COMMUNICATIONS PATTERNS IN AGRICULTURAL RESEARCH IN CAMEROON

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ABSTRACT

Agricultural research is unique in its total reliance on an effective communications mechanism. Research results obtained at an experimental station are of no value unless they can be disseminated to the end user of agricultural technology - the farmer. Furthermore, in common with other research disciplines, a national agricultural research system does not exist in a vacuum. To grow and evolve effectively, it must share its results and experiences with other systems, particularly those in countries with similar social and ecological conditions. It must contribute to the international pool of agricultural knowledge, on which it must also draw to feed its own information needs. In many countries, particularly those in the developing world, there are severe restraints which complicate and hinder such communication. We can think immediately of problems such as the lack of communications infrastructure, the lack of trained personnel, financial constraints and cultural differences. In order to promote the development of effective communications mechanisms, we must study the complex communications patterns of research workers in the national system. We must ask how research results are disseminated to users - farmers, extension workers, decision makers. We must look at where results are published - in research reports, in national and international journals, and ask how these publications are distributed. We must critically examine current publication and dissemination methods and explore more appropriate alternatives. We must examine any national bibliographic tools or collections and see how far these are available to both national researchers and researchers abroad. This paper attempts to answer some of these questions and to promote the development of a national agricultural research information system in Cameroon. The role of a national agricultural database in providing more reliable indicators of national research activity is also examined.

RESUME

La dépendance totale de la recherche en agriculture d'un mecanisme efficace de communications est unique. Les résultats de recherche obtenus au niveau d'une station expérimentale n'ont aucune valeur tant qu'ils ne sont pas transmis à l'utilisateur final des technologies agricoles: l'exploitant agricole. De plus, comme les autres disciplines scientifiques, un système national de recherche agronomique, ne peut pas exister tout seul. Pour se développer, il doit partager ses résultats et expériences avec d'autres systèmes, particulièrement ceux des pays ayant les mêmes conditions sociales et

écologiques. Il doit contribuer au système international de connaissances agricoles, dans lequel il doit également puiser pour satisfaire ses propres besoins en information. Dans beaucoup de pays, particulièrement ceux du monde en développement, il existe des contraintes qui compliquent et rendent impossible une telle communication. Il s'agit parexemple du manque d'infrastructures pour les communications, du manque de personnel formé, de contraintes financières et de différences culturelles. Afin de promouvoir le développement de mécanismes de communications efficaces, il est nécessaire d'étudier la complexité des modes de communications des travailleurs scientifiques au sein du système national. Il faut comprendre comment les résultats de recherche sont transférés aux utilisateurs (agriculteurs, vulgarisateurs, décideurs). Il est également nécessaire de répertorier les différents supports de publication et leur diffusion. Il faut procéder à un examen critique des moyens de publication et de diffusion et expérimenter des moyens alternatifs plus appropriés. Il faut examiner les outils et collections bibliographiques nationaux pour vérifier dans quelle mesure ils sont accessibles à la fois aux chercheurs nationaux et étrangers. Cette communication se propose de répondre à quelques unes de ces questions et de promouvoir le développement d'un système national d'information sur la recherche agronomique au Cameroun. Elle examine également la possibilité d'utiliser une base nationale de données agricoles pour fournir des indicateurs plus fiables sur les activités de recherche nationale.

INTRODUCTION

Agricultural research has a comparatively strong tradition in Cameroon compared with other francophone African countries. Before independence in 1960, most research in Cameroon was carried out by expatriate researchers on an *ad hoc* basis. In 1965, when there were only two Cameroonian and 61 expatriate researchers, the law establishing the Office National de la Recherche Scientifique et Technique (ONAREST) was passed. After several structural changes ONAREST began functioning in 1974. It was reorganized in 1976 and was replaced in 1979 by the Délégation Générale à la Recherche Scientifique et Technique (DGRST), which became operational in 1980. In 1984, higher education and scientific research were regrouped in one ministry, MESRES, to which computer science was added in 1989. It is this ministry, the Ministère de l'Enseignement Supérieur, de l'Informatique et de la Recherche Scientifique (MESIRES), which is currently responsible for agricultural research in Cameroon.

Until 1973 research activities were still dominated by the French research institutes, notably those now combined in the Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD), the Institut Français de Recherche Scientifique pour le Développement en Coopération (ORSTOM) and the Institut Pasteur. ORSTOM was charged with the more basic research and the CIRAD institutes were given responsibility for research on crops, animal production and forestry. In 1973, ONAREST created its own national agricultural research institutes, which have now become the

Institut de la Recherche Agronomique (IRA) and the Institut de Recherches Zootechniques (IRZ), and took direct charge of research, with the French institutes continuing to play an important role in providing expatriate research staff as well as training opportunities for Cameroonians abroad. This participation still exists.

Agricultural research is unique in its total reliance on an effective communications mechanism. Research results obtained at an experimental station are of no value unless they can be disseminated to the end user of agricultural technology - the farmer. Furthermore, in common with other research disciplines, a national agricultural research system does not exist in a vacuum. To grow and evolve effectively, it must share its results and experiences with other systems, particularly those in countries with similar social and ecological conditions. It must contribute to the international pool of agricultural knowledge, on which it must also draw to feed its own information needs.

Publications are the single most important means by which scientific links can be forged between researchers within one country or region, and by which they, in turn, can be linked to the international scientific community. Publications also form the raw material for the extension service, which must select appropriate information and repackage it for presentation in an appropriate way, if sophisticated technological advances are ever to achieve their desired impact on farmers' fields[1]. If publications are ever to provide a solid basis for the evaluation of scientific research activity, then considerable work will have to take place in the developing countries themselves to ensure that the information required for the construction of such indicators is in fact available.

This paper examines the development of agricultural research communications in Cameroon, discusses current activities in this area and makes suggestions for further improvements in the system.

Constraints in the production of scientific literature

A national medium for the dissemination of research findings has existed in Cameroon since 1978 with the introduction of the quarterly publication *Cahiers de l'ONAREST/ONAREST Scientific Papers*, which was replaced in 1980 by *Revue Science et Technique/Science and Technology Review*. These journals attempted to provide a forum for all activities carried out by the various research institutes in the country. Although they were reasonably successful, it was considered that their scope was too broad to attract a specialized readership. Consequently, the *Revue* ceased publication in this form at the end of 1982 and was split into four specialized series covering medicine, agriculture and animal husbandry, social sciences and earth sciences. The *Revue Science et Technique. Série Sciences Agronomiques et Zootechniques/Science and Technology Review. Agronomic and Animal Sciences Series* is now the major national forum for reporting agricultural research findings.

We have previously drawn attention to the precarious position of many African journals. In 1973, crop science articles reported in the CAB Abstracts database were published in some 20 Africa-based scientific journals, but by 1982 the number of journals had fallen to less than 10, and these were concentrated in just three or four countries (including Cameroon)[2]. In common with most African publications, the *Revue* has experienced many difficulties during its brief lifetime. The publication is intended to be quarterly, but since the first issue dated December 1984 only seven further issues have so far been produced, containing a total of 84 papers. Responses to a questionnaire survey of IRA/IRZ researchers' publication habits over the period 1988-1990, which is currently being carried out, have so far indicated that 50 papers were submitted to the *Revue* during this time. 25 have been accepted and so are regarded as being "in press", 24 are still being considered; 1 has been rejected; none has yet been published.

Faced with problems of this kind many researchers may be tempted to submit manuscripts abroad, particularly to the more prestigious journals of the industrialised world. However, publication in such journals is often fraught with difficulties for the developing country researcher, unused to the rigid rules of presentation and language required[3]. Given the current financial constraints on journal subscriptions, foreign publication can also easily lead to the ironic situation of information from developing country researchers being more easily accessible to researchers in the industrialized countries than to other researchers in the original country.

Even though it is acknowledged that in many parts of the developing world publication in a prestigious American or European journal is considered to be the ideal, there is evidence to show that in those countries where adequate outlets for papers in national journals do exist, then agricultural researchers do use them to report their findings. In two surveys of researchers' publication habits in Brazil and India[4], local journals accounted for over 90% of the researchers' published output, whereas in Nigeria only 25% of papers were published in local journals[5]. An earlier study of Asian rice researchers (45% of whom were in India) also indicated that only 25% of papers were actually published abroad, though 65% of the researchers said they would *like* to publish in the more prestigious international journals[6].

In our current survey of IRA/IRZ researchers, 40% of the papers submitted for publication during 1988-1990 were sent to foreign journals. Of these, over 50% were produced by expatriate researchers or were jointly authored by expatriate and Cameroonian researchers. No papers with expatriate author involvement were submitted to the *Revue* during this period.

What can be done to improve this situation? How can research workers at centres and stations around the country keep abreast of activities at other research sites, given such problems in publication? What other methods exist for the dissemination of research information around the country? How can we expect

international databases to include more developing country information if the publications are not being produced?

Alternate/appropriate publication procedures

We know that the non-conventional literature, that is material not distributed through conventional commercial channels, (such as research reports; consultants' reports; experimental data; land and soil surveys; conference papers; and theses or dissertations), plays a particularly important role in the literature of tropical agricultural development[7]. Estimates of the volume of non-conventional material in the literature of tropical agriculture or in developing countries in general varies from 20% to as high as 75%[8]. Table 1 presents the latest figures available from our current survey of IRA/IRZ researchers' publication habits.

Table 1. Documents generated by IRA/IRZ Cameroon researchers (1988-1990)

TYPE OF DOCUMENT	%
Internal reports	29
Conference papers	25
Submitted to the Revue	24
Submitted to other Cameroonian journals	3
Submitted to foreign journals	19

Source: Questionnaire survey, June 1990 (based on 54 responses naming 351 documents).

As can be seen non-conventional documents made up 54% of the researchers' total publications output during the period 1988-1990. Much of the non-conventional literature is never published and consequently is never disseminated effectively to researchers in other parts of the country and certainly never succeeds in being included in international databases. A partial solution to our current problems may be to tackle the non-conventional literature itself. This is after all the source material on which most conventional publications, in the *Revue* or elsewhere, are based.

There are several ways by which we could approach the problem.. Most non-conventional documents are produced in very limited numbers and have a restricted distribution. We could try to improve the dissemination of the documents themselves with only slight changes in presentation. Naturally, this applies only to certain documents which it is felt are in an appropriate form and could usefully be brought to the attention of a wider audience. We could also introduce new forms of publication, such as newsletters, bulletins and report series, which have proved their effectiveness elsewhere[9]. They can be produced at low cost, even using an office duplicator, if necessary. In particular annual reports of research activities must not be delayed simply because the facilities or the finance are not available to produce a high quality, glossy publication. It is

essential for the successful planning and monitoring of agricultural research that research results are made available to other researchers on a timely and coordinated basis. These options are currently being examined by the ODA scientific editor on the Cameroon World Bank project.

Another approach would be to ensure that as many non-conventional documents as possible are included in the national agricultural database. They could then be included in bibliographic publications, such as new accessions lists and library catalogues, together with details of where they could be obtained, and also transmitted to international cooperative databases, such as the FAO's Agris (International Information System for the Agricultural Sciences and Technology). Another related possibility would be the inclusion of abstracts or even synopses of non-conventional literature in either bibliographic publications or in a more conventional publication such as the *Revue*. This is the approach taken in the Netherlands with the creation of the Netherlands Agricultural Report Depositary[10].

We could even try to intercept the information before it actually reaches the non-conventional document stage, by the establishment of a research project information system using FAO's CARIS (Current Agricultural Research Information System) methodology. If a bulletin or newsletter on current project activities, including details of any non-conventional or conventional publications coming from the project, could be produced and disseminated this would also serve to keep researchers up-to-date with developments elsewhere in the country.

In our previous study of crop science publications from sub-Saharan Africa, using the CAB Abstracts database, we noted a five-fold increase in the books/conference proceedings category between 1973 and 1982[11]. This trend was observed to have begun in anglophone Africa (this type of document accounting for 70% of total publications for those countries in 1982), but we are now seeing signs that it has spread into francophone Africa too. The increase is attributed to the publication of conference proceedings by the international agricultural research centres, the International Development Research Centre (IDRC) and other similar organizations concerned with the promotion of agricultural research in sub-Saharan Africa. Looking again at Table 1, we can see that 25% of our IRA/IRZ researchers' output over the period 1988-1990 consisted of conference papers (not necessarily published), and within the past year at least three volumes of proceedings have been published of international agricultural research conferences held in Cameroon[12]. Thus with the decline in national and regional journal publications, these meetings are fulfilling an important role in ensuring the dissemination in published form of research findings. Even though they can provide only a limited outlet, researchers should be encouraged to make presentations at such meetings whenever possible, and to attend them, even if not presenting a paper.

Role of national databases

Most of these alternatives, of course, presuppose that the library or documentation centre is in a position to collect, process and store the documents, effectively prepare and disseminate bibliographic publications, and to transmit relevant references to the appropriate international databases. The library, documentation and publications services at IRA and IRZ are currently being reorganised within the framework of two development projects. The Cameroon National Agricultural Research Project (Projet de Recherche Agricole National, PRAN) supported by a World Bank loan with ODA and GTZ co-financing, aims to strengthen IRA and IRZ by improving the infrastructures and the capacity of the research and support staff. The library and documentation component of the project includes the establishment of a joint IRA/IRZ library and documentation centre at the Nkolbisson site (which is the headquarters of both institutes), the development of a national database on agricultural research and a network linking the regional centres and stations to the headquarters. This project also provides for an expatriate scientific editor to assist in the development of more effective agricultural research publications. Another project signed between MESIRES and ORSTOM includes the promotion of database compilation in the various MESIRES research institute libraries and the development of a common database at the ministry library. Both projects are progressing steadily. ORSTOM and CIRAD have provided considerable input to the systems involved by the development of a standardised input format, BABINAT (Bases de Données Bibliographiques Nationales), and the provision of equipment and technical assistance.

The BABINAT format represents an essential prerequisite for the development of a national, cooperative database. It is being implemented in the MESIRES research institute libraries, at the Centre Universitaire de Dschang (the main centre for graduate-level agricultural training in the country) and in some units of the Ministère de l'Agriculture (MINAGRI). A simplified version of the format, known as Basic BABINAT, has been developed for use in the regional centre and station libraries of IRA and IRZ. This version requires less staff training and enables the production of simple bibliographic listings relatively quickly[13].

The databases created at both IRA and IRZ cover all library accessions, published and unpublished --books, reports, theses and conference papers, plus some journal articles-- and include both national and foreign sources. Turning now to the IRA and IRZ databases themselves, Tables 2 and 3 present the basic characteristics of these two databases.

There are two inter-related points of interest in this context: the relative proportion of non-conventional documents and the proportion of material originating in Cameroon as opposed to that produced abroad. At present these ratios are not quite as high as we would like them to be, particularly in the IRZ database. This could be for several reasons. The databases are both relatively new, IRA's began in 1987 and IRZ only began working on theirs in 1989,

neither yet contains records of all the library holdings. IRZ's database, with less than 650 records, represents only the major library holdings. We can expect these two ratios to increase as more material is added.

Within the framework of the MESIRES/ORSTOM project, ORSTOM has prepared a database on Cameroon consisting of references to all documents produced by ORSTOM or prepared by authors working for ORSTOM over the period 1947-1984. This database has been published as a printed bibliography[14] and the documents themselves are all available on microfiche. Table 4 presents the basic characteristics of this database. It is instructive to compare this table with Tables 2 and 3 referring to the IRA and IRZ databases. In the ORSTOM database 45% of the documents are classified as non-conventional and 43% of the material is produced in Cameroon. Of this Cameroonian material, the vast majority (90%) consists of monographs and of these 83% are classed as non-conventional.

Table 2. Characteristics of the source material in the IRA database

SOURCE	%
Cameroon	30
Other franc. Africa	6
Anglophone Africa	7
France	20
Other W. Europe	17
N.America	10
Latin America	6
Asia	4

NUMBER OF RECORDS	4889

LANGUAGE	%
English	50
French	49
Spanish	1

TYPE OF DOCUMENT	%
Monograph	95
Serial article	5
Conference paper	20
Non-conventional	50
Thesis	2

Table 3. Characteristics of the source material in the IRZ database

SOURCE	%
Cameroon	16
Other franc. Africa	3
Anglophone Africa	9
France	20
UK	20
Other W. Europe	14
N.America	16
Other ind. countries	2
Other dev. countries	<1

NUMBER OF RECORDS	641

LANGUAGE	%
English	70
French	30

TYPE OF DOCUMENT	%
Monograph	75
Serial article	25
Conference paper	10
Non-conventional	30
Thesis	10

If the IRA and IRZ databases are to serve as a means of disseminating information about research activities in Cameroon and of generating the bibliographic indicators needed, then we must ensure that the national system strives to collect and process as much of the non-conventional material as possible. The development of an information network around the country will promote this process by shifting responsibility for collection from the headquarters library and documentation centre to the units in the regional centres and stations, who will usually be closer to the researchers generating this information.

Table 4. Characteristics of the source material in the ORSTOM Cameroon database

SOURCE	%
Cameroon	43
France	46
Chad	3
Other countries	8

NUMBER OF RECORDS	2740

LANGUAGE	%
English	97
French	3

TYPE OF DOCUMENT	%
Monograph	70
Serial article	30
Conference paper	12
Non-conventional	45
Thesis	2

Linkages with the international community

How do we ensure that research carried out in Cameroon is communicated to the international research community? More specifically, how do we report our findings to researchers in other developing countries, who may well be working on similar problems? We know that developing country material, particularly in the agricultural sciences, is usually not well covered by the general international databases[15], so how do we ensure that meaningful indicators are generated?

In an early survey of national contributions to three selected abstracting journals (*Plant Breeding Abstracts*, *Dairy Science Abstracts* and *Biological Abstracts*), only 28 articles were reported from Cameroon over the period 1948 to 1973[16]. Over a similar time period, we find that the ORSTOM Cameroon bibliography contains 58 references to conventional journal articles and 83 references to conventional monographs published in Cameroon between 1947 and 1973. Of course, these documents cover all aspects of research and only a few of the monographs were found to be strictly relevant to agriculture, the majority dealing with hydrology, medicine and linguistics. However, the 58 journal articles were nearly all of interest, the majority drawn from the three Cameroonian titles *Recherches et Etudes Camerounaises*, *Revue de la Chambre de l'Agriculture, de l'Elevage et des Forêts du Cameroun* and *Le Cameroun*

Agricole, Pastoral et Forestier. We can safely assume that the abstract journals studied by Boyce and Evenson did not cover these titles at that time.

Our own work on crop science publications from sub-Saharan Africa using the entire CAB Abstracts database produced rather higher figures for Cameroon[17]. Table 5 presents the gross annual crop science publications output from government researchers in Cameroon over the period 1973 to 1982. These figures may be rather inflated since they are taken directly from online searches on the database (they do not allow for irrelevant documents nor for duplication, a particularly serious problem with the CAB database in the earlier years).

Table 5. Gross crop science publications from government researchers in Cameroon, 1973-1982

Year	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
No.	24	16	11	29	24	16	19	12	15	19

Source: Bennell and Thorpe[2].

Actual abstracts were only examined for three years during this period (1973, 1978 and 1982); the results of this evaluation are presented in Table 6.

Table 6. Evaluated crop science publications from government researchers in Cameroon, 1973-1982

Year	Type of publication			Authorship		
	Nat./Reg.	Int./Non Afric	Books/Proc.	Expat.	Nat.	Jnt.
1973	-	23	-	23	-	-
1978	-	9	1	7	2	1
1982	4	5	3	4	7	1

Source: Bennell and Thorpe[2].

We can conclude from these data that publications output from Cameroon (in common with the majority of sub-Saharan Africa) has decreased markedly over the period 1973 to 1982. There was a concomitant marked changed from 100% expatriate authorship in 1973 to 60% national authorship in 1982. We can also note a move from 100% publication in international/non-African journals in 1973 to 40% in 1982, with 35% in national or regional journals, and 25% in books or conference proceedings.

The most appropriate international database for agricultural research information from developing countries is the FAO's Agris. IRA is the national Agris centre, responsible for the contribution of bibliographic records from Cameroon to the international database. We are therefore working to increase the input of Cameroonian material, both published and non-conventional, to our own national database and hence to Agris. Other regional databases, such as

RESADOC (Réseau sahélien de documentation et d'information scientifiques et techniques), may serve a similar purpose[18]. An interesting variation on this theme is presented by SESAME, a cooperative database of francophone tropical agricultural literature, which is distributed on CD-ROM (compact disc, read only memory)[19]. The first release contains some 50,000 records contributed by four French organizations, including CIRAD and ORSTOM, plus the Faculté des Sciences Agronomiques at Gembloux (Belgium) and the Institut Sénégalais de Recherches Agricoles (ISRA). Material contributed from the IRA and IRZ databases is scheduled to be included in the next release.

CONCLUSION

It is essential that agricultural research results are effectively disseminated to all clients of the research system --other researchers, both in country and abroad, extension workers, agro-industrialists, political decision-makers, etc. Publications, whether conventionally produced or not, are the prime means of achieving this aim. We must critically examine our publication and dissemination procedures, and explore new avenues which may be more appropriate in the present situation. In whatever form the information is disseminated, whatever medium is used as the information carrier, we must ensure that it is brought under adequate bibliographic control. To guarantee that our research results reach workers outside the country, we must ensure that our national database is constructed in accordance with international standards and that we can effectively participate in international cooperative systems. Only if we succeed in all these areas can we hope to produce truly meaningful indicators of agricultural research activity in developing countries. This is the path we are progressing down, albeit slowly, in Cameroon, and I believe that it is the right one.

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