PN-AAV-883

Research Project #3

IAAS

Institute of Agriculture and Animal Science

of the

TRIBHUVAN UNIVERSITY

MUCIA

Midwest Universities Consortium for International Activities

IAAS Faculty Project for Strengthening Agricultural Research

INSTITUTE OF AGRICULTURE AND ANIMAL SCIENCE

Funded by: U.S. Agency for International Development

Project Number AID/NESA-C-1197

Administered by Michigan State University

PREFACE

A new farmer-oriented research program is underway. Until recently, the Institute of Agriculture and Animal Sciences has been able to commit only small amounts of funds to support research. At the same time, more than forty faculty members have received graduate level training, often with a strong research emphasis, abroad. And twenty more faculty members will return to the Institute over the next two years.

To meet this critical financial limitation and to more firmly establish a professional commitment to continuing research among IAAS faculty, new funds have been set aside under the MUCIA program. These funds have proven to be a great stimulus to research, demonstrating in a relatively short time that appropriate incentives will stimulte the latent research talent located at IAAS and move the Institute's research program forward. This represents an enormous potential for addressing the agricultural needs of small farmers in the Chitwan area.

Appendix I attached to this report contains general supplementary guidelines to the Revised Research Proposal Form for IAAS Research originally, dated 9 March 1981. These guidelines have been reviewed by AID officials and IAAS administrative personnel and are intended to direct scholarly review of research proposals as well as to meet contractual requirements for accountability of funds. Appendix II attached contains a complete list of the reports approved to date under this program.

MAPPING AND CHARACTERIZATION OF MAJOR SOILS OF THE INTERNATIONAL AGRICULTURE AND ANIMAL SCIENCE FARM AT RAMPUR

Prepared by:

B. R. KHAKURAL

MAPPING AND CHARACTERIZATION OF MAJOR SOILS OF THE INTERNATIONAL AGRICULTURE AND ANIMAL SCIENCE FARM IN RAMPUR

Project Title: Mapping and characterization of major soils of the International Agriculture and Animal Science Farm at Rampur.

Project Leader: B. R. Khakural

Collaborators: Dr. H. D. Foth

Mr. J. R. Joshi

Introduction: IAAS is a teaching institute where some research will be conducted on agronomic crops, fruits and vegetables for teaching students and for solving farmers' problems. Because soils of the IAAS farm are not mapped, we know very little about different types of soils present and their physical and chemical properties. Detailed characterization of farm soils will be very useful for locating experimental plots and for accurate extrapolation of research results. In addition, we will have some knowledge of farm soils for teaching students and making fertilizer recommendations to farmers. Therefore, it is essential to have a soil map of the farm and a thorough knowledge of morphological, physical, and chemical properties of the soil. The short-term MUCIA advisor has also recommended mapping IAAS farm soils.

Literature Review:

Beginning Date: January, 1982

Ending Date: January, 1983

Major Hypothesis: Soils increase in age with increase in elevation from flood plain to the highest terraces. Higher base status soils with near neutral pH are expected near the river and very acid soils are expected at the highest elevation on the upland.

Anticipation of Results: The most fertile soils are expected near the river with micronutrient problems commonly associated with calcerous and neutral soils, and the most acid and infertile soils are expected at the highest elevation with micronutrient problems associated with acid soils. Also fertilizer data, such as potassium and other major nutrients will, in the same way, be related to soil differences.

Methods: A detailed map of the farm will be prepared after making observations at the 60 meter grid. Dominant farm soils will be characterized for morphological, physical, and chemical properties. Physical properties include particle size analysis and bulk density. The 1/3- and 15- bar moisture level will be determined monthly to assess soil moisture regimes. Soil samples will also be analized for chemical properties, such as organic carbon, soil pH, CEC, base saturation and available N, P, K.

Chemicals Required:

$K_2Cr_2O_7$ - Potassium dicromate -

Fe $(NH_4)_2(SO_4)_2$ - Ferrous ammonium sulphate -

$KMnO_4$ - Potassium permanganate -

NH_4OAC - Ammonium acetate -

conc. H_2SO_4

H_2O_2 - Hydrogen peroxide

Calgon - Sodium Hexametaphosphate -

Glacial acetic acid (99.5%)

Sodium acetate (NH_4OAC)

Ammonium Chloride (1N, 2.5N)

Sodium chloride

Sodium hydroxide (NaOH)

Boric acid (H_3BO_3), 2% Solution

Bromocresol green-methyl red mixed indicator

Bromocresol green

95% ethyl alcohol

Methyl Red

Ammonium oxilate

Equipment:

Bucket angors	-2
Core rings	-200
Core sampler	-1
Light table	-1

Cartographic pens and colours

Literature Review: Very little is known about different soil types surrounding the IAAS farm. The soils of the Rampur area are mapped as sandy loam soils with a loamy sand surface (0-18 cm) in the Soil Survey of Chitwan, Narayani Zone (Mahargam, P. L., Dambar B. Tamang and P. V. Shah 1971). However, this survey is too general to be useful for locating experimental plots, for fertilizer recommendations and other purposes. IAAS soils are found to be deficient in Boron micronutrient (Khatri Chetri, T.B. and A. B. Karki 1979). Canadian International Development authority, Brian Carson,

has prepared a physiographic map of Chitwan, where physiographic divisions are shown on aerial photographs and we will attempt to get it for our mapping.

REFERENCES:

1. Maharjan, P. L.; D. B. Tamang; and P. V. Shah. 1971. Soil Survey of Chitwan, Narayani Zone. Report No. 17 (unpublished).

2. Khatri Chhetri, T. B. and A. B. Karki 1979. Effect of Borax on the Field of Cauliflower. IAAS Journal 1(3): 1-10.

3. Brian Carson. 1982 (Personal Communication).

FARMING SYSTEM SURVEY QUESTIONNAIRE

1. Farmer's Name _____ Date: _____

2. Details of Family Members

S. No.	Age	Education	Employment
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			

3. Permanently Hired Labor

S. No.	Age	Sex	Other Facilities	Types of Work To Be Performed
1.				
2.				
3.				
4.				

Machines and Other Implements	No.	Type
a. Tractor		
b. Tractor Ploughs		
c. Tractor Trailer		

d. Tractor Harrow

e. Animal Desi Plow

f. Animal Wooden Plow

g. Animal Harrow and Plank

h. Spades

i. Sprayers

j. Other (specify)

Others

	No.	Type
a. Truck		
b. Taxi		
c. Bicycle		
d. Radio		
e. Sewing Machine		
f. Other (specify)		

Land Holding

	Total	Owned	Rented Out	Rented In	Tenure Station
Low Land (Khet)					
Upland (Pakho)					

Land Use and Output

	Crops	Area	Production	Disposal: Sold			Disposal: Domestic Use		Disposal: Stored
				Qty	Price	Value	Qty	Value	
1.	Maize								
2.	Paddy								
3.	Wheat								
4.	Mustard								
5.	Pulse								
6.	Fruits								
7.	Vegetables								

Cropping Patterns

a. Upland (Pakho)

b. Lowland (Khet)

Cropping Calendar

Months	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Crops												
Maize:												
a. Land Preparation[8]												
b. Planting												
c. First Hoeing (weeding)												

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8. A brief description of each operator will be noted on a separate sheet of paper.

d. Second Hoeing

e. Harvesting

f. Threshing

g. Storing

h. Marketing

	Rice	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
a.	Land Preparation												
b.	Seedling Preparation												
c.	Transplanting												
d.	Weedings												
e.	Harvesting												
f.	Storing												
g.	Marketing												

	Wheat	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
a.													
b.													
c.													
d.													
e.													
f.													
g.													

Mustard

a.

b.

c.

d.

e.

f.

g.

Which are the busiest months of the year?

b.

c.

d.

e.

f.

g.

Pulse

a.

b.

c.

d.

e.

f.

g.

Do you have an Orchard? Yes_____ No_____

Major Fruits	Area	Major Problem (specify)
a.		
b.		

c.

d.

Major Vegetables

a.

b.

c.

d.

Which are the busiest months of the year?

Why?

During these busiest months, what work is done mainly and with what crops?

Do you have problems hiring labor during any times of the year (e.g. what crops and what operations such as planting, weeding, harvesting, etc.?)

If yes, when, with what crops and operations, and why?

Do you practice exchange labor?

If yes, for which crops and operations?

Do you also have problems hiring bullock pairs for plowing?

If yes, why?

Do you have leisure time in any months of the year?

If yes, what are those months and what do you do during those months.

Do you have any small agro-based industry established?

If yes, when was it financed and from whom? What is its capital investment and how is it operating?

Where do you sell your crops?

Market	Price Received	When*	Qty. Sold
Local			
Rampur			
Naranyanghat			
Sajha			
Other			

*Immediately after harvest, two months from harvest, beyond four months of harvest.

What kind of storage do you have?

1) Kachha (traditional) 2) Pakkha (modern)

Can you assess the amount of losses (%) incurred in on-farm storage?

	Crops				
	Maize	Paddy	Wheat	Mustard	Other
1. Qty. stored					
2. Loss (%) within one month of harvest					
3. Loss (%) within two months of harvest					
4. Loss (%) within six months of harvest					
5. Loss (%) beyond six months					

FARMING SYSTEM LIVESTOCK QUESTIONNAIRE

Questions:

1. How many animals do you keep and who owns them?

		No.	Breed	Owner
a)	Cows_____			
	- Milch			
	- Dry			
b)	Bullocks			
c)	Bulls			
d)	Calves			
e)	Buffalo -			
	- Milch			
	- Dry			
f)	Buffalo Bullock			
g)	Sheep			
h)	Goat			
i)	Pig			
j)	Poultry			
k)	Others			

2. What are the feeds and fodders that you provide your animals -

a) Roughage-

   i) Dry (Type)

   ii) Green (Type)

b) Concentrate -

   i) Home made (Type)

   ii) Purchased (Brand)

3. Do you allow your animals to graze, and if yes, for how many hours a day?

4. What type of house do you provide for your animals?

   i) Pucca

   ii) Kachha

   iii) Semi-Pucca

5. What types of animals you prefer and why?

   i) Local

   ii) Improved

6. Where do you breed your animals?

   i) at your farm

   ii) at your neighbor's farm

   iii) at IAAS farm

7. What are your main problems in keeping your animals?

   (First, Second, Third)

   a) Breed

   b) Feed

   c) Housing

   d) Marketing

   e) Disease

   f) Other

8. What are the livestock products that you produce on your farm?

   a) Milk and Milk products

   b) Meat and Meat products

   c) Eggs

   d) Wool

e) Live Birds

9. What is the quantity of livestock products you produce (Every Year)?

a) Milk_____kg

b) Ghee_____

c) Meat_____

d) Eggs_____(Nos)

e) Wool_____kg

f) Live birds and animals_____

10. Do you sell any of the above products? If yes, what, how much and at what price?

i) Milk

ii) Ghee

iii) Meat

iv) Eggs

v) Live birds and animals

11. Where do you sell your products?

i) at your village

ii) at local market

iii) at Narayanghat

12. What are the different types of animal disease that you encounter on your farm?

i) H.S.

ii) Liverfluke

iii) Mange

iv) Round worms

v) Black leg

vi) Ranikhet

vii) Fowl pox

viii) Others

13. Where do you treat your animals?

    i) at your village

    ii) at IAAS

    iii) at the Veterinary Hospital at Bharatpur

14. Do you follow any prevention measures for animal disease? If yes, what types?

15. Do you use FYM in your field? If yes, how much in a year?

16. Do you purchase FYM, and if yes, how much and from where?

17. Do you use bullocks to plough your land? How much land is ploughed by a pair of bullocks?

18. Do you use bullocks for draft purposes other than ploughing? If yes, how many hours a day on an average.

19. Do you use Buffalo Bulls for draft? If yes, for what crops?

20. Do you produce and sell any animal by-products?

    i) Skin

    ii) Bone

    iii) Hooves and horns

    iv) Others

21. Why do you keep animals in your farm?

    i) for food

    ii) for income

    iii) for manure

iv) for power

v) for fun

22. Do you sacrifice animals during ceremonies. If yes, what species mostly do you use?

23. What type of food do you prefer -

i) Vegetarian

ii) Non-Vegetarian

24. Do you feel beef-eating is un-religious?

25. Which species of animal is most economical in your opinion?

i) Cattle

ii) Buffalo

iii) Pig

iv) Poultry

v) Sheep

vi) Goat

26. Which is the most difficult period of the year for feeding livestock and why?

27. Around how much land is grazing land in your ward?

28. Could you tell how you prepare animal feed (Kudo) at home and what ingredients are mixed?

FOOD SUPPLY QUESTIONNAIRE

1. Can you tell which are the months when the on-farm storage has the following readily available crops:

	Crop	Month
a.		
b.		
c.		

2. Months when supplies may be uncertain

	Crop	Month
a.		
b.		
c.		

4. Do you get extension service? Yes____ No____

If yes, mark the following agencies

_____IAAS

_____(District Agri. Office) J.T.A.

_____Sajha

_____ADB, NMDP

_____Chitwan irrigation project

_____RMS

_____Other (specify)

5. For which areas do you get extension?

_____Marketing and Credit

_____Cropping practices

_____Fertilizer use

_____Pesticide use

_____Horticulture

_____Animal Health and management

_____Animal diseases

_____All

_____Other (specify)

Sajha

1. Do you get all inputs from Sajha?

		A) Enough	B) On Time
1.	Seeds	_____	_____
2.	Fertilizer	_____	_____
3.	Chemicals	_____	_____

2. If not, why?

c. No money to buy

d. Not interested

e. FYM is enough

APPENDIX I

SUPPLEMENT TO THE REVISED
RESEARCH PROPOSAL GUIDELINES FOR IAAS RESEARCH
AS OF JULY 1982

APPENDIX I

SUPPLEMENT TO THE REVISED RESEARCH PROPOSAL GUIDELINES FOR IAAS RESEARCH AS OF JULY 1982

I. MUCIA RESEARCH FUNDING PROCEDURES

A. The research proposal is submitted to IAAS research committee by researcher:

1. Departments or divisions may do prior screening of proposals.

2. The research committee is composed of:

   a. One member from each department.

   b. Dean or Assistant Dean.

   c. MUCIA Chief-of-Party.

   d. Invited participants including the proposed research leader or research team, interested faculty members and outside agency representatives.

3. Each proposal should include a clear statement of:

   a. Reason for studying the problem.

   b. Researcher's knowledge of the problem including discussions with farmers, co-workers, and other professionals.

   c. Review of literature.

   d. How this research is related to continuing professional interests of researcher.

4. As stated in the 1981 Joint Annual Review, how this research relates to future planning in researcher's department in these areas:

   a. Teaching

   b. Extension

   c. Research

B. If favorably recommended by the research committee, MUCIA research fund commitment will be made by the signature of the Dean or his designate and the MUCIA Chief-of-Party or his designate.

C. If research is more than six months, provision will be made for biannual review. A shorter review period may be set by the research committee.

D. At termination of any funded phase of research an end-of-project report shall be submitted outlining research results and budget expenditures. Additional research funds to the listed research leader shall not be authorized until the previous research report is submitted.

E. Funds released to IAAS from the MUCIA research fund and not expended for the specified research shall be returned to MUCIA with the end-of-project report.

II. RESEARCH COMMITTEE POLICY QUESTIONS

A. General Emphasis

1. Nepalese agriculture and related problems.

2. Farm-related problems.

3. Multidisciplinary problems.

4. Areas not now emphasized but needing support.

B. Major Research Thrusts and Consequent Policy Question

1. The policy question is whether IAAS shall cover as wide a range of subjects as the research interests of its faculty or whether it shall concentrate the majority of research and money on three or four main topics over the next four or five years. There is support for both views and this is a critical decision for IAAS at this stage of development.

C. Specific Research Areas to be Considered

1. Production

a. Crops produced and reasons. Influence of diseases and pests on production and utilization.

b. Production emphasis for soils use and factors other than production influencing soils use.

c. Emphasis for horticulture research and reasons.

d. Animals to be be used for livestock research, and reasons for using them. The focus is on health and nutrition, and on new breeds.

APPENDIX I (Continued)

2. Farm Management

Help farmers and their families better use their resources to improve their quality of life and the quality of life in Nepal.

3. Home Economics

Presently in Nepal this area receives minimal attention, but it is critically important for the future well-being of Nepalese families.

4. Rural Development

Farmers, their families and rural neighbors live in a matrix of institutions. Institutions are created to improve life but some institutions have lost their usefulness. The question is how we can improve the institutions of education, communication, transportation, health, credit and markets which will improve quality of rural life.

R. D. research widely includes social, economic, cultural and political factors. Choosing first priority topics requires much deliberation.

APPENDIX II

IAAS/MUCIA AGRICULTURAL RESEARCH PROGRAM

APPROVED RESEARCH PROJECTS

AS OF JULY 1982

APPENDIX II

IAAS/MUCIA AGRICULTURAL RESEARCH PROGRAM
APPROVED RESEARCH PROJECTS
AS OF JULY 1982

Project #1. Soybean Research and Extension in Chitwan: Principle researcher, K. P. Sharma in collaboration with S. P. Katel, S. B. Gurung, S. M. Shrestha, S. C. Shah, and R. Poudel. Several research activities will be conducted to test the hypothesis that low initial seed moisture content and seed storage conditions are more critical factors than genotypes and duration of storage in preserving soybean seed viability.

Project #2. A Case Study of the Farming Systems of Sharadnagar Panchayat: Principle researcher, P. M. Tulachan. The researcher will conduct a baseline study of farming systems in the Sharadnagar Panchayat to identify current practices and socio-economic and physical constraints faced by farmers. This material will be used to develop a farming systems handbook to be used as a reference by researchers and planners and in the agricultural economics curriculum.

Project #3. Mapping and Characterization of Major Soils of the IAAS Farm at Rampur: Principle researcher, B. R. Khakural in collaboration with H. B. Foth and J. R. Joshi. A complete mapping of soils on the IAAS farm and their classification according to physical and chemical properties will be done

to aid in the placement of experimental plots to determine the applicability of research results to other farms.

Project #4. Duck Cum Fish Culture Research: Principle researcher, K. T. Augusthy in collaboration with M. K. Shrestha. In this study, the researchers will test the economic viability of a duck/fish pond culture and examine the impacts of various food sources for ducks and fish on their growth rates.

Project #5. Year Round Production of Vegetables in Rampur: Principle researcher, Rishi R. Adhikari in collaboration with Durga D. Dhakal and Ram C. Koirala. The purpose of this project is to develop a planting schedule for year round vegetable production for home consumption and sale by farmers of Chitwan District.

Project #6. Survey and Identification of Plant Parasitic Nematodes in Chitwan: Principle researcher, M. H. Khan. The project will identify plant parasitic nematodes associated with vegetables, legumes, fruits, and other economically important crop plants, and their population and distribution in relation with hosts in different localities in Chitwan as a first step towards their control and the prevention of crop losses.

Project #7. Studies on Chemical Control of Root-Knot Nematodes of Okra and Eggplant: Principle researcher, L. N. Bhardwaj in collaboration with S. M. Shrestha and R. C. Koirala. This project will evaluate the effective dose of furadan necessary to control root-knot diseases of okra and eggplant under local conditions.

Project #8. Studies of the Effect of Seed Dressing and Foliar Sprays on Seedling Health and Blast and Brown Spot Diseases of Paddy: Principle researcher, L. N. Bhardwaj in collaboration with S. M. Shrestha, M. H. Khan, and Moti Lal. This project will test the effectiveness of fungicides in reducing losses of rice seedlings in nursery beds.

Project #9. Effect of Date of Sowing and Nitrogen Levels on the Incidence of Rice Blast and Leaf Spot at the Nursery Stage: Principle researcher, S. M. Shrestha in collaboration with L. N. Bhardwaj, R. B. Chhetry, and Moti Lal. In this study, S. M. Shrestha will test the hypothesis that the date of sowing and nitrogen levels are the critical factors affecting the suceptability of Masuli variety rice seedlings to blast and leaf spot at the nursery stage.

Project #10. Evaluation of the B.Sc. (Ag.) Program at IAAS, Rampur: Principle researchers, B. N. Pokharel and G. P. Shivakoti. The researchers will make recommendations for the improvement of the B.Sc. Program based on the results of a survey of faculty, students, and former students and their immediate supervisors.