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FD-AAO-844
931-1155.11
SEP 3 1980

ACTION MEMORANDUM FOR THE DEPUTY ASSISTANT ADMINISTRATOR FOR FOOD AND NUTRITION, BUREAU FOR DEVELOPMENT SUPPORT

FROM : DS/AGR, Donald R. Fiester *by JDF*
SUBJECT: Water Buffalo Panel, National Academy of Science, Six Months Extension, unfunded. (Small Activity Project No. 931-1155.11)

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38716

PROBLEM: Your approval is required for a six months (from October 1, 1980 to March 31, 1981) unfunded extension of the Small Activity/Special Project Inputs for "Water Buffalo Panel-National Academy of Science" (Grant No. AID/DSAN-G-0130, Project No. 931-1155.11).

DISCUSSION: The water buffalo has played a prominent role in the agricultural program of small-scale farmers in many of the developing countries-particularly in Asia. These animals are also efficient utilizers (converters) of available resources (poor quality roughages) which are of little value for other purposes, in developing countries and they are "easy keepers". However, only about one-third of the full potential of the water buffalo are realized with present management practices. Factors needing attention include reproduction, genetics, nutrition, health (diseases and parasites), growth rates (meat), milk production, work efficiency, and management practices.

To increase meat, milk and draft power production efficiency requires a complete understanding of the status of knowledge on the subject and the development of practical recommendations for improving all of these factors. The National Academy of Science has demonstrated proficiency in such matters by completing similar projects with plant subjects in recent years (The Winged Bean, Leucaena, Guayule, etc.) and was awarded a contract to undertake a project for the water buffalo. In previous contracts of this type, committees of experts were assembled and they produced highly readable, illustrated booklets on these neglected plant species for researchers and administrators who have now applied their skills to develop the species into productive crops. Scientists, farmers and gardeners are growing these plants and improving their production and fulfilling their potential capabilities, in developing countries. Pre-contract contacts with animal scientists in many countries indicated that the water buffalo represented an animal counterpart portion to the plant programs just mentioned. Therefore, a USAID contract was developed for the National Academy of Sciences to organize an expert panel of U.S. animal scientists and researchers with experience in developing countries who appreciate the importance of the water buffalo. This panel is to produce a report containing realistic conclusions on the merits of the water buffalo relative to those of other domestic animals now used in developing countries. The report is to be an illustrative publication

DS/PO OFFICIAL FILE

926-12

that focuses on the animals potential and its limitations. The booklet should present the water buffalo in a manner particularly oriented toward use by decision makers and animal scientists involved in developing country programs. An USAID/NAS contract was approved to cover commitments made by the Grantee to complete program objectives during the period of April 6, 1979 through September 30, 1980.

In July, 1979 an international panel on water buffaloe met in Gainesville, Florida. Panelists were from Thailand, Australia, West Indies, Egypt, the Philippines, India, New Guinea, Portugal, Venezuela, Brazil and the United States. In August, 1979 a seminar was presented in Washington on the summaries of the panel discussions. A text for a publication has been drafted and reviewed by a committee. The draft has been revised as per suggestions and the revised draft was posted on August 15, 1980 for a second review and editing by a panel and committee. Although the text is complete, the editor plans to insert a few pictures which have not arrived from overseas sources. The task should be completed before March 31, 1981.

Due to the fact that publication review members are located in twelve different countries, it is unlikely that their responses will be received and/or that the booklet can be published before the termination date of the grant. Other details needing attention before final printings include reviews by the NAS editorial board and receipt of illustrative pictures from contributors. Therefore, the NAS has requested a six-month no fund extension to provide ample time to complete the publishing of this report.

RECOMMENDATION: That you approve the six month unfunded extension of this small activity as requested.

APPROVED: Joy Buhh

DISAPPROVED: _____

DATE: 9.12.80

Attachments:

- 1) Letter from Gikas to Darvin dated August 4, 1980.

Clearances:

DS/AGR/AP, JYohe	<u>MY</u>	Date	<u>9/2/80</u>
DS/AGR, SEngberg	<u>SE</u>	Date	<u>9/2/80</u>
DS/AGR, MMozyński	<u>MEM</u>	Date	<u>9/2/80</u>
DS/PO, BChapnick	<u>666v h</u>	Date	<u>7/5/80</u>
DS/PO, MRechcigl		Date	

NATIONAL ACADEMY OF SCIENCES

Handwritten signature/initials

OFFICE OF CONTRACTS AND GRANTS
2101 CONSTITUTION AVENUE
WASHINGTON, D. C. 20410

August 4, 1980

Mr. Morton Davin
Grant
Agriculture Nutrition Branch
Central Operations Division
Office of Contract Management
Dept. of State
Agency for International Development
Washington, D.C. 20523

RE: Contract No. AID/DSAN-G-0130
Expiration Date; September 30, 1980

Dear Mr. Davin:

The referenced contract has a current expiration date as indicated above. We have reviewed the work under this contract and as a result have determined that additional time is needed to satisfactorily complete the work contemplated.

The unexpended balance as of May 31, 1980 is \$19,222 for this contract and appears sufficient to cover all anticipated expenditures through the period of the requested extension.

Therefore we request that the contract be extended without additional funds until March 31, 1981.

If this request meets with your approval, we would appreciate having an appropriate amendment sent to us for execution at your convenience.

Sincerely yours,

Handwritten signature of Thomas Gikas
Thomas Gikas, Director
Office of Contracts and Grants

TG:jb

cc: Dr. V. Rajinowitch
Mr. H. Todd

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ATTACHMENT A

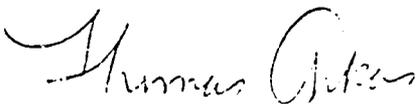
NATIONAL ACADEMY OF SCIENCES
NATIONAL RESEARCH COUNCIL

Commission on International Relations

Panel on the Water Buffalo:
its Potential for Developing Countries

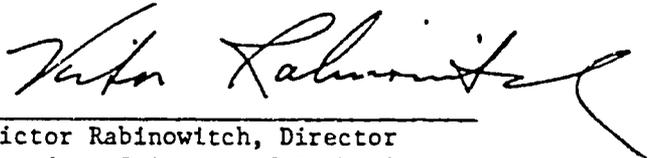
This proposal is submitted by the National Academy of Sciences which assumes full technical and financial responsibility under its Act of Incorporation for the work to be carried out under any contract resulting from this proposal

Contract Administration:



Thomas Gikas, Director
Office of Contracts and Grants
National Academy of Sciences
Telephone: 202/389-6213

Program Administration:



Victor Rabinowitch, Director
Board on Science and Technology
for International Development
National Academy of Sciences
Telephone: 202/389-6521

August 22, 1978

NATIONAL ACADEMY OF SCIENCES - NATIONAL RESEARCH COUNCIL

SUMMARY

This proposal to the U.S. Agency for International Development, is to request funds for the Academy to assist the Agency by assessing the state of knowledge and the future promise for developing countries of the water buffalo, bubalus bubalis. The Academy, through the Board on Science and Technology for International Development, will organize an expert panel of U.S. animal scientists and researchers from developing countries who have extensive experience with the husbandry of the water buffalo. This panel will produce a report containing realistic conclusions on the merits of the water buffalo relative to those of other domestic animals now used in developing countries. The result would be an illustrative volume report that focuses on the animal's promise and the limitations. The illustrated booklet will present the water buffalo in a style particularly oriented toward decision makers and animal scientists.

The attached Estimate of Costs of \$42,900 covers non-personnel costs for an 18 month period beginning November 1, 1978. The Academy requests authorization to charge personal services costs for this project to contract AID/ta-C-1433 of the DS/OST.

BACKGROUND

The Agency for International Development, through its June 1970 contract with the Academy, requested the Board on Science and Technology for International Development to establish an Advisory Committee on Technological Innovation (ACTI) to search for and assess developments in science that seem relevant to the solution of problems of developing countries.

In recent years ACTI has completed a number of plant studies that are attracting attention worldwide. These include:

Underexploited Tropical Plants with Promising Economic Value (21,000 copies in print);

Products from Jojoba: A Promising New Crop for Arid Lands (5,000 copies in print);

The Winged Bean: A High Protein Crop for the Tropics (13,000 copies in print);

Making Aquatic Weeds Useful: Some Perspectives for Developing Countries (12,000 copies in print);

Guayule: An Alternative Source of Natural Rubber (6,600 copies in print); and

Leucaena: Promising Forage and Tree Crop for the Tropics (12,000 copies in print).

Highly readable, these illustrated booklets have served to introduce those neglected plant species to researchers and administrators who have applied their skills and funds to develop the species into crops, with the result that hundreds of scientists, farmers, and gardeners are growing these plants and testing their products. Millions of dollars have been spent on this testing and so far the species are fulfilling their exceptional promise.

Discussions with animal scientists in Australia, Papua New Guinea, the Philippines, Thailand, Brazil, Guyana, Egypt and the United States indicate that the water buffalo represents an animal counterpart to the above mentioned plants.

Most animal scientists are unfamiliar with the water buffalo; it is an alien species not treated in university courses. Furthermore, it is often despised by the agricultural advisers sent to developing countries, and governments that wish to "modernize" are embarrassed by the presence of these animals. Even in the buffalo's native regions, technically trained agriculturists seldom study it. As a result, many myths and uncertainties surround the water buffalo and it is hard to determine the animal's true qualities. It is often considered

as only a "poor-man's beast of burden," but it seems to be potentially much more. Indeed, some researchers believe that it has global promise, for both tropical and subtropical, developing and developed countries alike. There are dozens of countries that probably should be testing it, but this is prevented by the lack of research.

The Water Buffalo

While there are some purebred water buffalo, most have little pedigree and are either the swamp type or the river type.

The swamp buffalo is slate gray, droopy necked, and oxlike, often seen in postcards and wooden statuettes from the Far East. Found from the Philippines westward to India, it wallows in any slimy puddle it can find or make, and it is distinguishable by its massive sweptback horns. It is used for traction and for meat.

The river buffalo is found even farther westward: from India to Egypt and Eastern Europe. Usually black, with coiled horns, it avoids mud and prefers clean water for wallowing. It produces much more milk than the swamp type and corresponds to a dairy breed in cattle. India's 600 million people depend on it and river buffalos make up about 40 percent of that Country's milk animals, and produce 60 percent of its milk. Buffalo milk is rich--its butterfat content is twice that of cow's milk--and buffalo butterfat is the major source of cooking oil (ghee) in India. Buffalo meat is also eaten, since it is not forbidden by religion.

The water buffalo is central to agricultural systems in Asian countries from the Phillipines and China to India and Pakistan. Researchers and decision makers in these countries are likely to be the major beneficiaries of the work described in this proposal. Nevertheless, the animal is not exclusively an Asian animal. Small numbers of water buffalo are actually well established on

several other continents including South America, Europe, and Australia.

A recent survey by the United Nations suggests that more buffalos are alive today than at any other time in history--perhaps more than 150 million. That figure is about one-seventh of the world's cattle population. The increase is fastest in those parts of the world not usually associated with the animal.

In Brazil's Amazon region, for instance, a few water buffalo introduced 40 years ago have multiplied to about 200,000 head and are still expanding. Buffalo meat and milk are now sold widely in Amazon towns and villages, and the meat sells at the same price as beef. One author claims that a two-year-old buffalo gives more meat than two three-year-old cattle. Neighboring Colombia and Venezuela are also exploiting water buffalo.

Across the Pacific the new nation of Papua New Guinea has found the water buffalo ideally suited to its difficult environment. Dr. John Schottler, head of buffalo research in Papua New Guinea, recently reported that for nine years they had unsuccessfully attempted to run cattle on the plains of the Sepik and Ramu Districts on New Guinea's north coast, but the cattle remain undernourished and underweight, as the temperatures are high, the forage is poor quality. A few years ago, buffalo were introduced from Australia and have performed spectacularly, producing more calves and much more meat than the cattle. Schottler believes that in the wet tropics buffalos maintain better appetite than cattle. The government of Papua New Guinea has since imported hundreds more water buffalo and now has thriving herds totalling almost 2,000 head.

Even in the cold of Eastern Europe buffalos thrive. They have been reared in Hungary, Rumania, and the Soviet Union since the Middle Ages, often brought by Crusaders returning from the Holy Land; in Italy, buffalos have grazed the swamps near Naples almost since the days of the Roman Empire. In Bulgaria, during the winter, blanket-draped buffalos are used to pull snowplows.

In African countries the water buffalo is largely unknown, except in Egypt where villagers eagerly adopted the animal about 1,300 years ago. Today, its exceptional qualities make it the most important domestic animal in that country. Indeed, during the last 50 years buffalo numbers have doubled and now top 2 million head. Buffalos supply Egypt with more meat--much of it in the form of very tender veal--than any other domestic animal. They also provide milk, cooking oil, and cheese.

It is remarkable that no other African country has yet seriously adopted the water buffalo. Yet the presence of small herds in three African countries suggest that there are no inherent barriers to the buffalos becoming a valuable new domestic animal in many nations south of the Sahara. In 1968 two small herds--gifts of the Egyptian government--were established in Tanzania. Reportedly these have acclimatized well at Mpwapwa, in the country's central savanna, and at Mabuki, near the shores of Lake Victoria. In 1971 Uganda imported ten water buffalos from India: little more than a year later, the herd had almost doubled and the animals were proving docile, productive, and healthy. In 1969 Mozambique imported 100 herd from Italy. By 1972 the herd had more than doubled, establishing the nucleus of a breeding stock that promised considerable benefits to the country's livestock industry.

Water buffalo research is beginning in the United States as well. On Sunday, February 12, 1978, the first commercial herd ever imported into North America arrived. The 53 animals were rounded up on Guam and flown to the University of Florida by a Louisiana rancher who first read of the water buffalo's promise in a Smithsonian Magazine article written by a staff officer of the National Academy of Sciences.

These animals, together with five others purchased from the Toronto Zoo some years ago, have convinced University of Florida researchers that the buffalo

has qualities previously unrealized. For example, when fed an adequate diet, they breed as fast as cattle, even though their gestation period is longer. They appear better adapted to cold weather than Brahma cattle and to Florida's hot weather than European cattle breeds. Though docile and undemonstrative, they seem more intelligent than cattle. Perhaps the most significant finding is that the water buffalo is not so much a competitor as a supplement to cattle. It seems able to thrive on marginal environments where cattle can't survive, such as, on coarse, nutrient deficient grasses and succulent aquatic plants containing little dry matter.

Another apparent myth is the claim that water buffalo must have water for wallowing. Although they love wallowing - (and when raising them it is best to allow it) - it does not seem absolutely necessary. The University of Florida herd is provided no wallow. In northern Australia, hundreds of thousands of buffalos survive an extended dry season each year, and Malaysian scientists have shown that the animals grow equally well when prevented from wallowing. However, in all these cases, the animals were given shade as a substitute for a wallow. Nevertheless, if buffalo get near water they eagerly wade in--right up to their ears. Wallowing cools and moistens their skins and a mud cake deters insects and ticks. Tropical rainstorms give buffalo great pleasure, too: they stand in a downpour, eyes half-closed in blissful contentment.

Much of the current myth about buffalos is based on little data and is often prejudiced. For instance, it is widely quoted that water buffalo meat is tough and less desirable than beef. But at the University of Queensland, Professor Charles has reared water buffalo and cattle together under farm conditions for the past nine years. He reports that the buffalo steaks are lean, tender, and on sight almost indistinguishable from beef. Charles has conducted taste preference tests in which buffalo steaks were compared with those from

Angus and Hereford breeds, the major types of beef cattle. From all the cuts tested by the panel, the buffalo meat came in first and second. In Manila, two-thirds of the beef eaten in homes and restaurants is actually water buffalo.

PROPOSAL

The Academy's study on the water buffalo would seek to break through uncertainty, and to marshal facts and draw up a balanced appraisal.

It is planned to follow the method used successfully in the winged bean study. A group of prestigious U.S. cattle researchers would be pitted against the world's best buffalo experts for several days of confrontation, argument, debate, comparison and, it is hoped, agreement. This confrontation will generate much "heat" but it also should illuminate:

- the strengths and weaknesses of buffalos in comparison to those of other domestic animals
- the most crucially important gaps in our knowledge of the buffalo
- priorities for buffalo research
- situations where the buffalo has no role to play
- situations where the buffalo may have a major role
- the way buffalos "fit" together with other domestic animals in LDC and developed-country farming systems
- how to capitalize on a century of cattle research to make buffalo research most effective (mistakes to avoid, short cuts to take, modern techniques to apply).

Panel members will represent disciplines such as:

Environmental physiology

Reproduction

Physiology

Veterinary science (with emphasis on disease resistance)

Genetics and breeding

Nutrition

Meat and milk production

The product will be a report similar in format and style to former ACTI booklets on leucaena, winged bean, and guayule. It will contain many photographs selected to illustrate the major points made in the text. The attached Estimate of Costs contains funds for the production and distribution of 7,000 copies.

The report will:

- ° identify priority research areas leading to the improved use of water buffalo in agricultural systems, notably in Asia where the animal is now important
- ° introduce the water buffalo's promise to researchers and decision makers in countries where it is unknown.

The panel will meet at least once and will report no later than April 30, 1980.

The study will complement the 1974 FAO book on the water buffalo: there will be no discussion (except briefly in the introduction) of the world distribution of buffalos, no comprehensive bibliography, little or no history, no description of experimental detail, little description of species, types, breeds or skin color. Panel members will proceed beyond the FAO book and analyze what appear to them to be the strengths and weaknesses of water buffalo to the farmers in LDC's.

In particular the report will highlight key points that are still at issue between cattle proponents and buffalo proponents and it will determine water buffalo research areas that need priority attention to resolve such differences.

Particular consideration will be given to the buffalo's alleged ability to outperform cattle (i.e., to produce more meat and more calves on low-grade forage).

Written for the attention of agencies engaged in development assistance and food relief, officials and institutions concerned with agriculture in tropical countries, and scientific establishments with relevant interests, the report should stimulate greatly increased research on the barriers holding back water buffalo development.

JUSTIFICATION

As with the studies of the winged bean and underexploited tropical plants, the project proposed here by BOSTID would bring to the attention of the international development community a resource the world thus far has failed to recognize and exploit to its fullest potential. If the buffalo lives up to claims made on its behalf, it represents a highly significant animal resource whose potential has barely been touched. A better understanding of the water buffalo could be of incalculable value to developing tropical nations with marginal lands--unusable for crops, cattle and other domestic animals.

The National Academy of Sciences is exceptionally suited to undertake this project because of its capability to call upon the most competent American and foreign specialists from the relevant fields of science, and from organizations concerned with international agricultural development, to participate in an interdisciplinary examination of this subject.

No country has any deep technical knowledge of this animal, though a few knowledgeable individuals can be found scattered across 20 or 30 countries. But the U.S. has probably the greatest concentration of general animal husbandry talent in the world, though animal scientists here work on conventional animals like cows and hogs. The buffalo has been kept in obscurity by a general suspicion that is unworthy of comparison with cattle. The reticence of animal

scientists toward the buffalo may be justified, but the advantages of cattle over buffalos, and vice versa, have seldom been analyzed in an unbiased manner. The study proposed here will do this in a comprehensive manner for the first time. And, judging from the early results, there seems to be no reason why the water buffalo can't soon become a major contributor to the economies of both the southern United States and of developing nations that have moderate to heavy rainfall.

The study proposed here relates exceptionally well to AID's mandate to help the rural poor. In Asia, the Middle East, and Europe the buffalo is the only bovine animal that can live on the coarse grasses of the marginal land left to the peasant classes, and it adapts to small-farm and village situations better than cattle. Once a Chinese peasant woman told a visiting U.N. official, "To my family the buffalo is more important than I am. When I die they'll weep for me, but if our buffalo dies they may starve."

NATIONAL ACADEMY OF SCIENCES - NATIONAL RESEARCH COUNCIL

The Water Buffalo: Its Potential for Developing Countries

ESTIMATE OF COSTS

November 1, 1978 - May 31, 1980

1.	Travel Expenses		
	Domestic	5,058	
	International	<u>19,682</u>	24,740
2.	Communications and Shipping		4,600
3.	Materials and Services		10,200
4.	Indirect Costs		3,360
			<hr/>
			<u>\$42,900</u>

NOTE: Personal services will be provided under Contract AID/ta-C-1433.

* It is understood that the contract will provide for advance payments.

NATIONAL ACADEMY OF SCIENCES - NATIONAL RESEARCH COUNCIL

The Water Buffalo: Its Potential for Developing Countries

ESTIMATE OF COSTS

November 1, 1978 - May 31, 1980

Travel Expenses

Domestic

4 Fla ctte @ 100 fare	400		
1 Calif ctte @ 406 fare	406		
1 Minn. ctte @ 250 fare	250		
2 Kansas ctte @ 258 fare	516		
1 NY ctte @ 200 fare	200		
1 NC ctte @ 170 fare	170		
3 staff @ 172 fare	516		
13 x \$50/day x 4 days	<u>2,600</u>	5,058	

International

1 Port Moresby	2,000		
1 Sydney	2,040		
1 Rio	1,004		
1 Caracas	516		
1 Port of Spain	542		
1 Cairo	1,534		
1 Rome	1,004		
1 Manila	1,656		
1 Bangkok	1,942		
1 Dakarta	2,042		
1 Delhi	2,102		
11 ccte x 6 days @ \$50/day	<u>3,300</u>	<u>19,682</u>	24,740

Communications and Shipping

Telephone		1,000	
Cables		500	
Postage			
7,000 repts. @ .35	2,450		
correspondence	<u>650</u>	<u>3,100</u>	4,600

Materials and Services

Translations - 2 @ 500	1,000		
Photo. proc. - 50 @ 9.00	450		
Artwork/cover	500		
Books & per.	250		
Xerox	500		
Report - 7,000 (Leucaena)	<u>7,500</u>	10,200	10,200

Gen & Admin costs 8.5 %		3,360	<u>\$42,900</u>
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NOTE: Personal services will be provided under Contract AID/ta-C-1433.

* It is understood that the contract will provide for advance payments.

Proposed Letter of Agreement
NATIONAL ACADEMY OF SCIENCES
NATIONAL RESEARCH COUNCIL
2101 Constitution Avenue Washington, D.C. 20418 USA

COMMISSION ON INTERNATIONAL RELATIONS
Cable Address: NARECC
TWX # 7101 22 9586

Board on Science and Technology for International Development

Project: Panel on the Water Contract: AID/ta-C-1433
Buffalo: its potential Letter of Agreement: No. 7
for Developing Date:
Countries

NAS Coordinator: Noel Vietmeyer

Background:

The Agency for International Development, through its June 1970 contract with the Academy, requested the Board on Science and Technology for International Development to establish an Advisory Committee on Technological Innovation (ACTI) to search for and assess developments in science that seem relevant to the solution of problems of developing countries.

In recent years ACTI has completed a number of plant studies that are attracting attention worldwide. Highly readable, these illustrated booklets have served to introduce those neglected plant species to researchers and administrators who have applied their skills and funds to develop the species into crops, with the result that hundreds of scientists, farmers, and gardeners are growing these plants and testing their products.

Discussions with animal scientists in Australia, Papua New Guinea, the Philippines, Thailand, Brazil, Guyana, Egypt and the United States indicate that the water buffalo represents an animal counterpart to the neglected plants.

Most animal scientists are unfamiliar with the water buffalo; it is an alien species not treated in university courses. Furthermore, it is often despised by the agricultural advisers sent to developing countries, and governments that wish to "modernize" are embarrassed by the presence of those animals. Even in the buffalo's native regions, technically trained agriculturists seldom study it. As a result, many myths and uncertainties surround the water buffalo and it is hard to determine the animal's true qualities. It is often considered as only a "poor-man's beast of burden," but it seems to be potentially much more. Indeed, some researchers believe that it has global promise, for both tropical and subtropical, developing and developed countries alike. There are dozens of countries that probably should be testing it, but are prevented by the lack of research.

While there are some purebred water buffalo, most have little pedigree and are either the swamp type or the river type. The water buffalo is central to agricultural systems in Asian countries from the Philippines and China to India and Pakistan. However, the animal is not exclusively an Asian animal. Small numbers of water buffalo are actually well established on several other continents including South America, Europe, and Australia. Even in the cold of Eastern Europe buffalos thrive. They have been reared in Hungary, Rumania, and the Soviet Union since the Middle Ages, often brought by Crusaders returning from the Holy Land; in Italy, buffalos have

grazed the swamps near Naples almost since the days of the Roman Empire.

In African countries the water buffalo is largely unknown except in Egypt where villagers eagerly adopted the animal about 1,300 years ago. Today, its exceptional qualities make it the most important domestic animal in that country. Buffalos supply Egypt with more meat--much of it in the form of very tender veal--than any other domestic animal. They also provide milk, cooking oil, and cheese.

It is remarkable that no other African country has yet seriously adopted the water buffalo. Yet the presence of small herds in these African countries--Tanzania, Uganda, Mozambique--suggest that there are no inherent barriers to the buffalos becoming a valuable new domestic animal in many nations south of the Sahara.

Water buffalo research is beginning in the United States. University of Florida researchers are convinced that the buffalo has qualities previously unrealized. When fed an adequate diet, they breed as fast as cattle, even though their actual current gestation period is longer. They appear better adapted to cold weather than Brahma cattle and to Florida's hot weather than European cattle breeds. Though docile and undemonstrative, they seem more intelligent than cattle. Perhaps the most significant finding is that the water buffalo is not so much a competitor as a supplement to cattle. It seems able to thrive on marginal environments where cattle can't survive, such as, on coarse, nutrient deficient grasses and succulent aquatic plants containing little dry matter.

Buffalo steaks are lean, tender, and on sight almost indistinguishable from beef. In tests, from all the cuts tested by a panel, the buffalo meat

came in first and second. In Manila, two-thirds of the beef eaten in homes and restaurants is actually water buffalo.

Objectives

The Academy's study on the water buffalo would seek to break through uncertainty, and to marshal facts and draw up a balanced appraisal of the animal.

A group of prestigious U.S. cattle researchers would be brought together with the buffalo experts from around the world for several days of confrontation, argument, debate, comparison and, it is hoped, agreement. This meeting should illuminate:

- ° the strengths and weaknesses of buffalos in comparison to those of other domestic animals
- ° the most crucial gaps in our knowledge of the buffalo
- ° priorities for buffalo research
- ° situations where the buffalo has no role to play
- ° situations where the buffalo may have a major role
- ° the way buffalos "fit" together with other domestic animals in LDC and developed-country farming systems
- ° how to capitalize on a century of cattle research to make buffalo research most effective (mistakes to avoid, short cuts to take, modern techniques to apply)

Anticipated outcome

Panel members will represent disciplines such as: environmental physiology, reproduction, physiology, veterinary science (with emphasis on disease resistance), genetics and breeding, nutrition, and meat and milk

production. The panel will meet at least once and will produce a report similar in format and style to former ACTI booklets on leucaena, winged bean and guayule. It will contain many photographs selected to illustrate the major points made in the text. The report will:

- ° introduce the water buffalo's promise to researchers and decision makers in countries where it is unknown.

- ° identify priority research areas leading to the improved use of water buffalo in agricultural systems, notably in Asia where the animal is now important.

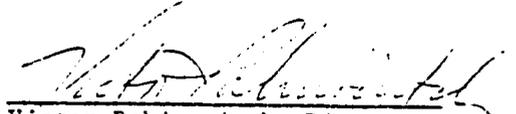
The study will complement the 1974 FAO book on the water buffalo which focused primarily on the world distribution of buffalos, their history, and descriptions of species, types, breeds and skin color. Panel members will proceed beyond the FAO book and analyze what appear to them to be the strengths and weaknesses of water buffalo to the farmers in LDC's.

Written for the attention of agencies engaged in development assistance and food relief, officials and institutions concerned with agriculture in tropical countries, and scientific establishments with relevant interests, the report should stimulate greatly increased research on the barriers holding back water buffalo development.

17

Projected Costs

Level of effort: 9 person months professional staff and 6 person months support staff.



Victor Rabinowitch, Director

Approved for AID/OST

Name

Date

REPORT PROVISIONS

Published reports, which should show AID sponsorship, shall be prepared and submitted to AID as stated below:

- (a) Three hundred (300) copies of the Panel Report;
- (b) Ten (10) copies of such other reports as may be prepared;
- (c) Copies of the above stated reports in the quantities indicated shall be submitted to:

Chief, Livestock Production Division
DS/AGR/Livestock SA-18 (RPC)
Agency for International Development
Washington, D.C. 20523

- (d) One (1) copy of each report shall be submitted to the Grant Officer whose name appears on the work order and three (3) copies of each report shall be submitted to:

The Documentation Coordinator
DS/DIU SA-18 (RPC)
Agency for International Development
Washington, D.C. 20523

- (e) And, all correspondence should reference both the Grant and Project numbers.