.

Williams, S. K. T. (1979): *Rural Development in Nigeria*, University of Ife Press.