RESEARCH OUTPUT IN RABBIT SCIENCE AND PRODUCTION EMANATING FROM SUB-SAHARAN AFRICA – IMPLICATIONS FOR FUTURE RESEARCH AND DEVELOPMENT EFFORTS

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ABSTRACT

This study examined the trend and quantum of research output in all aspects of rabbit science and production emanating from sub-Saharan Africa, with emphasis on their relative contributions to the development of viable and sustainable smallholder rabbit units. The hypothesis was that a high proportion of research works in rabbit science and production is not client-based and, therefore, has poor uptake or adoption rate by the preponderant smallholder rabbit units in the region. The objectives of the study were: to examine the trends in scientific research outputs in all aspects of rabbit science and production and to assess the contributions of Research & Development (R&D) in rabbit science and production that are oriented towards smallholder units. Publications were sourced from journals, conference proceedings, bulletins, technical reports and grey literature from 1990 to 2007. Data recorded from each publication included names of authors, year of publication, country of origin, area of publication. Each publication was categorized based on the following criteria: basic or applied research, on-station versus on-farm research, uni- or multi-disciplinary, or conducted with external collaboration or funding. An index of possible applicability of research findings was used to classify the papers. In all, a total of 115 publications were sourced from the literature for the period covered by the study. Results showed that over 80% of the publications were basic research output, uni-disciplinary in nature, and were conducted under on-station conditions, while about 10% of the research studies had some form of foreign collaboration through technical support and/or funding. Publications in journal papers accounted for 88% of the publications, while the rest were from Conference Proceedings (mainly World Rabbit Congresses) and other reports. The index of potential applicability of research output showed that over two-thirds (or 68%) of all the research results needed further trials to adapt the technologies to existing conditions of backyard rabbits units. Strategies for a new research agenda to boost R&D efforts to promote smallholder rabbit production are discussed.

Key words: Rabbit science, Sub-Saharan Africa, Smallholder rabbit units, Research output.

INTRODUCTION

Sub-Saharan Africa continues to be plagued by problems of extreme poverty and malnutrition. According to the official statistics of the Food and Agriculture Organization (FAOSTAT, 2004), one out of every three people in the region is undernourished. In order to address this issue, the scientific community has frequently been challenged to get more involved in addressing humanitarian emergencies related to hunger and starvation. In a recent speech to the United Nations, the British Prime Minister, Gordon Brown, called on the global scientific community to apply its creative genius and innovative flair in solving the challenges facing the world's poorest countries (SciDev. Net, 2007). According to the Owen *et al.* (2005), research and development approaches in livestock science could play a critical role in the drive towards poverty reduction and food security. Over the years, scientists have come to agree that the domestic rabbit possesses numerous qualities that can make it contribute to family welfare and food security (Owen, 1976; Cheeke, 1986). On account of their preponderance and contributions to food security, these authors and others have suggested that priority should be given to research on rural and backyard rabbit production systems. Lukefahr and Cheeke (1991a) called for applied research to be conducted in developing countries in all aspects of rabbit production.

According to Lukefahr (2007), a dynamic and viable rabbit breeding industry depends on a cadre of rabbit scientists who engage in research activities that directly solve farmer problems. The extent to which rabbit research efforts is focused on such units is not clear. It becomes essential to examine the trend as well as analyze the current situation in rabbit research in sub-Saharan Africa over the past two decades, so as to make recommendations on ways to improve research efficiency. The objectives of this study are: to examine trends in research outputs in all aspects of rabbit science and production, and to assess the contributions of R&D in rabbit science and production that are beneficial to smallholder rabbit units.

MATERIALS AND METHODS

Scientific publications from 1990 to 2007 emanating from sub-Saharan Africa (SSA) were sourced from journal papers, conference proceedings (especially the World Rabbit Congresses), bulletins, technical reports and grey literature. From each publication the following data were recorded: country of origin, publication outlet (e.g. journal or proceedings), area of research, (e.g. nutrition, breeding & genetics, reproduction, extension, etc., basic or applied research, Uni- or multi-disciplinary, on-station or on-farm, or both, research, or development or R&D, defined as a form of scientific investigation with a developmental focus, usually involving end-users (in this case, e.g. rabbit farmers), funding source(funded or not indicated), developmental focus/ impact on livelihoods, external collaboration (i.e. links to institutions/NGOs/foundations), for on-farm studies, total number of communities or villages involved, as well as the number of farms per village, duration of on-farm studies, impact assessment of on-farm research, funded research and source of funding (as indicated in the acknowledgement section of each paper. Index of potential applicability (Morand-Fehr *et al.*,2004) categorized as follows: category "0" represents research outputs with no possible application whatsoever; category "1" represents research outputs with eventual application after carrying out other trials to adapt the technology to existing conditions in smallholder farms; category "2" represents research outputs with possible application of results and category "3" represents research outputs with direct applicability of results (Morand-Fehr *et al.,* 2004). Data analysis was done using univariate and frequency procedures of SAS (1998).

RESULTS AND DISCUSSION

Figure 1a shows the trend across the years for research outputs emanating from sub-Saharan Africa, from 1990 to 2007, for all data and for a subset of the data with publications in Nigerian Journals excluded. This was done in order to remove any "access bias", since it was much easier to have access to rabbit journal papers published in Nigeria than publications from other countries in sub-Saharan Africa. The year trends for the two curves were approximately similar, with research outputs showing some fluctuations from 1990 to 1996, and becoming fairly stable thereafter. A similar trend is shown in Figure 1b. Both charts showed a slight difference in research output with the inclusion of rabbit research papers from Nigerian local journals. Thus, subsequent interpretations were based on the full data. Figure 2 shows the distribution of rabbit research papers by publication outlets. About 88% of all the research outputs (or 101 papers) were published in Journals, while 10% were published in conference proceedings, principally, in World Rabbit Congresses, while the remaining 2% were from "other" outlets, including technical reports and books. Figure 3 shows the distribution of rabbit research papers by various Conference Proceedings.

Figure 1a (left) and 1b (right): Year trends for research output in rabbit science and production in sub-Saharan Africa

Over two-fifths (or 46%) of the papers were published in the 6th World Rabbit Congress, while 18% and 27% were published, respectively, in the 7th and 8th World Congresses. The remaining conference papers (9%) came out in the Associations of Institutions of Tropical Veterinary Medicine (AITVM), which holds annually in Germany.

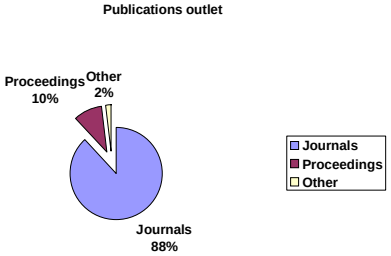

Figure 2: Distribution of rabbit research papers by publication outlet.

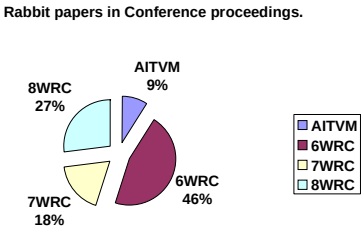

Figure 3: Distribution of rabbit research papers by various Conference Proceedings

Figure 4 shows the distribution of research papers by the nature of research, classified as uni-disciplinary or multi-disciplinary. Results show that over four-fifth (or 83%) of the papers were uni-disciplinary, indicating low level of interactions among the different disciplines within animal sciences and across disciplines, involving economics, extension, sociology/gender studies, etc. According to Conroy *et al.* (2002), livestock researchers have traditionally, focused on a mono-disciplinary approach to solving problems relating to livestock, instead of system-based approach to research. These authors agree that in order to link research to development, it becomes necessary to move from a mono-disciplinary to a multi-disciplinary approach. This will involve the establishment and strengthening of multi-disciplinary research collaborations.

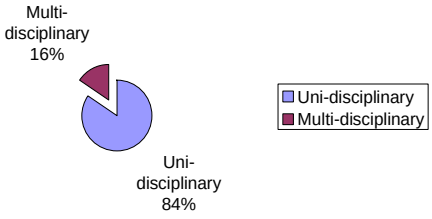

Figure 4: Distribution of research papers by the nature of research.

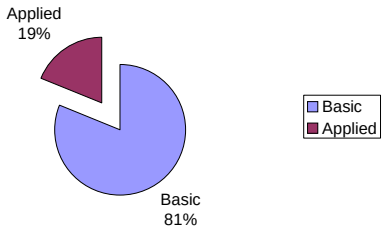

Figure 5: Distribution of research papers by the type of research

Figure 5 shows the distribution of research papers by the type of research, classified as basic or applied research. About 81% of all the research outputs were found to be basic research, with very low potential for possible applicability under smallholder operations. Figure 6 shows the distribution of research papers by the location where study was conducted, classified as on-station or on-farm. About three-quarters (or 72%) of all the research outputs were conducted under on-station conditions, in University Agricultural Research Station, while 26% of the studies were done on-farm. Most of these on-farm studies are either surveys or short term trials. Thus, a major limitation with such trials is that they do not allow a full assessment of the entire production process. Though on-station comparisons are valuable, but their application is limited by high costs and possible genotype-by-environment interaction effects. The implication of this finding is that only a small proportion of research works are focused on the requirements of smallholder rabbit producers. Bang (1999) and Finzi (2000) emphasized the need for scientists to give priority to research under on-farm and rural backyard systems. Figure 7 shows the distribution of research papers by the involvement of funding agencies. About 90% of the papers had no external funding while the remaining 10% had some form of funding. Major funding agencies include Heifer International (HI, formerly HPI), United States Agency for International Development (USAID), Institute National de la Recherche Agronomique (INRA), Food and agriculture Organization (FAO), Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), IRAD, NORAD, etc. Incidentally, research outputs with funding support also had some R&D components and involved smallholder operations, and most likely, had a poverty alleviation focus. This is not surprising, since a major requirement by granting agencies is for research designs that

involve farmer participation and on-farm research. Figure 8 shows the distribution of research papers by journal outlet. About 38% of the papers were published in the duo of the defunct Journal of Applied Rabbit Research and World Rabbit Science (JARR + WRS), while 25% of the papers came out in Livestock Research for Rural Development (LRRD).

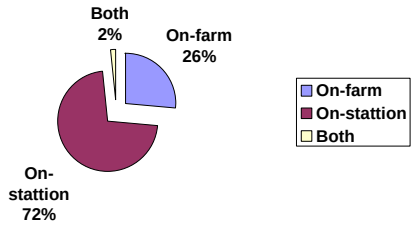

Figure 6: Distribution of research papers by location where study was conducted.

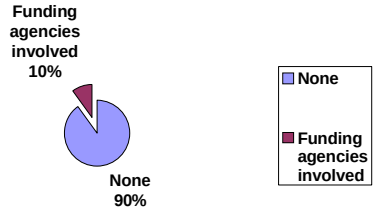

Figure 7:: Distribution of research papers by the involvement of funding agencies

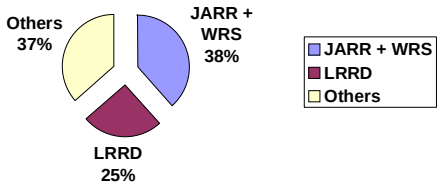

Figure 8: Distribution of research papers by journal outlet.

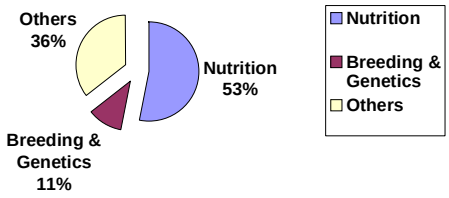

Figure 9: Distribution of research papers by areas of specialization

These journals together, represent almost two-thirds (63%) of all the research outputs from sub-Saharan Africa covered between 1990 and 2007. Table 6 shows the distribution of research papers by the areas of specialization. Over half of the papers (53%) were based on nutritional studies, while Breeding & Genetics had 11%. All other areas (reproduction, health, production system, economics/marketing, extension, etc) were under-represented, and recorded the remaining 36%. Since most of the studies (>72%) were done under on-station (intensive) conditions, it may be difficult to apply such findings to backyard systems. As a solution, Lukefahr (1999) cited examples of unconventional research works in rabbit nutrition in several developing countries, with a focus on alternative feeds and feeding systems which can support low-cost rabbit farming systems on small farms. Studies on rabbit Breeding & Genetics mostly evaluated purebred rabbits (especially the New Zealand White, Chinchilla and Californian) in various two-breed and three-breed crosses to determine most suitable genotypes under on-station conditions. It is worthy of note too, that about 4% of the studies represents research output on topics relating to extension, while economics and marketing had a trivial 4% of the output. There is the concern about the low level of research dedicated to extension as well as technologies related to rabbit meat processing using local recipes, and the effect of this on the acceptance and promotion of rabbit meat. Such research will further contribute to the popularization of rabbit meat in each locality in sub-Saharan Africa, a major boost to the promotion and acceptability of rabbit meat in the region. Table 1 show the distribution of research papers by the index of potential applicability of research under smallholder operations. Over two-thirds (68%) of all research outputs belong to “category 1” defined as the research outputs with eventual possible application after carrying out further trials to verify or adapt the technique to existing conditions in smallholder units (Morand-Fehr *et al.*, 2004). About 18% fell into “category 2” which represents research outputs with possible research applications. Results show that for 9% and 5% of all research outputs respectively, had direct application and no application respectively. The overall average coefficient of applicability (from Table 1) was 1.33, which indicates a low level of research uptake or applicability, especially under backyard systems. The high proportion of research outputs falling into categories 0 and 1 (73%) portends a worrisome trend. It implies that most of the studies do not have a clientele-focus, and most probably, do not arise from a “needs assessment” of smallholder rabbit units.

Table 1: Distribution of research papers by the index of potential applicability of research

Index of applicability	Number of papers	Frequency (%)
0 (No possible application)	6	5.22
1 (More tests required)	78	67.83
2 (Possible application)	21	18.26
3 (Direct application)	10	8.69
All	115	100.00
Overall index score = 1.33		

This trend could possibly be reversed with the adoption of participatory on-farm research, where the farmer and other end-users participate in the design, validation and endorsement of new technologies. There is the need to design a new research agenda with a special service delivery to backyard rabbit units. All researchers working in all aspects of rabbit science and production must work as a team, identify research priorities and define a common research agenda tailored towards the needs of smallholder units. This will require a major paradigm shift among researchers and institutions. According to Conroy *et al.* (2002), to make research more pro-poor requires changes in the attitudes and behaviour of researchers, which can be facilitated by supportive policies and requisite resources, as well as training in participatory systems-based on-farm research.

CONCLUSIONS

Results of this study showed that most of the research outputs in all aspects of rabbit production and management are mostly basic and uni-disciplinary research, that are mostly, not clientele-based, with low R&D focus. Most of the studies were on rabbit nutrition, and were conducted under on-station conditions. The index of potential applicability of research outputs indicated low potential uptake of research findings by rabbit farmers.

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