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USAID-SUPPORTED ANIMAL RESEARCH[1]

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ABSTRACT

United States Agency for International Development (USAID)-funded livestock research projects in effect during the period 1975 to 1985 have been reviewed. Some of these projects are entirely related to livestock, but often the livestock research is merely one component of a complex USAID research project. The projects may be country-specific, regional or worldwide. Generally, livestock research programs are funded for 3 to 10 yr and may be supported by different bureaus/divisions/offices within USAID or jointly funded with other international donors. Several of the International Agricultural Research Centers also received USAID support for activities concerned with livestock research. Annual funding per project varies from $15,000 to $4,000,000. Some projects give attention to only one species of livestock while others include several species for the purpose of improving the production of milk, meat, fiber, or draft power. Although USAID also funds other programs on livestock that involve policies, development and technology transfer, the total subject of livestock receives only a small portion of the overall USAID focus on agriculture. The amount of support by USAID to livestock research as well as livestock production for developing countries, is on the decline.

(Key Words: Development Aid, International Organizations, Livestock.)

Introduction

In general, the United States Agency for International Development (USAID) historically has directed over 50% of its Development Assistance funds toward Agriculture, Rural Development and Nutrition projects in the developing countries. This emphasis on rural and agricultural areas results from both the potential for increased agricultural production, and the fact that roughly 60% of the economically active population in these countries is employed in the agricultural sector, accounting for roughly 40% of the gross domestic product. For these countries to progress economically, it is necessary to improve the efficiency of the agricultural sector, thereby increasing rural employment, income and production. While the greater part of these programs have been focused on the production of food crops, the role that livestock plays in the production process does receive some attention.

The countries of the developing world contain 58% of the world's total land area, with 60% of the world's permanent pasture and 53% of the world's arable land. These countries have 65% of the world's cattle, 53% of the world's sheep, 56% of the world's pigs and 95% of the world's goats. Yet this animal population accounts for only 38% of the world's total meat production. Even more revealing is the fact that while the developing countries have 50% of the world's milk cows, they produce only 17% of the world's production of whole fresh milk. Also, while 95% of the world's goat population is found in these countries, they produce only 73% of the total goat milk. (It is suspected that the values of milk production for developing countries may be slightly on the low side because of on-farm consumption not completely accounted for in the estimations.) Values presented in table 1 illustrate differences in livestock numbers and production between developed countries.

Focus on Animal Research by USAID

It must be noted that the scope of this topic is extremely complex within the USAID system. For example, some animal-related programs sup-

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TABLE 1. WORLD LAND USE AND SELECTED LIVESTOCK PRODUCTION FACTORS[a]

Item	Total world	Developed countries	%	Developing countries	%
Total land (×1000 ha)	13,077,470	5,484,640	42	7,592,747	58
Arable land	1,368,984	649,629	47	719,355	53
Permanent crops	99,615	22,706	23	76,909	77
Permanent pasture	3,171,991	1,272,708	40	1,899,285	60
Forest and woodland	4,090,126	1,828,654	45	2,261,472	55
Other land	4,346,681	1,710,953	39	2,635,728	61
Livestock numbers (×1000)					
Cattle	1,226,432	427,190	35	799,243	65
Sheep	1,157,690	542,923	47	614,767	53
Pigs	763,813	332,953	44	430,850	56
Goats	472,784	25,681	5	447,103	95
Total red meat production (×1000 t)	144,615	89,637	62	54,978	38
Total milk cows (×1000)	226,354	113,877	50	112,476	50
Cow milk production (×1000 t)	437,909	362,651	83	75,258	17
Total goats (×1000)	472,784	25,681	5	447,103	95
Goat milk production (×1000 t)	7,695	2,075	27	5,619	73

[a]United Nations, Food and Agriculture Organizations' Yearbook on Production (1982).

ported by USAID funds are strictly research, while others combine research with development and extension. In fact, most of AID's animal programs focus only on development support. Also, some programs include mixed livestock species, while others are species-specific and are either oriented toward one component of animal production such as a disease control/eradication effort, or are multidisciplinary in scope. Sometimes poultry, rabbits, fish, wildlife, etc., are included in the USAID context of animal activities, while at other times they are excluded. Also be aware of the fact that funding sources and the administration for animal programs may involve only one unit of the "USAID family" or include multiple USAID units, other U.S. State government agencies, international organizations, other developed country collaborators and host country contributors. One of the previous papers in this symposium referred to a project titled the Small Ruminant-Collaborative Research Support Program (Small Ruminant-CRSP) in which nine U.S. universities and a U.S. foundation are contributing to a USAID-funded livestock research program. In this agreement, the United States institutions are providing some matching funds to the grant funds from the USAID. Comments on the complexity of USAID-supported animal research activities could be continued here, but the subject will receive additional attention in the following material.

For the purposes of this presentation, a review of USAID-supported livestock projects, containing at least an element of research, has been summarized for the period of 1975 to 1985. Some of the projects have been initiated in this period, others have been terminated, and a few have been in existence for the entire interval.

USAID-Funded Research

One of the newest agricultural research support programs in the Bureau for Science and Technology is funded by the Office of Research and University Relations (S&T/RUR). A total of 11 grants in fiscal year 1984 and 26 grants in fiscal year 1985 were awarded to historically Black Colleges and Universities (1890 institutions) by S&T/RUR. Of these 37 research grants, five pertain to research with livestock species. The species receiving attention in these five projects are: guinea fowl, rabbits, sheep, cattle and goats. These RUR grants are generally of short duration, with funding in the range of $35,000 to $100,000 for the life of the

project. The projects show a strengthening element for the 1890 institutions as well as an application to problems in developing countries. To date, the number of research proposals submitted far outnumber those accepted for funding.

Another recently initiated program is administered by the Office of the Science Advisor (SCI) to USAID in which innovative research projects are considered for short-term, minimum level funding. This program has been active for the past 3 yr and includes projects related to livestock production constraints in developing countries. During this period, at least 13 research projects have been funded to United States and developing country institutions on livestock-related topics. Examples of these are:

1) Utilization of cassava and waste through fermentation technology,
2) Development of solid fermentation technologies to upgrade the quality and utilization of coffee pulp as an animal feed,
3) New approaches to the control of bovine babesiosis,
4) Improved management of fodder trees in the terai and outer Himalayas and
5) Development of defined diet for in vitro membrane mass rearing of the tsetse fly.

These grants may be in effect for up to 3 yr and received USAID support up to $200,000 for the life of the project. Again, the number of research proposals submitted to the Science Advisor's Office greatly exceeds those accepted for funding.

One of the major budget items for the Bureau of Science and Technology (S&T) of the USAID in the past 10 yr has been for the support of the International Agricultural Research Centers (IRACS), some of which are actively engaged in livestock research programs. These IARC have established links with national research programs to form a key element in global research networks for supplying improved technologies needed to expand food production. The IARC involved in animal related research activities and their principal areas of investigation are as follows:

The International Laboratory for Research on Animal Diseases (ILRAD), Kenya

The program at ILRAD is directed toward the control of trypanosomiasis and theileriosis (East Coast Fever). The ILRAD has isolated different strains of the diseases, and immunity to single strains has been demonstrated. The laboratory is trying to develop cross-immunization, which would protect an animal from any strain of the disease in a given area. Substantial progress has been made in the case of East Coast Fever, and the center hopes to produce a general vaccine against the disease within the next 5 yr. Trypanosomiasis research has proceeded more slowly, due to the very complex nature of the pathogens antigens variation. An understanding of the genetic mechanism involved is vital to the center's efforts to treat and prevent the disease in sheep, cattle and goats. The ILRAD is also cooperating with ILCA in a study of trypanotolerance in cattle.

International Livestock Center for Africa (ILCA), Ethiopia

The ILCA is mandated to generate improvements in livestock production through research, training, and communications. The research program is directed toward production systems involving large and small ruminants. The ILCA is cooperating with ILRAD to study actively the productivity and adaptability of trypanotolerant livestock breeds, and coordinates a six-country network for trypanososmiasis tolerance research. The center has assembled a large data based on the role of livestock in traditional farming systems in rangeland, subhumid and humid areas. The ILCA also has developed effective pasture management packages for sheep and goat producers, and is conducting research on improved technologies for animal traction. The center has found that livestock productivity complements and increases crop production, rather than competing. The major activities of ILCA are grouped into four areas.

Appropriate Technology. The ILCA is researching various interventions, that impact on livestock use. These include increasing the efficiency of draft animals through improved implements, the use of forage banks as a high-quality feed source for livestock during times of nutritional stress and improved means of constructing livestock impoundments.

Trypanosomiasis. The ILCA is conducting research to identify the conditions under which breeds that are tolerant to trypanosomiasis can produce most economically, and to introduce appropriate systems of production that harness the potential of such breeds.

Forage Legumes. The ILCA is researching the use of forage legumes in crop-livestock systems, focusing on how legumes can be used to replace fallow in crop rotations to fix soil nitrogen for future crops and provide high-quality feed for domestic ruminants.

Livestock Policy. The ILCA conducts studies on key policies issues affecting livestock production in Africa. Work is concentrated on three subjects: 1) financing of livestock services, 2) comparative analyses of livestock sectors and 3) effects of importation of livestock products on domestic markets and production systems.

Stimulation of Research. The ILCA is conducting seminars and workshops to disseminate the research results they are obtaining and encourage further applied research in these types of problems throughout Africa. It also operates a large information service for African livestock researchers.

International Center for Tropical Agriculture (CIAT), Colombia

The CIAT has a Tropical Pastures Program as a major research activity. This effort concentrates on improving forage production on acidic, infertile soils of the tropics. The program seeks to identify and further develop grass and legume species that are adapted to the prevailing conditions, and assure high performance in animal production systems. The activities include germplasm and pasture evaluation in production systems. To evaluate these forages, CIAT maintains a network of major screening sites and regional trials throughout Central and South America.

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), India

The ICRISAT is researching the dynamics of crop-livestock systems through its research on farming systems. Draft animals are an essential component of the centers improved vertical management package. Research has also been conducted that shows the role that common property plays in providing for improved nutrition. Livestock products are an important benefit received through the individuals use of common property for livestock feed. The ICRISAT is also researching means of improving forage production and management strategies for semi-arid regions.

International Center for Agricultural Research in the Dry Areas (ICARDA), Syria

Recognizing the important role of livestock in dry area farming systems, ICARDA's research activities include farming systems research to study the interactions of livestock, agronomy and economic factors in farm productivity. Milk, meat and wool production are especially important in the barley producing areas. The center also conducts forage research projects that concentrate on the use of legume-cereal rotations. To increase both crop and livestock production, expansion of efforts in these two topics is as follows:

Livestock in Farming Systems. The ICARDA is investigating improved nutritional strategies based on pastures, hays and straws, and assessing the economic benefits of these changes on sheep and crop productivity at the farm level. The focus is on Crop-Livestock Integration and Pasture Crops and Animal Nutrition. The ICARDA is carrying on this research through on-farm forage and grazing trials, and through the research/selection of dual purpose grain-grazing cultivars of crops such as barley.

Pasture and Forage Crops Improvement. The objectives of this activity are to increase the availability of pastures and forages to livestock, and, through the use of adapted legumes, improve soil fertility and ultimately yields of cereals. These investigations include the use of annual forages to replace fallow, and the improvement of marginal grazing lands, through the control of soil erosion, introduction of adapted plants, the identification of suitable grazing systems and improved management of the lands on the local level.

Some of the other projects that the Bureau for Science and Technology (S&T) has and(or) is funding may be familiar. One of the other reports in this symposium eluded to the Small Ruminant-Collaborative Research Support Program (Small Ruminant-CRSP), which happens to be the largest individual livestock research project presently being funded by S&T. This project is supported with $4 million per year by S&T funds. It also receives additional support from the 10 U.S. collaborating institutions, USAID missions, other international agencies and host country collaborators. Thus, the total annual costs for this program approach $7 million. Some of the findings from this project should also be of benefit to U.S. sheep and goat producers.

S&T is also presently funding a 5-yr project with the International Centre of Insect Physiology and Ecology (ICIPE) in Kenya. (This center is not a member of the IARC.) The goal of this project is to improve cattle production through the utilization of naturally acquired resistance to ticks and thus reduce pesticide (ascaricide) use. The research is attempting to develop tick control methods that rely on the acquired resistance of cattle to ticks instead of close-interval applications of acaricides The approach requires the protection of cattle against theileriosis (East Coast Fever) by naturally acquired immunity, by vaccination or by the use of curative drugs.

Prior to this project, S&T funded studies with ICIPE on the entomological aspects of tick populations and ecological differences in tick species. These former projects provided foundation information for the development and implementation of the present project with ICIPE.

An active S&T Farming Systems Support project also gives some attention to the livestock component of the small farmers in developing countries. However, this research project places major emphasis on food crop production and agricultural production policies.

Other livestock research projects that which S&T has funded in the past 10 yr are:

1) Mineral studies with ruminant animals,
2) Improved feed information systems,
3) Microencapsulated repellents and pesticides for vectors causing parasitic diseases,
4) Sterility method for tsetse fly control,
5) Research on bovine babesiosis,
6) Physiology and ecology of ticks,
7) Host resistance - integrated tick control,
8) Livestock production in wet dry areas,
9) Analysis of tropical livestock production,
10) Livestock production in the tropics,
11) Nutrition for ruminant livestock,
12) Control of vertebrate pests,
13) Hemoprotozoal diseases in livestock, and
14) Developing livestock research center for the Bahamas

The S&T also has funded many short-term projects that are realted to livestock research results and(or) might promote future research activities. For example, support has been given for the publication of some of the NRC (National Research Council) requirements, the potential of the water buffalo, the importance of African swine fever, biotechnology desired for animal disease prevention and establishing priorities for projects in livestock research.

So far, livestock research projects supported by the other bureaus of the Agency for International Development have not been mentioned. These other bureaus would be the regional and worldwide bureaus and(or) the divisions within these bureaus. Examples of these would be the Bureau for Africa and the Bureau for Food for Peace and Voluntary Assistance. Although these other bureaus, or their components, do support some research activities, their main emphasis is on development assistance projects that often include several different topics for attention. Often, the livestock research portion of the overall project is quite obscure. Projects funded by these bureaus, during the past 10 yr, which have large or small components of research concerning livestock are listed in table 2 with location and years of activity. It must be emphasized that the livestock research components in most of these projects did not play a major role in the project activities, but has been present to some degree.

No doubt, some of you have thought about other livestock projects in developing countries that have not been mentioned. For example, the project in Africa titled "Joint Campaign Against Rinderpest or the Animal Production Project in Viet Nam, which was funded at the level of $4.7 million annually. Yes, they were large, effective livestock-oriented projects but were not research oriented.

Future Directions

A few comments are in order on the possible future of livestock research projects to be funded by USAID. In the area of animal production and utilization, USAID is placing its research priority on the use of livestock in mixed-farming systems, including agroforestry. A high priority has also been placed on livestock in range-pasture systems, including both native and improved pastures. The major emphasis is on the use of ruminant livestock for food production and draft power, although it is recognized that attention should also be given to poultry, swine, and perhaps other species, in mixed farming systems. The AID has recently prioritized livestock research programs as follows:

1) Feed supply and feeding systems.
A) Development and evaluation of systems

TABLE 2. LIVESTOCK RESEARCH SUPPORTED BY OTHER BUREAUS WITHIN USAID

Project	Country	Years
Livestock development	Belize	1983–1988
Sheep, llama, alpaca production and marketing	Bolivia	1971–1981
Small farm management and technology	Chile	1978–1981
Mixed farming and resources management	Gambia	1979–1986
Univ. of Nairobi veterinary facility	Kenya	1971–1977
National range/ranch development	Kenya	1972–1982
Agricultural systems support	Kenya	1978–1986
Land conservation and range development	Lesotho	1980–1987
Mali livestock development	Mali	1974–1980
Livestock sector II	Mali	1982–1989
Agricultural research and training	Morocco	1974–1982
Range management improvement	Morocco	1980–1986
Resource conservation and utilization	Nepal	1980–1985
Niger range and livestock management	Niger	1976–1982
Integrated livestock production	Niger	1983–1988
Institutional development for livestock	Paraguay	1969–1978
Bakal range and livestock development	Senegal	1975–1985
SODESP livestock production	Senegal	1978–1984
Central range lands development	Somalia	1979–1988
Livestock marketing and health	Somalia	1984–1988
Blue nile agricultural development	Sudan	1978–1985
Western Sudan agricultural research	Sudan	1978–1987
Agriculture education--livestock production	Syria	1979–1984
Masai livestock and range management	Tanzania	1970–1981
Khon Kaen university research development	Thailand	1983–1989
Togo animal traction	Togo	1983–1986
Agricultural production--general and miscellaneous activities	Tunisia	1970–1977
Agricultural research	Tunisia	1982–1986
OMVS agronomic research	Central and West African regions	1975–1980
Botswana range and livestock management	South African region	1973–1980
Entente livestock II	West African region	1976–1984

for forage production and year-round feeding for both mixed farming and range-pasture enterprises.

B) Development and testing of methods or interventions to enhance feed utilization.

2) Control of diseases and insects

A) Development and testing of procedures for control of ticks worldwide, tsetse fly in Africa, and African swine fever in Africa, Latin America and the Caribbean.

B) Development of methods for the production of vaccines, including the use of biotechnological techniques.

C) Development of biological control procedures for pests.

3) Germ plasm improvement

Genetically incorporate disease and insect tolerance traits in susceptible animals and desirable production traits in low-producing animals.

4) Animal traction power

Development of improved animal traction systems including harnesses, implements and cultural practices to more effectively utilize animal power.

5) Socio-economic and public policy.

Development of improved understanding of socio-economic constraints and of public policies to promote more effective use of animals for food and power.

The information presented here on individual projects has been intentionally brief in order to cover as many of the areas as possible on the subject. There also may be some controversy on the authors' classification of the projects considered as livestock research. However, the authors did confer with numerous knowledgeable individuals on the subject and came to the conclusions presented. Livestock specialists within USAID have been disappointed that more attention has not been given to livestock

research in the past and that contemplated for the future; however, we need to continue to promote the importance of livestock in developing countries. The differences in livestock production factors between the developed countries and the developing countries is shameful and should be minimized. The potential for increasing livestock production in most of the developing countries is being sadly overlooked.

Conclusions

In general, the projects concerning livestock research may be active for 3 to 10 yr before they are replaced or eliminated. Some of the projects concentrate on one species, while others consider several species for the purpose of improving the production of milk, meat, fiber, and (or) draft power. Emphasis has been on improving the feeding, breeding, health, management, and marketing systems related to livestock production. Project participants in host countries may include ministries of agriculture, universities, extension services, private organizations, international agencies, and etc. Usually, attention to extension activities play a major role. Information transfer is usually accomplished by the research program, through training, workshops, and seminars. There is also a wide latitude in the funding levels of livestock research projects; these may vary from $15,000 to $4,000,000 per year. Some of the projects focus on constraints in one area of the world, while others consider world-wide production problems.

Appendix

Suggested Publications Pertaining to Subject Matter

AID Publication. 1985. Development Through Innovative Research. The First Three Years of the AID Program in Science and Technology Cooperation (PSTC). Office of the Science Advisor. USAID, Washington, DC.

AID Publication. 1985. Blueprint for Development. The Strategic Plan of the Agency for International Development. USAID, Washington, DC.

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