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QUANTITATIVE ANALYSIS OF CURRENT SCIENTIFIC RESEARCH AND PRODUCTIVITY IN I.A.R. AND N.A.P.R.I., ZARIA. NIGERIA.

BY

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ABSTRACT

The paper discusses research out-put as a live-wire to scientific and research institutions. It measures and correlates research contributions of scientists in Institute for Agricultural Research, Samaru, (I.A.R) and National Animal Production Research Institute, Shika, (N.A.P.R.I), Ahmadu Bello University, Zaria.

Fisher's T-test statistical techniques was employed to test the null hypothesis that there is no significant difference between the frequency of publication of scientists in I.A.R. and N.A.P.R.I.

The paper concludes that I.A.R. and N.A.P.R.I. have made remarkable impact not only in the agricultural sector but also in the economy in general. Also, despite the fact that N.A.P.R.I. was carved out of I.A.R., there is no significant difference between the productivity of researchers in the two institutes.

INTRODUCTION

Modern communities continually seek new and better ways of providing for the needs and aspiration of their people. Solutions to this attempt have been found in the development of science and technology. Science plays a vital role in today's world in producing economic and social change. Science is the most important foundation for technology which in turn, a tool for solving mankind's material problems. As a result science and technology have become crucial and are an expensive part of man's activity.

The survival of science and technology depends on research. This is to say that research is the live-wire of science. An important aspect of scientific research is the nature of its reward system. Garvey (1984) noted that scientists are always eager to publish their research findings and they compete among themselves for prestige.

In general, credit for a new scientific discovery goes entirely to the person who first announces it publicly. It then follows that the individual scientist requires suitable

methods for communicating the work that constitutes his claim to priority. A permanent record that can be produced in case of dispute is therefore needed. Such a record is normally provided by the production of written papers. Publication of scientific research in recognized journals has further advantage in that it can often be more surely disseminated to potential readers than is possible with other modes of communications.

The number of publications by a scientist or scientific community is generally taken as the measure of quantity while the most common method of measuring quality is to ask other people in the same field to assess the quality of a published contribution. But a recent and more scientific tool for measuring quality is citation analysis. The method consists of counting the number of times a document is cited in footnotes, reference or bibliographies appended to journal articles, books, reviews, or in secondary journals (i.e. abstracting and indexing services).

Quantitative measurement of productivity of scientists and scientific community is simply done by counting the total number of publications released by an individual or that community over a period. Roe (1965) used a simple count of publications as a measure of quantity, ignoring differences in forms. However, others like Mezer (1949) and Maris (1951) relied on pre-determined weights, both equated 18 articles in sociology to one book; Crane (1965) equated 4 journal articles to one book.

However, many scholars argued that there is no objective or empirical basis for the choice of weights, and most investigators admit that the weighting system they employ is subjective.

Universities and research Institutions are two organs that spear head the growth and development of a nation. The actual increase in the rapidity with which discoveries follow one another, may be regarded as one face of the acceleration of history, an acceleration which has been evident throughout the evolution of human societies. It is clear however that scientific activity, with all its technical and economic consequences, is at present passing through a period of particularly rapid development as compared with other known human activities and may broadly speaking, be said to be doubling in the course of each decade.

Nigeria, like her counterparts in the developed countries, is spending large amount of money in funding universities and research institutions in order to ensure smooth growth and development. In developed countries funding of research institutions and academic departments depends on productivity and in some places the quality of the products of members of these

institutions. For example, certain universities such as the state university of New York, t National science Foundation of the United states and some laboratories engaged in space resear in France are all funded based on the quantity as well as quality of their products which a measured by counting the total number of research publications of each member and the frequenc of citations received by each member.

However, observations of the Nigerian scene revealed a different situation, i.e., funding universities and research institutions is neither based on productivity nor quality. Furth observation also revealed that no attempt has been made to measure quantity and quality scientists' contributions in these places.

It is in view of the above that this research sets out to measure the quantity of the publish contributions of researchers working in I. A. R. and N. A. P. R. I. with a view to finding o whether or not differences exists between researchers in I.A.R. and N.A.P.R.I., in terms of th research activities and productivity.

I.A.R. Samaru and N.A.P.R..I. Shika were established since 1922 and 1927 respective as research stations under the department of agriculture of the then Northern Provinces. While Samaru Station was charged with the responsibilities of conducting all researches relevant to agricultural needs of Northern Nigeria as well as disseminating the information to the farmers, Shika station became in 1954 the research base of the Animal and Pasture station of the Agricultu Research Division. This station continued to be a research sub-station handling all researches animal Production until 1975 when it became by act of law, an autonomous research Institute.

Each of the above institutes is today consisting of researchers from different professio disciplines, all working in an integrated manner towards the improvement of our Agriculture.

The research proposals and progress which are made available to the public throu publications; either as a seminar paper, conference, proceedings, journal or book are first review by the Department of the researcher which is then passed to the programme research commit They are then further reviewed by the Institute's Professional and Academic Board before a fi review is done by the Institute's Board of Governors. (1989).

It is these seminar papers, conferences, proceedings, journal articles, Newspaper/Magaz articles and book publications of scientists in I.A.R. and N.A.P.R.I. that were counted and analy with the aim of Finding out whether research articles and productivity depend on where scient

are working (I.A.R. OR N.A.P. R.I) or depend on either rank of the scientists or the research programmes they belong to. The null hypothesis that there is no significant difference between the frequency of publication of scientists in I.A.R. and N.A.P.R.I was tested.

Therefore, following the above this study will have the following objectives:

To determine the productivity of researchers in I.A.R. and N.A.P.R.I.

To determine whether or not productivity of researchers in I.A.R. and N.A.P.R,I. differs significantly.

To determine productivity of researchers by research programmes.

To determine whether or not productivity depends on rank and qualifications.

Through the above stated objectives, the study hopes to find out the quantitative contribution of scientists in I.A.R. and N.A.P.R.I. and which among them takes the lead. Like the developed countries, Nigeria can use the research findings for a number of things, including base for funding research institutes in the country.

METHODOLOGY

For the purpose of this study Roe's Method of counting publication ignoring the differences in form was adopted.

The population for this study consists of all the research officers in I.A.R. and N.A.P.R.I that are on the staff list of the two Institutions during the year 1995. The officers are 53 in I.A.R. and 47 in N.A.P.R.I. (1992) (1993). Because the population is small, analysis was carried out on the entire population.

Questionnaire and interview methods were employed for the study, questionnaire was constructed in which questions were asked on the biodata, the channels in which they publish their research findings, list of their publications by type, the financial source(s) of their research undertaking, factors which they see as hindrance to their researches and publications, etc.

The statistical techniques employed for analysing data for this study is T-test. Fisher has provided several formulas designed for the computation of t. For the purpose of this study, t for difference between uncorrelated means of equal size is adopted. The formula is stated thus:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\frac{\bar{x}_1^2 - \bar{x}_2^2}{N_i(N_i - 1)}}$$

Where x_1 and x_2 = sums up squares in the two samples.

N_i = size of either sample.

FINDINGS AND DISCUSSION

In compliance with the purpose of this study, data collected from both questionnaire and interview responses of the population of researchers were carefully collated, analysed and presented here.

Out of the 53 and 47 questionnaires distributed to researchers in I.A.R. and N.A.P.R.I., 48 (90.57%) were returned from I.A.R. and 44 (93.62%) from N.A.P.R.I.

Both Institutes have since inception been important nuclei of physical expansion. Physical growth has managed not only from the expanded research and training programmes of the Institutes but also from their close association and collaboration with some Faculties of Ahmadu Bello University.

TABLE I: Breakdown of Research Programmes of the I.A.R. and N.A.P.R.I.

	I.A.R.	N.A.P.R.I
1	Cereal research programme	Diary cattle research programme
2	Legumes & oilseed research programme	Beef cattle research programme
3	Fibre research programme	Small ruminant research programme
4.	Horticultural crops research programme	Poultry research programme
5.	Agricultural mechanization research programme	Forage and crop residue research programme
6.	Irrigation Research programme	Swine Research programme
7	Farming systems research programme	Livestock system research programme

Today the Institutes have developed from subject-based sections to research programmes charged with the responsibility of formulating, executing and administrating the research activities of the various institutes. Table I shows the breakdown of research programmes in each Institute.

Table II shows the rank and qualification of the respondents. The study revealed that Assistant Research Fellows form the highest number of researchers in both I.A.R. and N.A.P.R.I., accounting for 17 (35.12%) and 15 (36.36%) respectively. In terms of qualifications, those researchers with Ph.D. accounted for 20 (41.66%) in I.A.R. and 14(31.18%) in N.A.P.R.,I, while those with M. Sc. accounted for 19 (39.58%) and 20(45.45%) in I.A.R. and N.A.P.R.I. respectively. B.Sc. accounted for the least in both institutes with 9 (18.75%) in I.A.R. and 10 (22.72%) in N.A.P.R.I.

TABLE II: Respondents by Rank and Qualification

	RANK								QUALIFICATION			
	PROF.	PRF.	SRF.	RFI	RFII	ARF	G.A	TOTAL	Ph.D	M.Sc	B.Sc	TOTAL
I.A.R.	1	2	7	7	11	17	3	48	20	18	9	48
NAPRI	2	2	8	4	9	16	3	44	14	20	20	44

KEY

PROF - Professor
PRF - Principal Research Fellow
SRF - Senior Research Fellow
RF I & II Research Fellow I & II
ARF - Assistant Research Fellow
G.A. - Graduate Assistant.

Analysis of the publications of respondents by type have been carried out and presented in table III. It is clear from table III that researchers in both I.A.R. and NAPRI produce more conference papers than any other. The conference papers accounted for 41 (39.90%) among I.A.R. researchers and 398 (40.20%) among NAPRI. Researchers.

TABLE III: Publications of Respondents by Type.

I. A. R.									N. A. P. R. I.							
Rank	No.	Sem.	Conf	Jnl.	News	Bks	Tota l	Rank	No.	Sem.	Conf	Jnl	News	Bks	Total
of.	1	28	37	85	3	8	161	Prof.	2	30	39	88	5	7	169
RF	2	32	42	38	2	-	114	PRF	2	21	442	30	-	-	93
F	7	33	105	109	-	-	247	SRF	8	39	122	141	2	-	304
I	7	31	96	60	2	-	189	RFI	4	22	77	49	-	--	148
II	11	53	102	56	1	-	212	RFII	9	52	80	33	-	-	165
F	17	49	30	28	-	-	107	ARF	16	45	35	24	-	-	104
s.	3	7	3	-	-	-	10	G.A.	3	4	3	-	-	-	7
al	48	233	415	376	8	8	1040	Total	44	213	398	365	7	7	990

This is closely followed by journal articles which recorded 375 (36.15%) and 365 (36.87%) in I.A.R. and NAPRI. respectively. Book publications and newspaper articles record the lowest in both Institutes.

The above revelation is in conformity with Carvey's *et al.* (1979) assertion that while local colleagues and books are most useful to the social scientists, on the other hand, seminar papers, conference, meetings and technical reports are more useful to physical scientists.

Abalaka (1991) in a related study on information needs and seeking behaviour of natural scientists of Ahmadu Bello University, Zaria also discovered that 61.7% of the natural Science academics found journal/periodicals, serials most important as channels through which information is obtained for teaching and research.

Many studies on information needs and seeking behaviour of scientists have revealed that scientists always make known their research proposals or findings at a local seminar, then national Seminar or conference before finally presenting it at international Conference. Figures in table III confirm this, and the fact that most of the researchers interviewed have indicated that they attend conference at least twice annually also further confirmed researchers' concentration on conference papers.

CONCLUSION/RECOMMENDATION

As one of the forerunners of Institutes of Agriculture not only in the Northern Nigeria but the country at large, I.A.R. and N.A.P.R.I. have made remarkable impact not only in the Agricultural sector but also in the economy in general. And this can be attributed to endless research findings of the staff of the Institutes which are published regularly.

This paper can also conclude that despite the fact that NAPRI was carved out of I.A.R. and both are carrying out their researches in different Agricultural fields, there is no significant difference between the productivity of researchers in the two institutes.

From the responses of researchers in these Institutes, three factors were identified as responsible for their low research productivity: lack of research facilities, lack of funds, and the cost of publications.

In view of the above, this researcher will once again re-echo earlier appeals by many well meaning Nigerians, especially Academic Staff Union of Universities to the Federal Government to endeavour to provide more funds and facilities to universities and research Institutes because they are near useless without funds and facilities.

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