PD-AAR-522
40877

MUCIA/AID Project at
The Institute of Agriculture and Animal Sciences
of Tribhuvan University
Rampur, Nepal

END OF TOUR REPORT

Dr. Weslie Combs, Professor
Department of Animal Science
Michigan State University
East Lansing, MI 48824

23 September 1982 - 30 September 1984

A report of work completed under Contract AID/NESA-C-1197 between the Midwest Universities Consortium for International Activities (MUCIA) and the U.S. Agency for International Development.

FOREWORD

My 26 months as Animal Science Advisor at IAAS has been interesting, challenging, and personally rewarding. It also has been at times frustrating. This was my first long-term assignment after many short-term development consultancies and the first opportunity to implement the recommendations of my own preceding short-term assignment. Much of the frustration derived from the unwieldiness of bureaucracy, American as much as Nepali, which makes two years seem far too short a time for the completion of an agenda the size of the MUCIA/IAAS Work Plan and especially in the livestock sector.

Yet, significant achievements were made. Most can be counted as achievements only because of the participation of interested faculty. Indeed, only such activities as done by the faculty are meaningful in development.

Some major activities will be recounted here with some indication of the role of the advisor which varied from project to project.

The activity in which I have taken the most satisfaction is the Mediterranean Livestock Study Tour. It was essentially the Animal Science Advisor's "course" and one which I had planned and proposed for several years in several countries. It is one of the few activities in which I "worked my will" on the participants when demands came to take the tour elsewhere. The success of any project depends upon the impact upon and participation of the participants. I believe the views and perspectives of the participants on the range of alternative livestock systems appropriate to Nepal were expanded as a result of seeing the working models on the tour. In the closing days of the project, one faculty member who had declined even to be considered for the tour unexpectedly volunteered that he had erred in his original judgment of what might be learned in the Mediterranean as it had been assumed that all technological advances were in North America and Europe. His generosity is more than a little appreciated. The reports of tour participants are appended from which readers may draw their own conclusions. It is to my deep regret that the tour was not structured as a credit course to count toward faculty promotion.

The growing of some 15,000 Leucaena leucocephala trees by the Dutch volunteers, Anne Waanders and Helmich van Rees under the direction and assistance of Dr. K. R. Tiwari was a step toward alleviating a chronic shortage of livestock fodder. Planting the trees on the watercourse slopes initiated the concept of moving forages to the less arable lands and commiting the flat lands to production of human food with livestock living off the residues supplemented by leucaena and other high-protein forages. This project is a good example of the constructive collaboration of the advisor, faculty, and volunteers in the proposal, design, and implementation of a research project with important implications for development of the North Farm. As leucaena was already established in the Horticulture compound, it was not a matter of introducing a new idea but one of catalyzing implementation.

The 50 cu m, Chinese type, underground fixed-dome biogas digester was the first of its size constructed in Nepal. It can be an important element in systematizing the management of buffalo and cattle by removing these herds

from the fields and into confinement. The digestion of dung is already producing methane gas for some faculty residences and the dairy laboratory and producing digested slurry which can be fed back to ruminants as a year round protein supplement. I had had no previous experience with biogas but it seemed to fit and there was considerable interest among faculty. In this case, MUCIA contracted directly with Gobar Gas Co., Butwal, as neither MUCIA nor IAAS had expertise in construction. . K. Nepali, farm manager, has had some training in biogas technology and has assumed charge of the digester.

The establishment of Kage sheep and Terai goat breeding flocks has established the capability of evaluation and genetic development of local sheep and goats. This was another collaborative effort with I. P. Dhakal taking full responsibility for the selection and assembly of the breeding stock to the extent of discreetly asking the advisor to withdraw when it became apparent they my presence was raising the asking price. There was little enthusiasm for small ruminants when the workplan was formulated and none for development of dairying. There was so little enthusiasm that I did not ask for funding for importation of Chios sheep and Damascus goats. I believe that interest in sheep and goats increased as a result of the tour; especially their potential as multi-purpose dairy/meat animals was recognized. By then however, time was insufficient to find the funds and effe t the importation.

The ordering of bullock-drawn wheeled tool carriers particularly illustrates the role advisors can play in devising solutions to special problems. Nepal is composed of small farm holdings. IAAS faculty have grown up knowing that small farms are nearly all tilled with bullocks and wooden plows. They have also seen large farms in the United States nearly all tilled with tractors. IAAS has a large farm but the maintenance and operation of tractors in Nepal is difficult. Much of the farm of the institute goes unplanted. I was raised on a 240 ac farm in California which was farmed largely with horses until World War II.

During my short-term tour in 1982, Dr. Hank Foth, then Plant Science Advisor recently returned from the ICRISAT station, Hyderabad, India, handed me a brochure on bullock-drawn wheeled tool carriers. These were essentially updated versions of the tillage equipment my father had abandoned when he had switched from horses to tractors more than 40 years before. These seemed an ideal "intermediate technology" for solving the IAAS problem of farming a large farm in a country teeming with bullocks and few tractors.

Upon my returning for the long term assignment, ICRISAT verified the feasibility of farming the 200 ha at IAAS with bullocks and the equipment went into the workplan and was ordered. To my disappointment, the equipment was not shipped until too late to arrive before my departure. Ploughing with bullocks and wooden plows had little appeal to a faculty aware of more advanced technology. In "selling" the concept of animal traction farming and research, papers were circulated from renowned research institutes doing related work and the potential for physiological research was emphasized. A number of faculty, including Dean B. P. Sinha and three trainees, have now seen the tool carriers in action at ICRISAT. Dean Sinha has since also visited an Ahmish settlement in Ohio where farming was with horses. It is my understanding that Mr. Basnyet, lecturer in Agricultural Engineering, is studying techniques of animal traction in his graduate program in Thailand.

The transfer toward the end of the project by Dean Sinha of M. Kharel from the Paklihawa campus bringing to the central campus the first lecturer in Animal Breeding.

The above along with the purchase of adequate large animal weigh scales and the construction of pigeon facilities are project achievements in which I am particularly pleased and the more so because of faculty participation.

Animal Science Advisors, MUCIA/Nepal Project, 1978-1984

Development is built on the successes and disappointments of those precedent. I have learned much from my predecessors who have left end-of-tour reports documenting their activities and recommendations. It seems fitting at the outset of this last Animal Science Advisor's End-of-Tour Report of the MUCIA/Nepal Project to acknowledge those who have served previously as MUCIA Animal Science Advisors to IAAS.

Herbert W. Bird
Poultry Nutritionist
University of Wisconsin
IAAS tour: 1 January 1978 - 23 April 1978 (early termination)

Robert J. Deans
Livestock Systems Management
Michigan State University (short term)
IAAS tour: 10 June 1978 - 15 July 1978

Kenneth P. Miller
Animal Scientist
University of Minnesota
IAAS tour: 6 October - 16 February 1979

Jesse B. Williams
Ruminant Nutritionist and Management Specialist
University of Minnesota
IAAS tour: 1 May 1979 - 31 May 1981

Others have contributed to development of the animal science program. For example, C. Donald Meaders, Agricultural Educator 1976 - 1977, Michigan State University, coordinated preparation of syllabi for Practices of Animal Production I and II for the pre-professional agriculture programme.

The excellent Farm Development Plan prepared by Wallace W. Nelson, Farm Management Specialist 16 September - 18 October 1977, University of Minnesota, was still as appropriate when a renewed farm plan was needed in 1984 and I was happy to put it forward.

Recommendations of the five Animal Science advisors are tabulated in Table 1 indicating which advisors made the recommendation and the fate of each recommendation. Those of Bird, Deans, Miller, and Williams have been gleaned from their respective end-of-tour reports. I readily acknowledge the bias which my analysis may have brought to recording my own recommendations. I believe that all of them have been recorded in the work plan and the proposed work plans written and circulated by me.

This is not an exhaustive compendium there being several recommendations on improvement of buildings and curriculum which have not been tabulated.

There is considerable consistency of recommendations by successive advisors. However, some major departures were taken in my recommendations from directions taken previously.

Table 1

Animal Science Advisors

Recommendation	Bird 1978	Deans 1978	Miller 1978-79	Williams 1979-81	Combs 1982-84	Status as of Project Terminiation
Graduate Degree Training						
Animal Breeding				X	X	M. Kharel, M.Sc., U. Philippines, Los Banos 1984; (MUCIA); Transfer to RA
Animal Breeding						V. K. Kolachhapati nominated for MSC to India 1985 (USAID); Paklihawa.
Animal Genetics					X	Ph.D. proposed in IAAS II
Aquaculture				X	X	K. T. Augusthy resigned 1983 for Ph.D. program McGill U., Canada (IDRC)
						D. K. Jha, M.Sc., Tribhuvan U. appointed 1984
Buffalo Production/Mgt						See Livestock Management
Cattle Production/Mgt	X			X		C. M. Shrestha, M.S., U. Illinois 1981 (MUCIA)
						Ph.D. Agriculture Economics, U. of Kentucky 1985 (Personal)
	X					B. K. Sharma, M.S., U. So. Dakota 1983 (MUCIA);
						Ph.D., U. Maryland 1987 (Personal)
						A. K. Kayastha, M.Sc., India, on extended and indefinite leave.
Livestock Management						J. L. Yadav, M.Sc., Haryana, India; Paklihawa campus chief 1984-
Livestock Management						D. Nepali, M.Sc., Haryana, India
Poultry Production				X		None planned; See Poultry Nutrition
Sheep & Goat Prod/Mgt	X			X		None planned
Swine Production	X			X		None planned; see Swine Nutrition
Animal Nutrition			X			
Poultry Nutrition						N. Joshi, M.S., Ohio State U. 197_ (MUCIA); Ph.D. Mich. St. U. 1985 (MUCIA)
Poultry Nutrition						S. D. Sah, M.S., Allahabad, India
Ruminant Nutr/Rumen Phys.	X					K. R. Tiwari, M.Sc., Matura, India
Swine Nutrition	X					M. Sapkota, M.Sc., Michigan State U. (MUCIA) 197_
Environmental Physiology					X	Ph.D. proposed in IAAS II
Phys. of Reprod/Art. Insem.	X		X			S. K. Sah M.Sc., U. Philippines, Los Banos 1984 (MUCIA)
Dairy Technology				X		N. Shah, M.S., U. of So. Dakota 1982 (MUCIA);
Dairy Technology					X	Ph.D. assistantship U. of Alberta 1984-1986 (Personal)
Vet. Med./Animal Health						I. P. Dhakal nominated for M.Sc. in India 1985 (USAID)
Non-degree Training						
Animal Traction					X	3 instructors ICRISAT Animal-drawn wheeled tool carrier course 1983
On-campus Courses						4 An. Sci. faculty, Research methodology 1983
						6 An. Sci. faculty, Effective classroom instruction 1984
						2 An. Sci. lecturers/An. Sci. Advisor, Managment analysis & decision making
Study Tours					X	5 lect. Mediteranean Livestock Study Tour, Cyprus-Greece-Italy 1983
						1 lecturer Indonesia Rural Development Tour 1983
						1 assistant lecturer India Plant Scienct Tour 1983
						1 lecturer stop en route Thessaloniki, Greece re: Sheep Milking
USDA Short Courses						2 lecturers stop en route U. of Hawaii re: Leucaena Research

X = recommended; / = changed; T = terminated

Table 1 (cont.)

Recommendation	Bird 1978	Deans 1978	Miller 1978-79	Williams 1979-81	Combs 1982-84	Status as of Project Terminiation
	Animal Science Advisors					
Livestock						
Cattle		X				
Indian Draft	X					
Hariana		X				Acquired with North Farm
Chianina Semen/Traction Res.					X	Deferred; (to increase range of bullock size for traction research)
2 Unspec. Zebu Dairy Breeds	X					No action
Red Sindhi		X			X	No action
Sahiwal		X			X	No action
Brown Swiss Semen						No action
Hostein Semen					/	Initiated 1979; terminated 1982
Jersey Semen				X	/	Initiated 1979; terminated 1982
Ayrshire Semen				X	/	Initiated 1979; terminated 1982
Buffalo		X				
2 Unspecified Breeds	X					
Murrah		X				Acquired with North Farm
Mediterranean Semen (Italy)					X	No action
Sheep		X	X			
2 Unspecified Breeds	X					
Local Lampuchre						Acquired before 1982
Kage (Kathmandu)					X	56 acquired 1984 (most prolific Nepal breed, shorttail/small)
Greek Chios (Prolific Milk Breed)					X	Req. by IAAS/deferred to IAAS II (to improve prolificacy/milk/size/wool)
East Friesian Milksheep Semen					X	No action; (to improve prolifacy-milk-size-wool) Crosses only
New Breeds (Kage x Prolific Milk Breed)					X	No action; (to combine adaptibility with improved genetic response)
Goat		X				
2 Unspecified Breeds	X					
Meat Breeds			X			Local and Jamnupari acquired before 1982
Milk Breeds			X			
Native Alpine		X				No action
Local Terai		X			X	56 Acquired 1984 (adapted and prolific)
Jamnupari					/	Phasing out 1984 (lack prolificacy)
Damascus (Shami)					X	Req. by IAAS/deferred to IAAS II (improve milk/size w/o reducing twins)
New Breeds (Terai x Damascus)					X	No action; (to combine adaptibility with improved genetic response)
Swine		X				
2 Unspecified Breeds	X					
Hampshire					X	Boar from Biratnagar 1980 (pigmented/but moderate performance)
Large White					X	From Hong Kong CA 1981 (prolific, fast growth/but sunburn)
Landrace					X	From Hong Kong CA 1981 (prolific, fast growth/but sunburn)

Table 1 (cont.)

Recommendation	Bird 1978	Deans 1978	Miller 1978-79	Williams 1979-81	Combs 1982-84	Status as of Project Terminiation
		Animal Science Advisors				
Livestock (cont.)						
Swine (cont.)						
Tamworth						IAAS purchased Pakribas 1982
Duroc					X	No action; (prolific, rapid gains, hardy farm pig, pigmented)
Black/dark		X	X			Some Hampshire crossbreeding
Local Dwarf					X	No action; (adapted to scavenging; very early sexual maturity)
New Breeds (Local x Exotic)					X	No action; (to combine adaptability with improved genetic response)
Poultry						
2 Unspec. Chicken Breeds	X					
Jungle Fowl						No Action; (basic genetic studies on progenitor of breeds)
Local	X					
Imported						NH Red, WH Sussex, Shaver;
Pigeons		X			X	4 pens built by MUCIA 1984 but no birds
Guinea Fowl					X	4 pens built by MUCIA 1984 but no birds
Ducks		X				One batch for meat 1983-1984
Turkeys		X				No action
New Breeds (Local x Exotic)					X	No action; (to combine adaptability with improved genetic response)
Facilities						
Brooder-Broiler House			X			Constructed with IAAS funds 1983 Design inadequate
Laying House			X			Constructed with IAAs funds 1983 Design inadequate
Incubation/Procession			X			
Student Projects	X					
Animal Science Advisors						
Trop Rum Prod	X					Deans, Miller, Williams, Combs
Parasitologist	X					No action
No Further Advisors				X		Rejected
Animal Production						IAAS II 1985
Veterinarian						IAAS II 1985
Facilities						
Joint Feed/Soils Lab	X				X	Equipment, but no functional lab
Technology						
Solar Cooking	X					
Biogas			X		X	50 cu m underground fixed dome 1984 (MUCIA)
Mechanized Traction			X		/	Old tractors not replaced
Animal Traction			X		X	2 animal-drawn wheeled tool carriers on order
Silage making		X	X		/	Silage pit unused since 1979, converted to digested biogas slurry pit

Table 1 (cont.)

Recommendation	Bird 1978	Deans 1978	Miller 1978-79	Williams 1979-81	Combs 1982-84	Status as of Project Terminiation
	Animal Science Advisors					
Technology (cont.)						
Buffalo Dairying	X	X	X	X	X	
Cattle Dairying	X	X	X	X	X	
Goat Dairying			X		X	
Sheep Dairying					X	
Research						
Cooked Soybeans	X					?
Rice Bran/Swine	X					MUCIA Project #12 terminated/management difficulties
Mustard Cake vs Soyabeans			X			MUCIA Project #17 M. Sapkota 1983
Chitwan Mustard Oil Cake						N. Joshi, M.S.U. Ph.D. thesis 1985, amino acid analysis
Local Chickens	X				X	No action
Scavenger Poultry	X	X			X	1978 project? 1982-84 deferred
Leucaena Variety Trails					X	MUCIA Project #20 K. R. Tiwari 1983
Leucaena Seed Scarification					X	Adjunct to project #20 Anne Waanders & Helmich van Rees
Leucaena Intercropping					X	Rejected by research committee 1984
Leucaena Feeding Trial					X	MUCIA Project #30 B. K. Sharma 1984 deferred indefinitely for Ph.D. studies
Dairy Cattle Crossbreeding			X	X	T	Initiated 1979; terminated 1982
Goat Breeding			X		X	MUCIA Project #29 I. P. Dhakal 1984
Sheep Breeding					X	MUCIA Project #29 I. P. Dhakal 1984
Pigeons					X	Pens built by MUCIA 1984
Guinea Fowl					X	Pens built by MUCIA 1984
Ducks					X	One batch for meat production only 1983-84; non-research
Fish-Cum-Duck						Facilities unsatisfactory
Integrated Fish-Crops-Livestock					X	No action
Liver Fluke Incidence						MUCIA Project #18 I. P. Dhakal 1982 IAAS Journal 1984
Private Clinic Disease Survey						I. P. Dhakal 1984
Farm Development						
Lowland Pastures and Forage					/	Unplanted or in forages/1 ha trees 1983
Lowland Food Crops Only					X	Accepted in principle/unimplemented
Wetland Forage		X			/	Remains in paragrass
Wetland Fish/Rice/Vegetables Only					X	No action
Banks to Forge		X				80% native grass and trees
Banks to Leucaena					X	1 ha planted 1983
Banks to Leucaena Intercrop					X	Rejected in research committee 1984
Preserve Natural Woodland					X	Occasional tree destroyed for site clearance
Woodland as Wildlife Preserve					X	No action
Upland Pasture and Forage		X			/	Most traded to maize station 1984
Perimeter Fencing					X	Initiated/terminated due to substandard work 1984
Crossfencing		X			/	Tree plots fenced 1983

1) Planting of flatlands to crops for human use rather than to forages.

The demand for human food is such in Nepal that use of arable lands for forages is difficult to justify except as part of some rotation or intercropping to enhance production of foodstuffs for humans. Livestock would be relegated to consuming the residues of such crops. Therefore, I recommended that all forages be removed to the slopes dividing the higher lands from the lowlands. The planting of Leucaena leucocephala was the first step of this process.

2) Silagemaking.

Silage is not made on any scale, if at all, in Chitwan and probably not in Nepal. Ensiling requires technology not now available. It was recommended that other methods of treating fodders be adopted such as the feeding of digested biogas slurry as a supplement to straws and other roughages.

3) De-emphasis of dairy cattle crossbreeding in favour of sheep, goats, and buffalo.

Crossbreeding of local cattle with temperate zone dairy breeds will double or triple lifetime milk yield but this is accompanied by a near doubling in reproductive rate. In the Western beef systems such increases in reproduction can be harvested profitably by slaughter. In Nepal, slaughter of cattle is forbidden by custom and law and any increase in cattle reproduction creates more fodder demand in a country that is already grossly overstocked. Buffalo are much more important as dairy animals in Nepal and sheep and goats have high potential for dairying. As these can all be slaughtered, emphasis on multi-purpose production in buffalo, sheep and goats seems to hold more potential for development in Nepal. Flocks of Nepali Kage sheep and Terai goats were established and plans adopted to import prolific, multi-purpose Greek Chios sheep and Damascus (Shami) goats from Cyprus.

4) De-emphasis of mechanization in favour of animal traction.

The high cost of tractors and fuel and the difficulty in obtaining spare parts and skilled operators and mechanics has constrained farm mechanization in many developing countries. Bullocks are readily available as is improved animal drawn equipment. Two sets of bullock-drawn wheeled tool carriers were ordered from Hyderabad, India, though they had not arrived as the MUCIA team departed Nepal.

In 1981, it had been recommended that no Animal Science Advisor should be assigned to the project "under the present situation." When I arrived at IAAS in September 1982, the Farm Manager, having seen several advisors come and go, toured me around the Livestock Centre of the North Farm. A number of useful but obviously unused facilities built by one of my predecessors were each identified in turn as "monuments" to Dr. So-and-So. He then turned and asked, "Now, what will your monuments be?" My response was, "There aren't going to be any, you will have to build them yourself." Believing that development consists of what the faculty do themselves rather than what the advisor does, I have been good to my word having neither driven a nail, nor turned a spade limiting my interventions to planning, advising, and the occasional demonstration.

What I had done on my short-term tour, January-February 1982, however, was to prepare as my end-of-tour report an extensive prospectus for the development of animal science programs at IAAS. Every member of the Department of Animal Science had contributed to the background of the report by participating in a series of "Advisor-Faculty" seminars in which each described one of the animal systems in Nepal. The institute had had the report for several months before my return and Michigan State/MUCIA administrators had simply charged me with implementing the proposals. If there was not unanimous concurrence with the report at IAAS, at least everyone was adequately forewarned.

From the proposals flowed the Animal Science components of the MUCIA Work Plan adopted in February 1983 following discussions within the Department of Animal Science and consultations among the MUCIA team, Dean B. P. Sinha, Gary Alex, USAID Project Officer, and Dr. Darrell Fienup, MUCIA/Nepal Project Coordinator, East Lansing.

The following activities and achievements followed in the Animal Science sector with some of which the Animal Science Advisor was involved (* funded by MUCIA/Nepal Project):

1983. Assistant Lecturer Nagendra Shah made and delivered ice cream for hundreds of Nepali farmers at IAAS field days.

*May 1983. Instructors Sudarsan Tiwari (Animal Science), Moti Lal (Agronomy), and Ram Koirala (Horticulture) participated in a 4-day training course on operation of bullock-drawn wheeled tool carriers, ICRISAT (International Centre for Research in Semi-Arid Tropics, Hyderabad, India).

*June 1983. Lecturers M. Sapkota, J. L. Yadav, and Nagendra Shah (Animal Science), B. Panta (Agronomy), and Bhola Pokarel (Agriculture Economics) participated in the Animal Science 23-day MUCIA/IAAS Mediterranean Livestock Study Tour led by the Animal Science Advisor inspecting dairy sheep and goat systems in Cyprus and Greece and buffalo dairies and Chianina cattle in Italy as well as FAO headquarters in Rome.

*June 1983. Lecturer K. T. Augusthy (aquaculture) participated in the MUCIA/IAAS Indonesian Study Tour led by Rural Development Advisor, Dr. Herb Whittier.

*July 1983. Animal Science Lecturers K. R. Tiwari and D. Nepali participated in a USDA short course, Economic Management of Small Crop and Livestock Farms, Colorado State University, Ft. Collins, with a stop on return at University of Hawaii to inspect research with the tropical fodder/fuelwood legume, Leucaena leucocephala.

July 1983. K. T. Augusthy was awarded a fellowship IDRC (International Development Research Centre, Canada) for Ph.D. studies in aquaculture at McGill University, Montreal, Canada, as a result of his excellent IDRC research on the toxic effects on fish of local Nepali plants. The role of the Animal Science Advisor was largely one of encouraging and editing.

*August-September 1983. K. R. Tiwari, project leader, supervised planting of some 15,000 seedlings and direct seeding of Leucaena leucocephala as MUCIA Research Project #20. Some 20,000 seedlings had been grown by Helmich van Rees and Anne Waanders, volunteer students from the College of Tropical Agriculture, Deventer, Netherlands. The plots were designed by the Animal Science Advisor.

August 1983. M. Sapkota planted one ha of fodder and fuelwood trees on the North Farm as a cooperator with the Institute of Forestry, Hetauda, on a project funded by IDRC.

*1984. A large barn was modified by MUCIA to extend the roof over the entire floor area, to screen the entire barn to exclude rats, and to provide four screened pens for pigeons and guinea fowl.

*January 1984. M. Sapkota won Honourable Mention at the National Science and Technology Exhibition sponsored by the Nepal Academy of Science in Kathmandu. Mr. Sapkota's exhibit was a pig self-feeder made of wood and a metal drum-waterer constructed for his MUCIA pig feeding trial comparing mustard cake and soybeans as ration supplements. Entries were for technical developed or significantly modified in Nepal.

*January 1984. M. Sapkota, J. L. Yadav, N. Shah, B. Panta and the Animal Science Advisor were joined by B. K. Sharma in presenting a slide illustrated seminar on the MUCIA/IAAS Mediterranean Livestock Study Tour and Mr. Sharma's visit in Greece.

*April 1984. A 50 cu m anaerobic biogas digester, the first of its size in Nepal, of the Chinese, underground fixed dome type, was constructed with MUCIA/USAID funding on the North Farm and the first biogas generated. Gas hotplates were installed in 8 new apartments and a hotplate and two gas lamps in the dairy laboratory. Three hundred kg of cow and buffalo dung and 300 litres of water are added daily.

April 1984. M. Sapkota and N. Shah led third year students on IAAS India Tour to research stations and universities.

*April 1984. Extension personnel directed by Dr. Herb Whittier conducted a rabies vaccination campaign among dogs in the community and a hemorrhagic Septicemia vaccination campaign among cattle and buffalo.

May 1984. B. K. Sharma, as a result of his own efforts, received confirmation of a fellowship for Ph.D. studies in Dairy Cattle Nutrition from the University of Maryland.

*June 1984. Assistant Lecturer I. P. Dhakal (Veterinary Science) participated in the MUCIA/IAAS India Agronomy Study tour led by Dr. Herb Whittier.

*June 1984. I. P. Dhakal, with K. R. Tiwari and D. Nepali, established a research breeding flock of Terai goats with direct MUCIA/USAID funding.

*July 1984. I. P. Dhakal, with the Animal Science Advisor, established a research breeding flock of Kage sheep from the Kathmandu Valley with direct MUCIA/USAID funding.

July 1984. Nagendra Shah received confirmation of a fellowship for Ph.D. studies in dairy processing in the Department of Food Science, University of Alberta, Edmonton, Alberta, Canada.

*July 1984. a 1400 kg heavy duty cattle scales and a 300 kg small livestock scales arrived purchased by MUCIA/USAID.

August 1984. Mohan Karel, Lecturer in Animal Science, Paklihawa Campus, recently returned.

Some Additional Activities of the Animal Science Advisor

1983. Visited Ministry of Agriculture Feed Mill, Nepal Livestock Company slaughter plant, and Hetauda Leather Company, Hetauda, with S. D. Sah and K. R. Tiwari.

1983. Toured commercial hatcheries and poultry farms and Kathmandu Dairy milk processing plant, Kathmandu, with N. Shah, Farm Manager.

October 1983. Toured libraries in Kathmandu with John Beecher, MUCIA short-term advisor on Library Development.

February 1984. Submitted Proposed Breeding Plan for Karnali Sheep Farm, Jumla, to Department of Livestock Development and Animal Health at request of Director.

April 1984. Participated in the Far and Mid-West Region Peace Corps Program at Tulsipur, Rapti Zone; topic "Appropriate Animal Husbandry."

May 1984. Visited IAAS Paklihawa campus with K. R. Tiwari, Dr. Cordell Hatch, USAID consultant, and Gary Alex, USAID Project Officer.

May 1984. Participated in the Resource Conservation and Utilizaton Project (RCUP) Evaluation Workshop, Kathmandu, with review of livestock component proposals; sponsored by RCUP contractor, South East Consortium for International Activities (SECID).

July 1984. Visited Ministry of Agriculture Livestock Station, Pokhara, with Assistant Instructor I. P. Dhakal.

Some Unsuccessful Ventures

*Fish ponds. Despite the strong objections of the Animal Science Advisor, construction was continued on a set of four fish ponds of unsatisfactory layout and non-functional design initiated before the present team arrived. Some 0.4 ha of choice wetland was destroyed to gain 0.2 ha of pond surface. The ponds were built below ground rather than above making impossible the control of water quantity and quality or drainage or drying of the ponds. The ponds are too deep and ill-shaped to permit wading through by fishermen or netting of fish by conventional means. The "integrated" duck house is located atop an adjacent bank rather than over the ponds resulting in uncontrolled erosion of the banks and no integrated animal facility. It has

been the costliest research expenditure, has yielded no research results and is unlikely to yield any other than a test not yet funded of the relative fish-rearing capacities of the ponds.

A 3000 lb capacity electric feed mixer and a hammer mill ordered previous to this team arrived in May 1983. The intention had been to establish a commercial feed mill though Nepal has a serious deficit of food grains. The previous Animal Science Advisor had recommended that hand mixing was adequate and, indeed, a smaller electric mixer and hammer mill were unused because there was inadequate electrical service. New wiring has been installed but voltage is well below the nominal 22 ov and advise has been given that the motors will not long endure the usual fluctuations in voltage. The mixer requires operators with training and skills far beyond that of present IAAS staff. The equipment remain in storage; re-sale has been recommended by the Animal Science Advisor.

Summer 1983. Poultry houses were built with IAAS funds. Advice to build a single utility house and design suggestions were rejected in favor of building two small separated houses, one for layers and one for brooding chicks. The long, narrow shape of the brooder house reduced floor space some 20 percent below that in a square building of the same perimeter. The 12 foot walls in both buildings leave one-third of the volume unusable. Failure to anchor roof trussess resulted in the roof of the brooder house being completely blown away in a violent windstorm in early 1984. It has been replaced at IAAS expense.

TEACHING

Even after two years at IAAS, any evaluation of the quality of instruction is difficult. Only skeletal course outlines are published. In 1983, the Department of Animal Science organized to prepare course outlines and develop course syllabi leading to the publication of a textbook. However, within a few months, the chairman who had himself published a book received a Ph.D. assistantship in Canada. The Animal Science Advisor circulated an example syllabus and prepared a syllabus for an elective course in Sheep and Goat Production, but only one faculty member submitted his course outlines.

Several faculty have been identified by students as superior teachers. They are conscientious in meeting their classes and are diligent in their class preparations. Unfortunately, there is no mechanism for officially identifying and rewarding superior teachers though teaching is generally claimed as having first priority at IAAS. That a monetary award for "best teacher" went to a faculty member who was not teaching added a note of cynicism to the concept of merit awards.

There are several identifiable impediments to good teaching at IAAS. Indeed, the most intractable problems of developing both the nation and the Institute of Agriculture and Animal Science seem rooted in the educational system.

Impediments to improved instruction include:

Facilities. The recently built classrooms have been criticized by short-term consultants Wamhoff and Cooper (1984) and Sofranko and Odell (1984) because of their unsatisfactory acoustics and poor natural lighting. Under the best of conditions, dialogue with students is difficult but, because of student pronunciation, dialogue is made immeasurably worse with the acoustical reverberations of the classrooms. When fans or air conditioners are running, dialogue is almost impossible. In one case, I was reduced to having the student write her response. In addition, a large proportion of flourescent lights are out of order because of faulty starters, defective tubes, or failure of public power sometimes for days at a time.

Likewise, equipment of laboratories has been criticized as being inadequate in large part due to lack of maintenance.

Level of English. Nepali is the mother tongue for many students, but only the second language for others born into tribal and some other castes. English is the third language for many. Although the official language of instruction is English except for Nepali language and cultural courses, a minority of students are sufficiently proficient in English to take oral instruction in English as opposed to written lectures. The proficiency of English among faculty is generally adequate but varies from high levels of fluency in both oral and written expression to barely functional conversational levels. Accents vary from highly westernized to Indian sub-continental which are not easily understood by westerners. Conversely, students have complained that they were unable to understand my accent to which I responded by speaking more deliberately and writing more on the chalkboard. The departmental chairman visited my next lecture and pronounced my improved presentation satisfactory.

Teaching methods. By all appearances teaching is by rote with the major instruction being by memorization of lectures written on the chalkboard. Students have little practice or skill in analytical reasoning and synthesis. The first reaction of students to handouts of graphic materials from which trends or conclulsions were wanted was supposition that they were to memorize all of the numbers on the page. The almost total reliance upon the lecturer as the subject matter resource strengthens the authority of faculty over students.

The shortcourse in teaching methods offered at IAAS by Dr. Carroll Wamhoff and Dr. Colleen Cooper, Michigan State University, was well received by participants with about two-thirds of the faculty participating. Due to the short time remaining in the project, subsequent performance was not evaluated, but faculty responses to the diversity of new teaching methods experienced were highly positive. During the course of my short-term and long-term tours, the teaching of Dr. Hank Foth, Plant Science Advisor (1981-1982) and of short-term advisors offering special courses in technical subjects to faculty were, themselves, models of effective teaching.

Should Advisors Teach at IAAS?

I am more than a little doubtful that advisors should assume full responsibility for teaching courses. In each case that I did so, it seemed to me that the department simply postponed addressing the problem of scheduling the effective use of faculty who were carrying rather light teaching loads. In the most celebrated case, I was asked to teach Animal Breeding as no animal breeder was on staff at the main campus. However, a participant recently returned from University of the Philippines with an M.Sc. in Animal Breeding was returned to his post at the Paklihawa branch campus to teach in the one and two year programs where such a level of training is not required. When I announced my intention to stop lecturing to prepare for termination of the project, the animal breeder was transferred to Rampur.

Another problem with advisors teaching undergraduates is the enrichment of courses beyond the approved course content. In the case of the elective course, Sheep and Goat Production, for which I had developed the syllabus, the subject matter committee dictated that it be taught that Southdown sheep are the most important meat breed which conflicted with my view that the Suffolk was vastly superior and more widely used. Neither is of importance for Nepal but I was not pleased to teach something which I believed was untrue. However, it is necessary that the students know the approved answer for their external examinations. When I presented my syllabus to a departmental committee, I was asked to delete certain subjects because they were beyond the experience of the committee who felt that students given such a syllabus would demand that the material be taught. I have more than a little sympathy with their position because reference materials are meager.

In my view, the role of the advisor in teaching should be to assist faculty in improving their knowledge and teaching techniques and to developing teaching materials rather than taking classes other than on an occasional basis.

A Student Responds

On July 30, on short notice, I was asked to teach the course in Animal Breeding as the lecturer was departing for graduate studies. I delivered four lectures before the qualified replacement lecturer was transferred from Paklihawa. The series of lectures was a rationale for national animal breeding policy addressing the very serious problems of low productivity and environmental destruction due to massive overstocking in Nepal. To be sure, the subject was well outside the approved curriculum. The major thrusts of my lectures included:

1. That there is not too little fodder in Nepal but far too many livestock;

2. That a massive reduction of livestock numbers, especially cattle and others of low productivity, was required to reverse the degradation of pasture and forest lands;

3. That a reduction of unproductive livestock numbers would liberate feed supplies to raise the nutritional levels of livestock most capable of responding--sheep, goats, lactating cows and buffalo, etc.; examples were given of how production could be increased while reducing livestock numbers and shifting feed supplies to more productive livestock.

4. That the capacity of local livestock to respond to improvements in environment is so limited (due to their adaptation to survival in harsh environments) that their response does not compensate for the cost of environmental improvement. Numerous examples from Nepal were cited from my short-term end-of-tour report.

5. That a concurrent genetic improvement program is essential to increase the capability of Nepali livestock to respond to development investment. Examples from harsh environments of Nepal, Canada, and Israel were cited.

6. That cultural constraints in Nepal, especially the cultural and legal prohibition of cattle slaughter, were the most serious constraints on livestock development as technical solutions were readily at hand.

The class of about 75 students was challenged to put their minds to the solution of these difficult problems as they took their places among professional agriculturalists in Nepal. A few examples were given including the working of female buffalo, as in Indonesia, which would release half a million or so male buffalo for slaughter. The milking of all ruminants including sheep, goats, cattle, buffalo, yak and chauri was a basic theme for increasing animal productivity while reducing cattle numbers. More efficient animal drawn tillage equipment was another.

At the end of my final lecture, a student came forward with a three page handwritten paper which is reproduced as Appendix A with my response following. I was elated that a student had responded in a way which I believe to be unusual in the Nepali teaching system and certainly unprecedented in my teaching experience at IAAS. The paper is reproduced without editing.

LIBRARY

The Demise of a Journal Collection

The Library was an early victim of the USAID decision to leave at least one year gap between the termination of the current project and IAAS II.

The simple statement that subscriptions to 33 technical publications were cancelled due to the termination of the project may not fully convey the withdrawal symptoms. Following is an individual accounting:

Date last issue received.

1983 Advances in Agronomy

July 1983	A J S
Oct	FAO Plant Protection Bulletin
Nov	Annals of the Entomological Society of U.S.A. Soil Science Society of America Journal
Dec	Horticultural Science Phytopathology
Jan 1984	Agronomy Journal American Journal of Agricultural Economics Annual Review of Plant Physiology Crop Science Journal of Economic Entomology Journal of Extension Journal of Nematology Journal of Nutrition Mycologia Soil Science Soil and Fertilizer Abstracts Transactions of the American Society of Agricultural Engineers
Feb	Environmental Entomology Nutrition Abstracts and Reviews Plant Physiology Poultry Science
March	Journal of Animal Science Journal of Soil & Water Conservation Rural Development Abstracts Rural Extension Education Training Abstracts World Farming
May	Ceres Journal of the American Society of Horticultural Science
June	Journal of Dairy Science
July	Economic Development and Cultural Change
Sept 1984	Rural Sociology

A full year before the close of the contract the attrition began and continued until the close on 30 September 1984.

Short-term Tour of Library Consultant, John Beecher, Public Service Librarian, University of Minnesota

Mr. Beecher has submitted his own report of the details of his tour. He was knowledgeable of the library situation at IAAS from his previous tour and

gave practical and encouraging advice with special reference to the documentation centre.

From 28-30 November 1983, I accompanied Mr. Beecher on a round of library visits in Kathmandu. We attended one session of the Second National Conference on the HELLIS (Health Literature and Library Information Service) Network and toured libraries at APROSC, Institute of Forestry, RECAST at Tribhuvan University, and ICIMOD. At other times, I have visited or used Tribhuvan University Library, British Council Library, USAID Library, and AWON Library (casual reading).

I had been told during my short-term tour that because the CAB abstracts were published in the U. K. they could not be purchased with USAID funds. Upon my return, CAB sent the name of their agent in the U. S. A. and a one year subscription to each of four of the abstracts was ordered. They of course were discontinued one year later with the USAID decision to re-bid the project. To aid in accomodating this, I recommended termination of the Journal of the American Veterinary Medical Association as most articles dealt with pets or horses and were rarely relevant to Nepal.

Other than a single meeting of the Library Committee early in my tour and another when John Beecher was on campus, the Library Committee was inactive and was bypassed for at least one large order of books toward the end of the project. The establishment of a communications centre by the extension staff in the old library creates some uncertainty about the control and use of the "learning laboratory" equipped in the new library.

Proposals of establishing departmental libraries threaten the development of the central library if institutional or project funds are diverted from the main library. The lack of departmental space and staff and the location of all departmental offices within 100 or so metres of the main library raise serious question as to the justification for such proposals.

The work of Jeanne Wood in organizing the library collection in 1981-1982 and the dedication of the Librarian, Mr. Devkota in maintaining and developing the library are acknowledged with appreciation.

Computer Centre

Mr. P. P. Sharma, Lecturer in Soil Science, has been in charge of the Computer Centre since the centre was established when Dr. G. P. Wood was MUCIA team leader in 1982. The first acquisition was an APPLE II Plus microprocessor with a second one added in 1984. Thermal, dot-matrix, and Daisy-Wheel printers have been purchased. Repairs thus far have been only to one disk drive. The computer seems to be one of the few bits of high technology which leaps which can be made without the virtual recapitulation of the industrial revolution as in establishing many other technologies in developing countries. Lack of maintenance, spare parts, and skilled technicians have thwarted many other attempted technological leaps. The dedication and capability of Mr. Sharma has been essential to this development at IAAS.

In the fall of 1983, Mr. Sharma participated with MUCIA sponsorship in a three month training program at Michigan State University with MSTAT, a sophisticated statistical analysis program package for CP/M systems which capability had been added to an IAAS microprocessor. Upon his return, Mr. Sharma presented an outline of MSTAT and immediately established training classes with each department at IAAS. Although faculty use of computers is not as great as it could be, it has been increasing. Mr. Sharma has been particularly helpful in advising his colleagues on data analysis. He has trained one person in word processing. Pro-duction of laboratory manuals and faculty bulletins has been enhanced by this capability. The acquisition of CROSSWORD MAGIC by the Animal Science Advisor led to a regular crossword puzzle by P. P. Sharma in the RAMPUR ROUNDUP.

In early 1983, the Animal Science Advisor and the Rural Development Advisor, Dr. Herb Whittier, each acquired PINEAPPLE computers with the same capability as the IAAS units. Mr. Sharma was particularly helpful in establishing these systems which relieved the MUCIA office of considerable typing. Although the Animal Science Advisor was nominally liaison for the computer centre, Dr. Whittier was even more active in his assistance to the centre.

After noting the desktop computer systems at Michigan State University and the University of Minnesota, it is suggested that IBM Personal Computers be added in Phase II to give access to the many agricultural programs developed for IBM microprocessors.

Personal Style and the Development of IAAS

The basic thrust of this section is that technical assistance advisors bring to the project the diversity of perspective and personal style lacking among the faculty of IAAS for the planning and development of an institute capable of bringing constructive change to Nepal but that the need for this diversity is not generally recognized by the faculty. It is emphasized that one personality is not considered here to be superior to another but that a diversity of personality types is essential to the planning and development of IAAS.

Personal Style as a Constraint on Development Justifying the Provision of Technical Assistance

A basic premise in international development is that technical assistance is justified because the recipient country has been incapable of marshalling national resources to produce even the minimal food requirements of the nation, or to achieve broadly based economic development, or to provide basic needs of shelter and health.

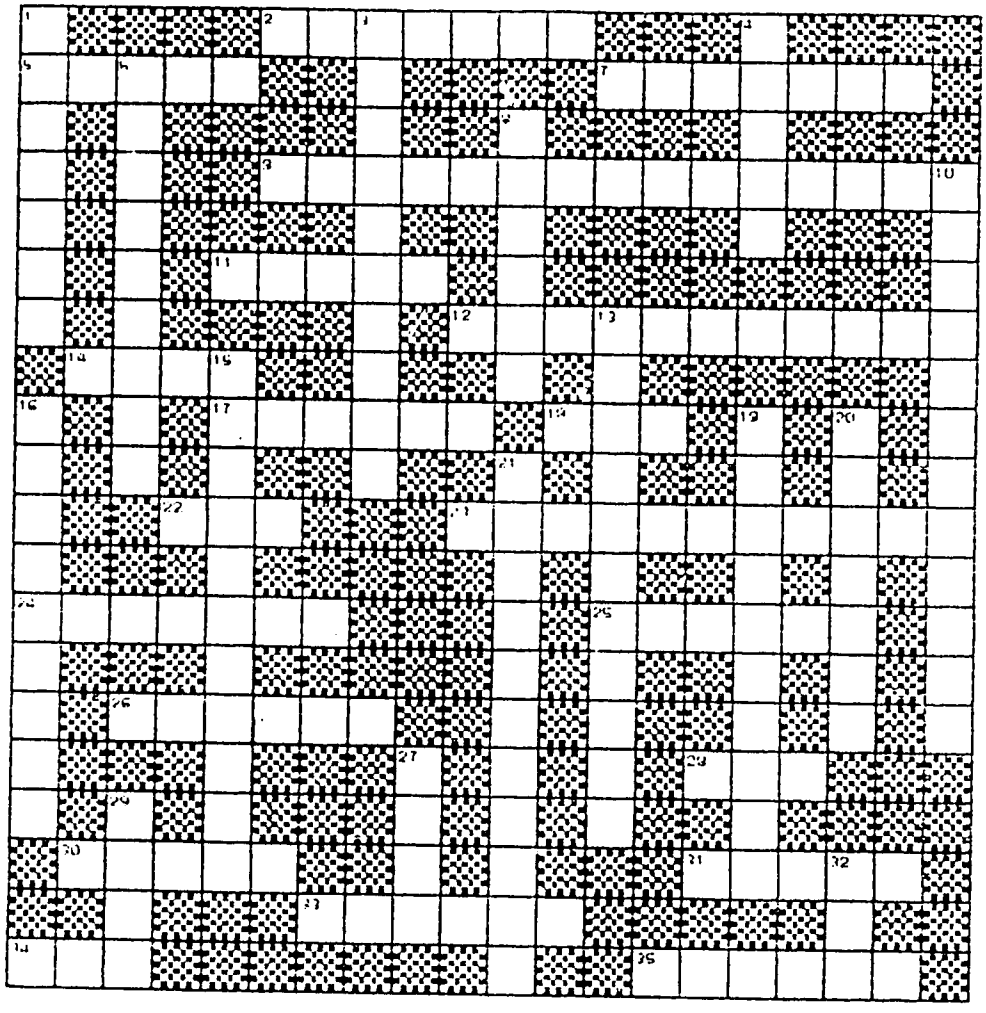
Basic roles of technical assistance advisors include:

1) Sources of technical knowledge.

As technical training increases, the role of advisors as sources of technical information becomes increasingly supplanted by the increasing expertise

Table 2

SHEEP BREEDS by W. Combs



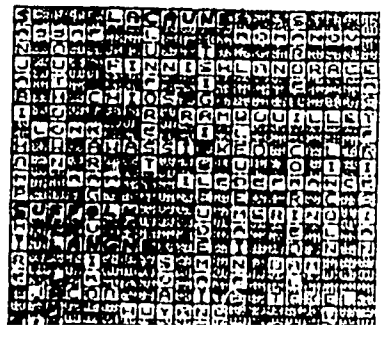
ACROSS CLUES

2 FRENCH MILKSHEEP
5 ISRAELI EAST FRIESIAN X AWASSI
7 USSR BLACK PROLIFIC
9 PROLIFIC NORTH EUROPEAN SHORTTAIL
11 GREEK ISLAND MILKSHEEP
12 FRENCH FINEWOOL
14 SCOTTISH BLACKFACE
17 ARAB FATTAIL MILKSHEEP
18 WINGLESS FLY IN FLEECES
22 MALE SHEEP
23 FRENCH MEAT TYPE MERINO
24 BLACKFACE FAST GROWING, LATE FATTENING
25 FINEWOOL OF SPANISH ORIGIN
26 ITALIAN MILKSHEEP
28 MOTHER
30 FOURHORNED
31 DUTCH HYPERMUSCULAR
33 PROLIFIC CHINESE
34 BROTHER OR SISTER
35 HORNED EXTRA-SEASONAL BREEDER

DOWN CLUES

1 IRANI FATTAIL
3 PROLIFIC BRIT
4 ITALIAN ISLAND MILK SHEEP
6 SLOW GROWING EARLY FATTENING
8 EASTERN EUROPEAN MULTI-PURPOSE
10 GERMAN MILKSHEEP
13 PROLIFIC FRENCH BLUEFACE
15 MILKSHEEP OF THESSALY
16 BLACKFACE MEATTYPE
19 LINCOLN X MERINO
20 LONGWOOL PARENT OF NEW BREEDS
21 PROLIFIC FRENCH BLUEFACE
27 BRITISH FERAL SHEEP
29 BABY SHEEP
32 FEMALE SHEEP

ANSWERS: SHEEP BREEDS



of local professionals. At IAAS, nearly all of the agricultural faculty have master's degrees, with a few doctorates, mostly from the U. S. A., India, and the Phillipines, under sponsorship of the technical assistance project. A few others have their degrees from elsewhere. In many fields, the faculty are at least as well trained as their advisors. Advisors can be especially helpful, however, in gaining access to new technical information because of their more ready access to communications and transportation.

2) Experience.

Advisors usually have both greater length of experience and, especially, greater breadth of international experience which enhances their potential value as resource persons to IAAS.

3) Cultural diversity.

The heaviest constraints on development are cultural, not technical. The ability of advisors to stand outside the cultural context and constraints of the recipient country and propose alternative solutions to problems is their most indispensible role. It is also the role that is often least appreciated by local professionals. Indeed, it is this role which generates the most friction and even resentment but holds the greatest potential for constructive change.

At times, the charge is made that advisors "want to change our culture." The charge is well founded. To the extent that malnutrition, poor public health, inadequate housing, and poverty have become ingrained in the culture of the least developed countries, cultural change is mandatory and implicit in technical assistance and the development process.

When the Animal Science Advisor proposed the milking of sheep and goats, the charge of cultural interference was raised by an IAAS lecturer, another Nepali animal science professional and even by an American educational advisor now residing in Nepal. A highly placed official in the Department of Livestock and Animal Health declared at an IAAS curriculum committee meeting (17 January 1984), "There will never be cheese made from goats' milk in Nepal." Such foreclosure of a potentially valuable avenue of livestock development for relief of malnutrition and poverty demonstrates the rigidity of entrenched cultural attitudes and perspectives.

All were speaking from experience on the Terai where, reportedly, sheep and goats are not milked. However, the livestock development literature of Nepal records that both sheep and goats are milked in the Himals. IAAS faculty from villages in the higher elevations confirm this from their own experience.

One role of the advisor is to interpret the country's culture to local professionals as many are not widely travelled in Nepal. Others are not well read in the livestock development literature of Nepal nor well informed on animal agriculture outside their regions of residence. The Animal Science Advisor's short-term end-of-tour report (Combs, 1982) has served as a review reference of Nepali livestock development.

Nowhere are cultural constraints more repressive of development than in the livestock sector. The heaviest of these constraints in Nepal is the prohibition of both slaughter and export of cattle. A massive reduction of the national cattle herd is called for to relieve the chronic shortage of fodder and to permit feeding more productive livestock to flourish. Indeed, there is not too little fodder in Nepal but too many livestock. While technical assistance advisors cannot prudently go so far as to publicly advocate cattle slaughter, they can bring to public discussion the general problem of overstocking and propose alternative means of reducing the national cattle herd.

A Nepali Speaks of Socio-Cultural Constraints on Development.

B. B. Pradhan, former Finance Secretary with HMG/Nepal wrote a full page article, "Development Culture" (Rising Nepal, May 4, 1984) which carried the heading,

"Often ignored, socio-cultural factors are playing havoc with the development process in the Third World. Nepal is no exception; says B. B. Pradhan, in fact she is a major victim."

The following excerpts from Pradhan's article refer to the national scene but seem equally pertinent to the development of IAAS:

"The Fifth Plan...achieved a break-through in investment and allocated the highest amount to agriculture...But the irony is that there has been a fall in agricultural production during this plan period, -1.1 percent growth as against the target of 3.5 percent."

"Why has Nepal's development performance been persistently poor?

"Financial resources--thanks to the bilateral and multilateral donors--...the availability of foreign aid exceeds the absorptive capacity...

"Trained man-power, though limited, is no longer inadequate for the current size of the development programmes. A recent study...shows a little surplus of higher level manpower...Shortage of trained man-power is certainly not the basic constraint.

"The most prominent features in the Nepalese society, common also among most oriental countries, are the mutual dependency relationship and property inheritance system in contrast to individualism and primogeniture in the western world.

"While lack of individualism in society has denied the necessary spirit for the achievement of economic progress, too individualistic an outlook in matters of business and investment has stunted the growth of large enterprises. The establishment of a public limited company has become a rare phenomenon. Even the cooperatives have not been much of a success.

"It is apparent from the behaviour of modern enterprises in Nepal that beyond traditional social and economic activities, the will to join together for economic activities beyond the immediate family is wanting.

"Adhocism is another socio-cultural characteristic. Planning is an anathema to most Nepalis. Whatever be their merits, the socio-cultural values of Nepal are less than helpful in the development process; they are in certain respects formidable constraints."

Personal Style Inventory as an Indicator of Cultural Constraints to Development of IAAS.

Interpretations which follow are those of the Animal Science Advisor and not necessarily those of the Education Advisors.

In May 1984, Dr. Colleen Cooper, Assistant Professor of Educational Systems Design, Michigan State University, as a short-term consultant administered to 43 IAAS faculty members a Personal Style Inventory test used by the MSU Cooperative Extension Service (see end-of-tour report of Carroll Wamhoff and Colleen Cooper, 1984, for the test and interpretive material on the Myers-Briggs personality inventory). Cooper also tested the three MUCIA advisors and others of the development community who were available. Two absentee faculty members were later tested by the Animal Science Advisor as well as a number of advisors and others working in development in Nepal and Ghana. The total faculty sample of 45 included approximately 40 Nepali men, one Nepali woman, and a few Indian contract lecturers. The frequency of faculty personality types was recorded in the class but the type of individual members was not recorded by person's name.

The Personal Style Inventory in its short form consisted of 32 paired questions which when tabulated measured four personality tendencies indicating where the respondent turns for information, (I)ntrovert vs. (E)xtrovert; how information is received, i(N)tuition vs. (S)ensing; how decisions are made, (T)hinking vs. (F)eeling; and how the respondent deals with the outside world, (P)erceiving vs. (J)udging. Although the test may reflect American cultural standards, the declared objective of developing IAAS as an English-speaking university meeting Western academic standards justifies at least an initial survey using this personality classification.

The general results were that neither the IAAS faculty nor the advisors were typical of the general American personality frequencies. It is acknowledged that the number of advisors tested is too small to characterize advisors in general. However, nearly two-thirds of the faculty were tested. IAAS faculty were overhelmingly (74%) of the general personality type (SJ) twice the frequency found among Americans tested. A single subcategory, ESTJ, accounted for 56 percent of faculty tested. The encapsulated description of the ESTJ personality is:

"Practical, realistic, matter-of-fact, with a natural head for business or mechanics. Not interested in subjects they see no use for, but can apply themselves when necessary. Like to organize and run activities. May make good administrators especially if they remember to consider others' feelings and points of view."

With few exceptions, IAAS faculty aspire to any administrative opportunity offered and are quick to assume control of activities which coincide with

their personal interests. Competition for training abroad is especially keen and their record of achievement in graduate studies has been consistently of a high order in contrast with an inconsistent record of achievement after return to IAAS in professional activities for which immediate personal incentives are lacking.

The characteristics of IAAS faculty which have been the most vexing to advisors are (1) a very heavy traditional cultural perspective of most problems, and (2) the haste with which judgements and decisions are made without consideration of alternative points of view. These are consistent with the personality inventory results. The frequent result is foreclosure of discussion with little consideration for alternative or dissenting views. Meetings called for consideration of an issue often proved to be only a formal confirmation of decisions reached before the discussion. Retraction of decisions thus taken or acceptance of significant compromise was rare excepting instances in which the Technical Assistance Team exercised their control on funding. At first, this was taken by advisors as personal rebuff, but there is evidence from other sources, including the Personal Style Inventory, that quick and firmly held judgement is very much a Nepali way of doing things.

Debating of issues as is common in Western universities does not occur at IAAS. The reason that such debate is precluded seems to be that the faculty approach problems from much the same perspective reflecting their lack of diversity of personality type and perspective. To the extent that "university" implies a universe of perspectives as well as disciplines, it would be a misnomer for IAAS at this stage of development.

On the other hand, the MUCIA advisors were a diverse lot. One was also of the SJ ("traditional-judicial") type, another NF ("catalyst") and the other NT ("visionary"). It was in character that they were, respectively, an administrator of long experience, a people-interactor, and a developer of long term systems plans. Such a team would be expected to bring to the IAAS faculty the diversity of perspectives and personal styles to achieve the planning, motivation of people and stable administration for systems analysis and synthesis and for building an institution "upwards and outwards."

Diversity of personalities within the team also makes for incompatibilities. On a large university campus, these diverse personalities might withdraw after office hours into their own separate social spheres for evenings and week-ends. However, in Rampur, three families previously unknown to each other are thrust into side-by-side residences with few of the back-home social outlets. The nearest ex-patriots are two to four hours away.

Adjusting to each other on a 24-hours-seven-days-per-week basis while simultaneously adjusting professionally and socially to Nepali colleagues generates considerable personal stress. That six of the 14 advisors sent to Rampur did not complete their tours on post reflects the situation very well. Much thought and planning needs to be given to this very fundamental problem of effective functioning of advisors in selecting and housing teams. However, despite the problem of some advisors not completing their tours, Mr. Mohan Sainju, Deputy Director of the National Planning Commission of Nepal, praised MUCIA for demonstrating that senior academics could successfully withstand the rigours of this isolated posting. It should be noted that the situation is

also unreal for Nepali faculty who also are unable to withdraw into a more general society after working hours as would be possible in Kathmandu. Neither advisors nor faculty are able to disengage from the project when they are residing on campus.

From various projects, of 10 advisors who had had long-term field assignments in international development, four were NT, two NF, two SJ, and two SP ("trouble-shooter"/problem solver/fixer). Doubling the group by adding short-term consultants, wives and professional back-up staff encompassed 14 of the 16 personality subcategories but little changed the ratios of the general types. They were diverse but skewed toward personality types of low frequency among Americans and virtually absent among IAAS faculty. The total group included 12 born in U. S. A., three Canada, two Philippines, one U. K., and one India, and included nine women.

Instead of institutional building, too often we have seen fractionation of IAAS, for example, the successive breakdown of three divisions into a dozen small departments ineffectual by Western standards of institutional development. Development of departmental libraries at the expense of the central library is actively proposed. This appears very much as the inclination to "family enterprise" rather than "corporate enterprise" mentioned by Pradhan. it further reflects the narrow cultural perspective of the faculty--there are few visionaries among them, or at least, their visions are generally constricted by heavy cultural constraints. The rationale of IAAS faculty is that each new departmental chairmanship brings a Rs150 (about 10%) monthly salary increase and increased opportunity for more training, senior staff positions, and facilities considered to be departmental entitlements. "Professional identity" is cited as a reason for departmentalizing when the minimum of three faculty in one discipline is reached.

The first subdivision from three divisions to seven departments came without forewarning to the technical assistance team underscoring how little advisors are integrated into decision-making at the institute where approval of project funding is not involved. It is an area of internal administration in which the consulting of advisors is deemed irrelevant from the IAAS point of view. Advisors saw the fractionation as a retrograde step in institution building increasing the competition for scarce resources without increasing the amount of those resources. On the other hand, faculty realized immediate benefits under university rules providing automatic salary increases for chairmen in which all can share as they rotate through the chairmanships with the very real liklihood of additional senior positions in the longer term as a departmental entitlement. It was a very rational move on their part however detrimental it may be to the development of the institute.

Sub-dividing the central library into dispersed departmental libraries would seem to offer further evidence of the "family enterprize" orientation of the Nepali culture.

Some have proposed that Nepal advisors be appointed instead of expatriates. IAAS faculty as a group are the most highly trained agricultural professionals in Nepal. However, to the extent that IAAS faculty are representative of Nepali professionals in agricultural development, it seems unlikely that adding Nepali advisors would do other than re-inforce the present

lack of diversity in perspective and personal style. Advanced degrees and greater technical knowledge alone are not sufficient.

As with the nation, IAAS has not wanted for funding nor for trained manpower. The institute wants for greater diversity of perspective and nowhere more than in administrative decision-making. This diversity is immediately at hand for the asking in the Technical Assistance team but is little used.

The great challenge to the advisors is to present their messages in forms and in ways most likely to be received by their Nepali colleagues. It has been indicated that concepts presented in the abstract are unlikely to be persuasive. For example, no broad support came for sheep and goat milking until five faculty members were shown sheep and goat milking systems in Cyprus and Greece on the Mediteranean Livestock Study Tour. This and other identifiable concepts gained endorsement among participants as valid alternatives for livestock development in Nepal. Some were acted upon after the tour.

If IAAS is to be other than a reflection of the developmental malaise of Nepal, is to build the institute "upward and outward", is to become a vehicle for constructive change, there must be a conscious effort to seek and develop diversity of thought and perspective among faculty. This does not mean turning control of the instutute to the technical assistance team, but it may mean leaving advisors some residual control, at least a veto over large and irrecoverable expenditures, during what may well be a prolonged development phase.

If the problem is rooted in the culture of Nepal it is nurtured in the educational system. The curriculum is rigidly prescribed with 8-10 course preparations per week demanding 30 to 40 classroom hours per week. Faculty say that this is partly so to give students less free time to plot disruptive activities. It also gives them little time for independent study and reflection. Nor is such required by teachers who are often the sole source of information and that transferred by rote. Even course content is prescribed in some detail by subject macter committees including non-faculty professionals. Once set, there is little scope for adding or deleting material as the official course content will be the basis for external examinations. In some cases erroneous and outdated information is carried forward at the insistance of some particularly opinionated committee member.

Analytical skills are weak among students in my experience. Inability to perceive inter-relationships of diverse elements of systems or to synthesize new relationships and systems is characteristic of what the predominating personality type of the faculty and is evident among students. In a class of 24, only 8 were even reasonably successful in identifying from small tables 3 major factors (breed, age, province/geographic location) causing variation in milk yield of dairy cows even though the factors were clearly labled as headings in the tables. Many students simply wrote sophisticated textbook answers (e.g. "genetic-environmental interaction") which were theoretically correct but could not have been derived from the material presented. Likewise, the faculty are highly knowledgeable of most technical subjects broached, but only a few intuitively recognize "interrelationships" and "possibilities" among alternatives.

Leg Pulling.

There are those among the faculty who do innovate and who are less conforming than their colleagues. However, several of these have used the expression, "Someone is pulling my legs". In American parlance, "pulling one's leg" means teasing someone by telling the person a minor falsehood or "stretching the truth" in jest. Ususally, only the most naive are deceived.

In the Nepali context, "leg pulling" has a more sinister connotation. It refers to actions by some to frustrate or defeat the achievements of others, figuratively to grasp achievers by the legs and pull them back and down into their "proper place." Deviation from the principal of seniority is often at issue and can bring retribution both to the person gaining the advantage "out of turn" and to the person conferring the advantage. Junior faculty members who through their initiative and performance are promoted or given other advantages over senior colleagues may be particularly vulnerable.

Leg pulling takes the form of whispering campaigns suggesting that the achiever is gaining advantages beyond his status, withdrawal of cooperation, rejection of research proposals, derogatory anonymous articles in scandal mongering newspapers, and of demands that the advancement be rescinded. Although the faculty have adopted in principle promotion on merit, it has not been implemented.

Leg pulling reinforces the hold of tradition on the faculty and frustrates constructive change at IAAS and in Nepal. Reluctance to be first to hand in reports has resulted in substantial delays in reporting on some study tours. Retribution for violation of the code can be devastating to the morale of the innovative and precocious and may result in their leaving the institute for situations more receptive of achievement oriented professionals. Worse, the frustrated achiever lacking opportunities to move elsewhere may simply lapse or be ground down into non-productive conformity.

Advisors can offer encouragement to achievers by feeding them ideas and facilitating their access to information, resources and opportunities but only on a basis which offers opportunity to anyone who initiates and achieves. Any perception that the advisor is unfair in giving special advantage or showing favouritism may only further prejudice the interests of the recipient.

Addressing Constraints of Personality

The constraints of personal style and culture must be carefully addressed by the technical assistance team. There can be no thought of trying to remake the faculty in the images of the advisors. One personality type must be regarded to be as valid as another; it is the development of diversity of perspective that is at issue. Some approaches to change might be:

1. Beginning each two year technical assistance tour with an orientation by an educational psychologist using personality inventories or other appropriate testing instruments with both faculty and advisors participating. This would lay some framework of mutual understanding of "where each party is coming from" within which framework work plans and training programs can be

developed for the following two years. Wives of advisors must also be included in this planning. Their personality tests reveal that they too bring a diversity of necessary personality traits to the successful functioning of a team.

2. Selecting training modes appropriate to the needs of the institute and to the demonstraced learning style of individual participants. The tours were effective in changing perspectives but should have been given formal course status.

3. On-campus literacy and training programs in Nepali and English for wives of faculty. IAAS now has a video set which could be used to expose staff families to foreign cultures.

4. Inclusion of fares for wives and children to accompany participants on the longer term overseas training and especially on graduate training. Those faculty who have taken their wives abroad during graduate study, have perceptibly broader outlooks than those whose wives were left behind. Their broader outlook may well be the reason they took their wives but was surely enhanced by her sharing his overseas experience.

5. Integration of advisors into decision-making in all aspects of operation of both the technical assistance team and institute even if ex-officio in the latter case. Decision-making too often gravitates to team and instutute administrators.

6. Strengthening of participation in decision-making by faculty committees. The committee structure of the instutute is largely inactive because faculty prefer to take their personal pleadings directly to decision-makers. Forcing allocation of campus land, library resources, equipment and facilities, and other decisions through faculty committees would greatly strengthen the institutional building process.

7. Rewarding of innovation. Faculty members should be rewarded with preference for promotion, additional training opportunities, and research funding. Awarding of project research and training opportunities, especially assistantships, should be removed from campus and conducted by the overseas campus of the contracting university. This would remove internal politics from the selection processes and give all faculty equal access to such opportunities and permit greater emphasis on merit and achievement.

The possibility must also be held open that some accomodation of the "family enterprize" approach may be possible and necessary if this can be done without thwarting the development of IAAS as an academic institution with strong research, teaching, and extension programs.

There is one other group of actors on this stage, the donor agency civil service staff, in this case, USAID. Their primary role is that of expediting the establishment of the project, procurement of material and services, and provision of guidance through the thicket of regulations governing the expenditure of donor agnecy funds. Althrough project officers were not included in the personality testing, they seemed often more sensitive to political and "public relations" implictations of project activities than were the technical assistance team.

During the final year of the project, interventions of USAID/Nepal seemed to unnecessarily divert attention of faculty from the work plan at hand toward planning for IAAS Phase II. Advisors viewed much of this intervention as inconsistent with their own views of how the project should be organized. It may well be that donor agencies should allow for the possibility that they too might benefit from the diversity of perspective of their own contract technical assistance teams.

Recognition by each party of the essential role of each of the others is necessary if the institution is to be built on a model most likely to serve the long range goals of the faculty and HMG/Nepal. Implementation by advisors without gaining the concurrence or participation of faculty is generally unproductive as is acquiescence to every faculty demand for alteration of proposals. Circumvention of advisors by project officers except in extreme circumstances can be disruptive to a work plan. The faculty of IAAS must recognize their need for advisors and project officers in institutional development and not view them as an unnecessary overhead cost to the project. In the end, development of the institution must be more than an inventory of buildings built and graduate degrees earned. This implies an increasing assumption by faculty of responsibility for long-term planning as they develop their skills of analysis and synthesis.

Most important is that faculty come to respect, encourage and reward constructive innovation in themselves and among their colleagues regardless of seniority or status. This requires increased background research of issues and holding debates open until opposing viewpoints have been expressed and seriously considered. Strengthening of the library information base and adoption of the proposed faculty merit evaluation plan would aid materially in this process.

References

Beecher, John W. 1983. End-of-Tour Report. MUCIA/Nepal Project. Library Consultant 4 November - 5 December 1983. 59pp mimeo.

Bird, Herbert R. 1978. End-of-Tour Report. MUCIA/Nepal Project. Animal Science Advisor 19 January - 21 April 1978. 10pp mimeo.

Combs, Weslie. 1982. A proposed prospectus for the development of the Department of Animal Science as I. A. A. S. End-of-Tour Report. MUCIA/Nepal Project. Animal Science Advisor 9 January - 28 Fabruary 1982. 219pp mimeo.

Deans, Robert J. 1978. End-of-Tour Report. MUCIA/Nepal Project. Animal Science Advisor 10 June - 15 July 1978. 30pp mimeo.

Keirsey, David and Marilyn Bates. 1978. Please Understand Me. Character and Temperment Types. Prometheus Nemesis Books, P. O. Box 2082, Del Mar, CA 92014. 210 pp.

Miller, Kenneth P. 1979. End-of-Tour Report. MUCIA/Nepal Project. Animal Science Advisor 11 October 1978 - 4 February 1979. 54pp mimeo.

Sofranko, Andrew and Russell Odell. 1984. End-of-Tour Report. MUCIA/Nepal Project. Academic Planning Consultants. mimeo.

Williams, Jesse B. 1981. End-of-Tour Report. MUCIA/Nepal Project. Animal Science Advisor 1 May 1979 - 31 May 1981. 43pp mimeo.

Wamhoff, Carroll and Colleen Cooper. 1984. End-of-Tour Report. MUCIA/Nepal Project. Education Consultants 1984.

APPENDIX A. Student letter on livestock numbers in Nepal and Animal Science Advisor's response.

Disagreement on Reduction on Livestock Numbers in Yielding Efficiency

Bhubaneswor Dhakal
2nd year student
Animal Breeding
14 August 1984

The no. of livestock should not be reduced in this prospect of Nepal. Instead of reducing the livestock numbers in increasing the yield efficiency. So, it is necessary that, choose the another way or methods to increase efficiency of livestock production. The reasons are mentioned as follows:

1. Poor feeding efficiency. In the reduction of no. of livestock, the production of rest animals (an not increase significantly means does not vary in yield in between well feeding & poor feeding. The local animals can grows even in poor feed. Suppose, a farmer raised cows in better feeding condition produces 2.5 lts. milk per day--and one calf in one lactation, he feed well managed concentrate & roughages (pasturing) can raised 4 cows in that condition. Same farmers in other condition i.e. mostly depend on pasture, he can raise 10:12 cows with milk 1.5 lts/day. Therefore total milk production is more. He will benefited from more no. of calves, manure, & some time by hide and bone.

2. Due to circumference of some problems we are unable to cross the local breeds with improved breed in large no. because (a) cannot found adopted breed in this locality for long time efforts. So we should fulfill our needs in immidiate condition, (b) Breeding animal between local & exotic are more disease susceptible & the veterinary services are not extended throughout the country, even if provided, farmers are unconcious to use & unable to afford (c) breeding programs is not effective by & widely used due to unavailablility of efficient breeds unableness of farmers to afford that bull, poor nutrition, transports etc. (d) animals are the important & most day to day farm power source & utilized in any condition but exotic breeds cannot do well as of local in this, geographic, agro-climatic, & socio-economic condition than that of local ones; distribution & raising of exotic breeds is possiblc untill & unless when agriculture farming is highly mechanized; so we required more no. of livestock (local).

3. Farmers of Nepal are greatly suffured from the highly expensive fertilizer; So they are not Afforded. Compost making & green manuring is equilly expensive ones. For more production of crops, to starved & rapidly increased population, the livestock be produce. FYM is last home of manure. FYM is also used as fuel (biogas plantation).

4. In rural farming societies, crops & livestocks are interdependend occupation beside it there is no side occupation. Livestock provided the employment opportunity mostly in rural area who are unemployed, also utilized the spare time out of crop production. The statement also prove the more livestocks are required in Nepal to fulfill the need of employment.

5. The larger animals population of Nepal are efficient in utilization of any type of farm biproducts & weeds. They utilizes farm product as from own up to stem, leaves, stalks, husk even roots also. Larger the population larger the utilization of farm biproducts.

6. Under the poor feeding condition, every farmer of Nepal raise animals, which is the source of nutrition & income of poor people. Those people cannot fed nutretious feeding to their livestock, who are starved themselves; where 40% people are under thos poverty line. Ultemetly we can say animals are wealth of poor people of Nepal. So; larger the no. of livestock richer the people.

7. The high hill, Himalayan region (temperate zone) is the grass belt of Nepal. It covers 15% area of Nepal where grasses are growing throughout the year without any efforts. Raising a large numbers of livestocks can efficiently utilization of that waste grasses, which is found now also by growing large no. of local animals.

These are the reasons in disagreement of livestock number reduction on my viewpoint. By considering these above listed points, a good agricultural economist, animal breeder can bring the animal revoluation in Nepal which causes bright future of Nepal & Nepalese people. For the development improvement of livestock in this prospect, a good economist go towards other any alternative or new course (ways or methods) which is appropriate in this content of Nepal.

Response of the Animal Science Advisor.

Dear Mr. Dhakal:

Your paper stating your disagreement with my proposal that massive reduction of livestock numbers is a necessary first step to development of a productive livestock sector in Nepal is very much appreciated. The objections stated are a fair representation of the viewpoints which I have encountered in Nepal during my two years at IAAS. As I was much involved in the termination of the MUCIA project and departing IAAS within a few days, I was unable to respond immediately. The following are my responses to your comments. They are not the only answers or solutions, but I hope you will continue to think about livestock development in Nepal. Such thought and discussion is essential to the formulation of policies leading to a more productive livestock sector.

1. The heart of the matter is contained in your statement in paragraph 6, "...animals are wealth of poor people of Nepal. So, larger the no. of livestock richer the people."

The word "cattle" (meaning all livestock in early English) and the word "chattel" (meaning moveable property) are derived from the same root. Livestock were literally the most moveable property of their owners. As such they were among the most valuable of assets because they were easily moved, produced products of commercial value, and reproduced themselves at rates which even permitted internal expansion of the herd. There are still pastoral people on every continent who measure their wealth by the number of livestock

they own. These include societies as diverse as Mongolian herders, African Fulani and even the American cowman.

Grazing was generally abundant until pastures turned into ploughed farms and then into dustbowls and deserts under pressures from increasing human populations. Such is the situation in Nepal today. Growth of human and cattle populations controlled only by disease, starvation, infertility threaten the very existence of Nepal's forests and grazing lands.

When I was growing up on a farm in the U. S. before tractors were widely used, farmers who had many horses often said that they were "horse poor" meaning that although horses had value they had to be fed whether they worked or not and could literally impoverish their owner. This is something like the "white elephant" received as a gift which must be fed even at the expense of the owner's family. Livestock should be the wealth of Nepal, but the inability to control cattle numbers except by death, disease and infertility, make the excess numbers of unproductive animals a destructive burden on the environment of Nepal and a drain on the resources of Nepali farmers. I emphasize "excess numbers of unproductive animals." Nepal is, indeed, "cow poor"; they have value in producing draught bullocks but all measures of productivity are low.

Though there are twice as many cattle as Nepal, cattle produce only an estimated one-third of the national mi Growth and reproductive rates among cows and buffalo are so low tha calving at 4 to 5 years of age and every-other year calving thereafter is the norm. You have indicated in the same paragraph that despite this wealth, 40% of Nepalis are below the poverty line and Nepal, itself, is one of the very most economically disadvantaged countries in the world.

2. A second crucial point you raise is the question of whether increasing livestock numbers will increase farmyard manure (FYM) for fertilizer. I believe that the fertilizing value of dung from milking cows is less than that of fattening steers, but I regret that I do not have sufficient data at hand to give a definitive answer on the effects on dung volume and quality of various levels of daily feed intake and various states of productivity but am sure that such information is available. It would make an interesting and useful investigation. However, it is difficult to see how the amount of dung can be increased by increasing the number of animals without increasing the feed supply. Increasing the forage supply in Nepal is unlikely if not impossible in the face of massive overstocking without decreasing and controlling the number of livestock.

3. I wish to correct your statement in paragraph 2 that crossbreds between local breeds and exotics are more susceptible to disease. The experience in India and elsewhere is that the F1 crosses of exotic dairy breeds have substantially reduced mortality and increased reproductive rates. Lifetime milk yield of such crosses has been reported as some three times that of local stocks and often even relatively higher as compared to imported purebreds which really do suffer in harsh environments.

While much of this increase in lifetime milk yield is due to higher yields per lactation, lifetime yield is enhanced by earlier ages at first

calving, shorter calving intervals, longer lifespan, and lower mortality at all ages. In a tropical country where slaughter is permitted, crossbreeding can be a powerful force in improving milk and meat production. In Nepal, prohibition of slaughter or export, would simply increase the number of unproductive cattle if indeed the low nutritional status of livestock in the country would support such a breed strategy.

4. I agree with you very much that more efficient utilization of roughages is essential livestock development in Nepal. I believe that this will come only with reduced livestock numbers, especially cattle and concurrent breeding programs to raise the capacity of the remaining animals to respond to the increased feed supply.

I hope that you will continue to ponder these important issues and to discuss them with your classmates and professional colleagues.

MUCIA ADVISORS MUCIA/NEPAL PROJECT; IAAS, RAMPUR, NEPAL 1976-1984

	----------LONG & SHORT TERMERS----------						OTHER
DATE	EXTENSION	AG-EDUC	RUR-DEV	EDUC/CURR	PL-SCI	AN-SCI	SHT-TERM
JAN 1976	GE MADDY	ODMEADERS					
FEB	GEM	**ODM					
MAR	GEM	**ODM					
APR	GEM	**ODM					
MAY	GEM	**ODM					
JUN	GEM	**ODM	*GH AXINN	NW AXINN			HJ MILLER
JUL	GEM	ODM	*GHA	NWA			HJM
AUG	GEM	ODM	*GHA	NWA			
SEP	GEM	ODM	*GHA	NWA			
OCT	GEM	ODM	*GHA	NWA			
NOV	GEM	ODM	*GHA	NWA			
DEC	GEM	ODM	*GHA	NWA			
JAN 1977	GEM	ODM	*GHA	NWA			
FEB	GEM	ODM	*GHA	NWA			
MAR	GEM	ODM	*GHA	NWA			
APR	GEM	ODM	*GHA	NWA			
MAY	GEM		*GHA	NWA			
JUN	GEM		*GHA	NWA	EESCHULTE		J LIBBY
JUL			*GHA	NWA	EES		JL
AUG			*GHA	NWA			
SEP			*GHA	NWA			WW NELSON
OCT			*GHA	NWA			WWN
NOV			*GHA	NWA			
DEC			*GHA	NWA			
JAN 1978			*GHA	NWA		HW BIRD	
FEB			*GHA	NWA	EESCHULTE	HWB	HJ MILLER
MAR			*GHA	NWA	EES	HWB	
APR			*GHA	NWA		HWB	J LIBBY
MAY			*GHA	NWA			JL/MSCHERER
JUN			*GHA	NWA		RJDEANS	MDS/LMARK
JUL			*GHA	NA/*RER		RJD	LDM
AUG				*REXERAY	HC BITTEN		LDM
SEP				*RER	-BENDER		
OCT				*RER	HCB	KP MILLER	
NOV				*RER	HCB	KPM	
DEC				*RER	HCB	KPM	
JAN 1979				*RER	HCB	KPM	
FEB				*RER	HCB	KPM	
MAR				*RER	HCB		HC COPPEL
APR				*RER	HCB		HCC / JWB
MAY				*RER	HCB	JWILLIAMS	JWBEECHER
JUN				*RER	HCB	JBW	JWB
JUL				*RER	HCB	JBW	
AUG			PF KAPLAN	*RER	HCB	JBW	
SEP			PFK	*RER	HCB	JBW	
OCT			PFK	*RER	HCB	JBW	
NOV			PFK	*RER	HCB	JBW	
DEC			PFK	*RER	HCB	JBW	
JAN 1980			PFK	*RER	HCB	JBW	
FEB			PFK	*RER	HCB	JBW	
MAR			PFK/GHA	*RER	HCB	JBW	
APR			PFK	*RER	HCB	JBW	
MAY			PFK	*RER	HCB	JBW	
JUN			PFK	*RER	HCB	JBW	
JUL			PFK	*RER	HCB	JBW	
AUG			PFK/GHA	*RER	HCB	JBW	RKCHAPMAN
SEP			PFK/GHA	*RER	HCB	*JBW	

MUCIA ADVISORS MUCIA/NEPAL PROJECT 1976-1984 (CONT.)

	LONG & SHORT TERMERS			OTHER
DATE	RUR-DEV	PL-SCI	AN-SCI	SHT-TERM
OCT	PFK	HCB	**JBW	
NOV	PFK	HCB	**JBW	
DEC	PFK/*GPW	HCB/HWF	**JBW	
JAN 1981	PFK/*GPW	HW FOTH	JBW	
FEB	PFK/*GPW	HWF	JBW	
MAR	PFK/*GPW	HWF	JBW	SCHWARZ-
APR	PFK/*GPW	HWF	JBW	WELLER
MAY	PFK/*GPW	HWF	JBW	
JUN	PFK/*GPW	HWF		
JUL	PFK/*GPW	HWF		
AUG	PFK/*GPW	HWF		
SEP	PFK/*GPW	HWF		
OCT	*GP WOOD	HWF		
NOV	*GPW	HWF		
DEC	*GPW	HWF		
JAN 1982	*GPW	HWF	W COMBS	
FEB	*GPW	HWF	WC	
MAR	*GPW	HWF		
APR	*GPW	HWF		
MAY	*GPW	(HWF)		
JUN	*GPW	(HWF)		
JUL	*GPW	MD THORNE		K WILSON&
AUG	*GPW			A SOFRANK(
SEP	*GPW/HLW		W COMBS	
OCT	*GPW/HLW	*MDTHORNE	WC	
NOV	(GPW)	*MDT	WC	
DEC	(GPW)/HLW	*MDT	WC	
JAN 1983	(GPW)/HLW	*MDT	WC	
FEB	WHITTIER	*MDT	WC	
MAR	HLW	*MDT	WC	
APR	HLW	(*MDT)	**WC	MTHOMPSON
MAY	HLW	(*MDT)	**WC	
JUN	HLW	*MDT	WC	D KRAUSS
JUL	HLW	*MDT	WC	DK/JMDLTN
AUG	HLW	*MDT	WC	DK/CCRESS
SEP	HLW	*MDT	WC	
OCT	HLW	*MDT	WC	HJ MILLER
NOV	HLW	*MDT	WC	J BEECHER
DEC	HLW	*MDT	WC	
JAN 1984	HLW	*MDT	WC	
FEB	HLW	*MDT	WC	
MAR	HLW	*MDT	WC	C WAMHOFF
APR	HLW	*MDT	WC	/C COOPER
MAY	HLW	*MDT	WC	SOFRANKO&
JUNE	*HLW	*MDT	WC	R ODELL
JULY	*HLW	(MDT)	WC	DK/D BUTANI
AUG (31 AUG TO KATHMANDU)	*HLW		WC	DK/CUYNO/DE
SEPT (19 SEPT DEPART NEPAL)	*HLW		WC	DKRAUSS/DB

30 SEPT 1984 END OF MUCIA/NEPAL PROJECT

* CHIEFS OF PARTY: GH AXINN; REX E RAY; GP WOOD; MD THORNE; HL WHITTIER.
** ACTING CHIEFS OF PARTY (OTHER THAN INTERMITTENT).
() TRANSFERRED OFF POST (*MDT) ON MEDICAL EVACUATION

MUCIA ADVISORS MUCIA/NEPAL PROJECT 1976-1984 (CONT.)

SHORT-TERMERS: HJ MILLER (CAMPUS PLANNING); J LIBBY, HC COPPEL, AND RK CHAPMAN (ENTOMOLOGY); WW NELSON (FARM MANAGEMENT); MD SCHERER (STUDENT RECORDS); LD MARK (ADMINISTRATION); JW BEECHER (LIBRARY SCIENCE); H SCHWARZWELLER (RURAL DEVELOPMENT); D KRAUSS (LAB EQUIPMENT); C CRESS (STATISTICS); C WAMHOFF & C COOPER (TEACHING METHODS); M THOMPSON (HORTICULTURE); J MIDDLETON (SOCIOLOGY); EE SCHULTE (SOILS); RJ DEANS, KP MILLER (ANIMAL SCIENCE); A SOFRANKO & R ODELL (ACADEMIC PLANNING); K WILSON, A SOFRANKO (WORK PLAN); A SOFRANKO & R ODELL (ACADEMIC PLAN); DK BUTANI (ENTOMOLOGY); R CUYNO (MANAGEMENT).

SERVICE OF 24 MONTHS OR MORE: HC BITTENBENDER 28+; GH AXINN 27+; REX E RAY 26+; W COMBS 26; NANCY AXINN 25; JB WILLIAMS 25; GP WOOD 25 (LAST 3 OFF POST).

```
  LEUCAENA PLOTS   SEEDLING SOWING DATES:2-3 JUNE 1983
IAAS 1983          SEEDLING PLANTING          AUGUST
K.R. TIWARI, PROJECT LEADER; COLLABORATORS:S.D. SAH; B. KHAKURAL;
RAM KOIRALA; ANNE WAANDERS; HELMICH VAN REES; W. COMBS, ADVISOR.
BLOCK    CUTTING   VARIETY    ROW   SEEDLINGS  TOTALS
                     1.5M  30M LONG  30 PER
                    APART  1M APART   ROW
NORTH-EAST-END----V-1/NJG--OUTSIDE---------30-EXCLUDED FROM TOTAL
******************1.5M SPACE INCLUDING FENCE*******************
* B-1     CUT/2*YR V-4/K67  R 01-04        120                  *
* (NORTH           V-6/CUN  R 05-08        120                  *
*   EAST)          V-2/K28  R 09-12        120                  *
*                  V-5/K8   R 13-16        120                  *
*                  V-3/SAL  R 17-20        120                  *
*                  V-1/NJG  R 21-24        120                  *
*         CUT<1M   V-1/NJG  R 25-28        120                  *
*                  V-5/K8   R 29-32        120                  *
*                  V-6/CUN  R 33-36        120                  *
*                  V-2/K28  R 37-40        120                  *
*                  V-4/K67  R 41-44        120                  *
*                  V-3/SAL  R 45-48        120                  *
*         CUT/1*YR V-1/NJG  R 49-52        120                  *
*                  V-2/K28  R 53-56        120                  *
*                  V-5/K8   R 57-60        120                  *
*                  V-3/SAL  R 61-64        120                  *
*                  V-4/K67  R 65-68        120                  *
*                  V-6/CUN  R 69-72        120      2160        *
*         2.5M SPACE                                            *

*LEUCAENA PLOTS                                                 *
*IAAS/1983                                                      *
* BLOCK   CUTTING   VARIETY    ROW   SEEDLINGS  TOTALS           *
* B-2     CUT<1M   V-1/NJG  R 73-76        120                  *
* (CENTRE)         V-6/CUN  R 77-80        120                  *
*                  V-2/K28  R 81-84        120                  *
*                  V-3/SAL  R 85-88        120                  *
*                  V-5/K8   R 89-92        120                  *
*                  V-4/K67  R 93-96        120                  *
*         CUT/2*YR V-5/K8   R 97-100       120                  *
*                  V-3/SAL  R 101-104      120                  *
*                  V-4/K67  R 105-108      120                  *
*                  V-2/K28  R 109-112      120                  *
*                  V-6/CUN  R 113-116      120                  *
*                  V-1/NJG  R 117-120      120                  *
*         CUT/1*YR V-6/CUN  R 121-124      120                  *
*                  V-4/K67  R 125-128      120                  *
*                  V-3/SAL  R 129-132      120                  *
*                  V-5/K8   R 133-136      120                  *
*                  V-1/NJG  R 137-140      120                  *
*                  V-2/K28  R 141-144      120      2160        *
*         2.5M SPACE                                            *
```

LEUCAENA PLOTS
IAAS 1983
HEDGEROWS:5 SEEDLINGS PER METRE*ROWS 4M LONG*30 ROWS 1M APART.
PLANTED: 9 THROUGH 17 SEPTEMBER 1983

BLOCKS	VARIETY 1M APART	SEEDLINGS 5*4M*30M	(SEE NOTES FOR DEVIATIONS)	
B-4 (NORTH)	V-4/K67	600	ONLY 160+88; SEE NOTES.	
	V-6/CUN	600		
	V-2/K28	600		
	V-3/SAL	600		
	V-1/NJG	600		
	V-5/K8	600		3600
1M SPACE				
B-5 (CENTRE)	V-4/K67	600	ONLY 160+88; SEE NOTES.	
	V-2/K28	600		
	V-3/SAL	600		
	V-1/NJG	600		
	V-5/K8	600		
	V-6/CUN	600		3600
1M SPACE				
B-6 (SOUTH)	V-2/K28	600		
	V-3/SAL	600		
	V-4/K67	600	ONLY 160+88; SEE NOTES.	
	V-1/NJG	600		
	V-6/CUN	600		
	V-5/K8	600		3600
	HEDGEROW SEEDLINGS			10800
	TOTAL SEEDLINGS			17280

BECAUSE OF LOSS OF ABOUT 30% OF SEEDLINGS IN THE 1*1M PLOTS, TWO FEW REMAINED FOR PLANTING THE HEDGEROW PLOTS.
THE 8 HIGHEST ROWS OF EACH VARIETY WERE PLANTED WITH SEEDLINGS IN EACH OF BLOCKS 4,5&6. THE LOWER 22 ROWS OF EACH VARIETY EXCEPT K-67 WERE DIRECT-SEEDED. AS TWO FEW K-67 SEEDS REMAINED, ONLY THE TWO PLANTS AT EACH END OF EACH OF THE 22 LOWER ROWS WERE DIRECT-SEEDED TO PROVIDE PROTECTIVE ROWS FOR THE ENDS OF ADJACENT PLOTS. THE BALANCE OF K-67 WILL BE SEEDED NEXT SEASON. THE 8 FULLY PLANTED ROWS WILL GIVE VARIETAL COMPARISONS ON THE HIGHEST GROUND.

```
*LEUCAENA PLOTS
*IAAS/1983                                                          *
* BLOCK   CUTTING    VARIETY     ROW    SEEDLINGS  TOTALS            *
* B-3     CUT/1*YR V-6/CUN   R 145-148      120                      *
* (SOUTH           V-4/K67   R 149-152      120                      *
*   WEST)          V-3/SAL   R 153-156      120                      *
*                  V-5/K8    R 157-160      120                      *
*                  V-2/K28   R 161-164      120                      *
*                  V-1/NJG   R 165-168      120                      *
*         CUT<1M   V-4/K67   R 169-172      120                      *
*                  V-1/NJG   R 173-176      120                      *
*                  V-2/K28   R 177-180      120                      *
*                  V-3/SAL   R 181-184      120                      *
*                  V-5/K8    R 185-188      120                      *
*                  V-6/CUN   R 189-192      120                      *
*         CUT/2*YR V-2/K28   R 193-196      120                      *
*                  V-6/CUN   R 197-200      120                      *
*                  V-3/SAL   R 201-204      120                      *
*                  V-5/K8    R 205-208      120                      *
*                  V-1/NJG   R 209-212      120                      *
*                  V-4/K67   R 213-216      120      2160            *
*                              1M*1M SEEDLINGS      6480            *
*******************1.5M SPACE INCLUDING FENCE********************
SOUTH WEST END----V-1/NJG--OUTSIDE---------30-EXCLUDED FROM TOTAL
```

```
 PROPOSED SCAVENGER POULTRY FACILITY IAAS 1984
 W. COMBS, MUCIA ANIMAL SCIENCE ADVISOR
***POULTRY WIRE OVER BRICK BASE/3M TOTAL HEIGHT
:::NYLON BIRD NETTING 3M HIGH
...NYLON BIRD NETTING DIVIDERS 3M HIGH
---
I I WOOD HOUSES WITH ROOSTS AND NESTS
---
///NYLON BIRD NETTING COVERING OVER ALL PENS (100M X 100M)

<EAST                          ^NORTH^  <100M>                          WEST>
*************************************************************************
*////////  (48M)  ////////////////:  :////////////////////////////////*
*////////////////////////// PEN 12 :  : PEN 1 ////////////////////////*
*////////////////////////////////:  :////////////////////////////////*
*16M/////BIRD NETTING COVER///////:  :///////BIRD NETTING COVER////////*
*//////////////////////////////---  ---//////////////////////////////*
*/////////////////////////////I I  I I//////////////////////////////*
*...............................===  ===...............................*
*//// ^BIRD NETTING DIVIDERS^ //I I  I I//////////////////////////////*
*////////  3M HIGH  ////////////---  ---//////////////////////////////*
*////////////////////////////////:  :////////////////////////////////*
*////////////////////////////////:  :////////////////////////////////*
*//////////////////////// PEN 11 :  : PEN 2 ////////////////////////*
*////////////////////////////////:  :////////////////////////////////*
*................................  ................................*
*////////////////////////////////:  :////////////////////////////////*
*///////////  EACH PEN /// PEN 10 :  : PEN 3 ////////////////////////*
*//////  16M*48M= 768 SQ M ///////:  :////////////////////////////////*
*////////////////////////////////:  :////////////////////////////////*
*//////////////////////////////---  ---//////////////////////////////*
*////////HOUSE 3*4M WITH NESTS> I I  I I//////////////////////////////*
*...............................===  ===...............................*
*////////HOUSE 3*4M WITH NESTS> I I  I I//////////////////////////////*
*//////////////////////////////---  ---//////////////////////////////*
*////////////////////////////////: A:////////////////////////////////*
*////////////////////////////////: L:////////////////////////////////*
*////////////////////////////////: L:////////////////////////////////*
*//////////////////////////// PEN 9  : L: PEN 4 ////////////////////////*
*................................ E:................................*
*////////////////////////////////: Y:////////////////////////////////*
*//////////////////////////// PEN 8  :  : PEN 5 ////////////////////////*
*////////////////////////////////:  :////////////////////////////////*
*////////////////////////////////:  :////////////////////////////////*
*//////////////////////////////---  ---//////////////////////////////*
*/////////////////////////////I I  I I//////////////////////////////*
*...............................===  ===...............................*
*/////////////////////////////I I  I I//////////////////////////////*
*//////////////////////////////---  ---//////////////////////////////*
*////////BIRD NETTING COVER///////:  :///////BIRD NETTING COVER////////*
*////////////////////////////////:  :////////////////////////////////*
*//////////////////////////// PEN 7  :  : PEN 6 ////////////////////////*
*////////////////////////////////:  :////////////////////////////////*
***********************************  ***********************************
                  SOUTH          ALLEY
                                 4M WIDE

"GARDEN NET"/"BIRD NET" NYLON NETTING
```

PROPOSED MODIFICATION TO PIG BUILDING B
NORTH FARM/IAAS FEB 1984
W. COMBS, ANIMAL SCIENCE ADVISOR

***MASONARY WALLS
---WOODEN PANELS
I WOODEN PANELS
:::0.4M BRICK DIVIDERS
///SLATTED WOODEN FLOORS
O WATERER

```
INDIVIDUAL
FEEDING PENS        <NORTH      ^EAST^          SOUTH>
1M*1.5M             *************************  *******
         1-2-3>>>   */////i////I////I           :     *
                    */////i////I////I           :     *  <STORE ROOM
                    *  ALLEY          *     I   :     *
                    *  1M WIDE        *     I   :-----*
                    */////I////I////I  *     I   :     *
         4-5-6>>>   */////I////I////I  *     I   :     *  <HOLDING PEN
                    ********************-----i   :     *
         7-8-9>>>   */////I////I////I           :     *
                    */////I////I////I           :     *  FARROWING STALLS
                    *                  *     I  *******   1.5M WIDE*2M LONG
                    *                  *     I  :-----*
                    */////I////I////I  *     I       O*  <1>
       10-11-12>>>  */////I////I////I  *     I  :-----*
                    ********************-----I  :::::::*
       13-14-15>>>  */////I////I////I           :-----*
                    */////I////I////I                O*  <2>
                    *                  *     I  :-----*
                    *                  *     I  :::::::*
                    */////I////I////I  *     I  :-----*
       16-17-18>>>  */////I////I////I  *     i       O*  <3>
                    ********************-----I  :-----*
       19-20-21>>>  */////I////I////I           :::::::*
                    */////I////I////I           :-----*
                    *                  *     I       O*  <4>
                    *                  *     I  :-----*
                    */////I////i////i  *     I  :::::::*
       22-23-24>>>  */////I////I////I  *     i  :-----*
                    ********************-----I       O*  <5>
       25-26-27>>>  */////I////I////I           :-----*
                    */////I////I////I           :::::::*
                    *                  *     i  :-----*
                    *                  *     i       O*  <6>
                    */////i////I////I  *     i  :-----*
       28-29-30>>>  */////I////I////I  *     I  :::::::*
                    ********************-----I  :-----*
       31-32-33>>>  */////I////I////I                O*  <7>
                    */////I////I////I           :-----*
                    *                  *     I  :::::::*
                    *                  *     i  :-----*
                    */////I////I////I  *     I       O*  <8>
       34-35-36>>>  */////i////I////I  *     I  :-----*
                    ***********************************
                                                <  2M>
```

APPENDIX F Animal Science Training

The following are the reports submitted by participants in trfining in the Animal Science sector and from Animal Science participants in the tours to Indonesia and India.

Contents

Wheeled Tool Carrier Training Program, ICRISAT, Hyderabad, India, 9-12 May 1983.

Report by ICRISAT submitted:

Ram Chandra Koirala, Lecturer in Horticulture
Moti Lal Prasad, Lecturer in Agronomy
Sudersan Tiwari, Lecturer in Animal Science

Mediterranean Livestock Study Tour, Cyprus, Greece, and Italiy, 3 June-27 June 1983.

Report by:

B.B. Pnnta, Lecturer in Agronomy
with
Maheshar Sapkota, Lecturer in Animal Science
and
Nagendra Shah, Lecturer in Animal Science

Report by: Nagendra Shah, Lecturer in Animal Science

Report by: Jagat Lal Yadav, Lecturer in Animal Science

Report by: Weslie Combs, Animal Science Advisor

Phola Pokharel, Lecturer in Agricultural Economics, also participated

U.S.D.A. Short Course: Economic Management of Small Crop and Livestock Farms

Letter by: K.R. Tiwari, Lecturer in Animal Science

Dainik Nepali, Lecturer in Animal Science, also participated

Rural Development Tour to Indonesia, 2-29 June 1983.

Report by: K.T. Augusthy, Lecturer in Fisheries

Plant Science Tour to India, June 1984.

Report by: Isshiwor P. Dhakal, Assistant Lecturer in Animal Science.

CONCLUDING REPORT ON WHEELED TOOL CARRIER TRAINING PROGRAM MAY 9 - 12, 1983

Background:

In the past 2 or 3 years wheeled tool carriers particularly Tropicultor and Nikart have received wider attention of industrialists, research scientists in universities and ICAR programs and the government officers. It is due to factors such as the success of or farm projects initiated by our Program and priorities allocated by the Government for dryland agriculture. Tool carrier has become more acceptable equipment now than a few years ago. At one hand scientists are evaluating WTC as an improved animal drawn machine, on the other hand many more industries are evaluating the available designs with the prospects of manufacturing. Machines are reaching farmers at an increasing rate.

In order to make best out of all the above efforts training of concerned persons is very important. This year we organized two training programs in cooperation with CIAE and AICRPDA. The first training program was held at Bhopal in February 83 and this one is the second.

Objectives:

The objectives of the training program were as follows:

1. To acquaint people who have had little or no experience with the capabilities and versatilities of tool carriers.
2. To acquaint people who have had experience with WTC about the present range of implements and latest developments.
3. To obtain feed back.

We invited participants from 9 agricultural universities and colleges, 6 state departments of agriculture and 14 commercial organizations including state Agro-Industries. We also invited scientists from Dryland Centers at Bellary, Sholapur and Akola.

In response to our invitations 34 participants attended the training course. The group comprised of 10 representatives of manufacturers of WTC and other private organizations, two persons from State Agro Industries Corp. of Gujarat and Maharashtra states and nine persons of state departments of

Agriculture of Karnataka, Andhra Pradesh and Tamil Nadu. We also had with us scientists from different universities including 3 persons from Institute of Agriculture and Animal Science, Kathmandu, Nepal.

Activity Report:

During the four days training program we spent most of the first three days in the field. The participants were divided into smaller groups so that every one could have adequate opportunity to work with the machinery and implements. On the first day a general introduction about various designs of tool carriers and attachments was given. Subsequently participants themselves did field operations by attaching and adjusting the implements on Tropicultor, Nikart and Agricart. During the operations considerable time was spent on explanation of implements.

In one afternoon we worked at FP & E workshop to demonstrate the servicing and maintenance of the equipment. The participants themselves dismantled and later assembled the tool carriers and implements to study the mechanisms and their function. They also studied the points on the tool carriers requiring frequent attention for trouble free service.

During the training period liberal time was alloted for discussions. Many persons in the group had considerable experience of working with tool carriers on broadbeds. We had specially invited Mr. N.C. Shrivastava from Dryland Center, Indore and Dr. M.V. Doble from Marathwada Agricultural University, Parbhani to stimulate the discussion. Many times the discussion was centered around broadbed and furrow system, dry seeding, possible uses of tool carriers by farmers and its economic aspects.

We also took the participants to Tadanpalli village where they could see our on-farm work. It was more important for them to talk to the farmers who have used WTC with their own bullocks for two years. This visit answered many questions regarding high draft of WTC and implements and economics. From Taddanpalli we went to Medak to see tool carrier manufacturing at Medak Agricultural Center.

Conclusion:

The four days training program has well served the intended objectives. It has helped the manufacturers and cooperating scientists to have better understanding of toql carrier based machinery systems. The training program was really a two way affair wherein many participants made a significant contribution in the discussion based on their experience. We could show all the participants the latest developments notably in planter and fertilizer application, tillage, weed management and cart attachments. We hope that this training program will generate more interest in prospective manufacturers towards WTC and make them quality conscious. We also hope that WTC evaluation projects at research centers would be benifitted with the training given to the scientists concerned.

LIST OF PARTICIPANTS ATTENDED THE WHEELED TOOL CARRIER TRAINING MAY 9 - 12, 1983

1. Department of Agriculture, Tamil Nadu

   1) Mr. S.K. Padmanabhan
      Executive Engineer
      Agricultural Training Centre
      Kottapattu, Trichy 620 020

   2) Er. S. Krishnaswami
      Dy. Chief Engineer
      Department of Agricultural Engineering
      Office of the Chief Engineer
      Chepauk, Madras - 600 005

2. Department of Agriculture, Karnataka

   3) Mr. P. Abdur Rub
      Deputy Director of Agriculture
      Dryland Agriculture Project
      Bellary, Karnataka

   4) Mr. Narase Gowda
      Deputy Director of Agriculture
      Tumkur, Karnataka State

   5) Mr. H.D. Sheshagiri
      Deputy Director of Agriculture
      P.B. 70, Shimoga, Karnataka State

   6) Mr. K. Manohar Rao
      Joint Director of Agriculture
      Dharwad, Karnataka State

3. University of Agricultural Sciences

   7) Mr. Vijaya Kumar H. Joshi
      Jr. Engr.
      University of Agricultural Sciences
      R.R.S. P.B. No. 24, Raichur 584 101

4. Marathwada Agricultural University

   8) Dr. Dhoble, M.V.
      Agronomist, Dryland
      Marathwada Agricultural University
      Parbhani

5. A.P. Agricultural University

9) Mr. R. Subramanyam Reddy
Agricultural Engineer
Agricultural Research Institute
Rajendranagar
Hyderabad - 500 030

10) Mr. V. Ramalingam
Agricultural Engineer
Agricultural Research Station
DCMS Buildings
Kamalanagar, Anantapur 515 001

11) Mr. K. Narayana
Sub Asst.
APAU Paleum
Mahaboobnagar Dist.

12) Mr. A. Veresham
Sub Asst.
APAU Paleum
Mahaboobnagar Dist.

6. AP Department of Agriculture

13) Mr. C.C.R. Nambiar
Agl. Engg Supervisor
Office of the Deputy Director
of Agriculture
Sangareddy

14) Mr. G. Subramanyam
Agl. Engg Supervisor
c/o Dy. Director of Agriculture
Nizamabad 503 003

15) Mr. A Radhakrishna Murthy
Agl. Engg. Supervisor
c/o Dy. Director of Agriculture
Khammam 507 003

LIST OF PARTICIPANTS ATTENDED THE WHEELED TOOL CARRIER TRAINING MAY 9-12, 1983

1. Mr. D.V. Shinde
   Maharashtra Agro Industrial Development
   Corp. Ltd.
   Nanded

2. Mr. A. Rathnaiah
   Grameena Praja Pragathi
   Bhainsa 504 103
   Tq. Mudhole, Dist. Adilabad

3. Mr. B.J. Jadeja
   Gujarat Agro Industries Corporation
   Sorkhej Road, Juhapura
   Ahmedabad 55

4. Mr. R.N. Prabhune
   Nimbkar Agri. Research Institute
   At Post Phaltan
   Dist. Satara

5. Mr. Bernard, K
   Coordinator
   Medak Agricultural Centre
   Cathedral Compound
   Medak

6. Mr. M. Charles Samuel
   Grameena Praja Pragati
   CSI Mission House
   Pochera, Tq. Boath, Dist. Adilabad

7. Mr. Kale Jagdish Narayan
8. Mr. Prakash Narayan Kale
   N.K. Engineering Co
   516/A Narayan Peth, Pune 30

9. Mr. Ravindra Akut
10. Mr. P. Mohan Rao
11. Mr. Vijaya Kumar B. Patil
    Mekins Agro Industrial Enterprises
    S-16, EEI Estate Phase II
    Balanagar, Hyderabad - 500 037

12. Mr. Motilal Prasad
13. Mr. Kairale Ram Chandra
14. Mr. Sudarsen Tiwari
    Institute of Animal Science
    Rampur, Nepal

15. Mr. Dattatraya Vithal Savant
16. Mr. Sawant, D.K.
17. Mr. Gondil Subhash Nivreetti
    The Vikas Industrial Cooperative Organization
    Palus, Dist. Sangli

18. Mr. Jairam V. Chandore
    American Spring & Pressing Works Ltd.
    P.O. Box 7602 Malad
    Bombay - 400 064

19. Mr. D.B. Vachhani
    Agriculture Research & Development Farm
    A.R.D. Foundation
    P.O. Box 7602 Malad
    Bombay - 400 064

REPORT ON INDONESIA OBSERVATIONAL TOUR

K.T. Augusthy, Fisheries

In June (1-29), 1983, an observational tour to Indonesia was organized and funded by MUCIA (Midwest Universities Consortium on International Activities Inc.) for selected staff members of IAAS Nepal. We were a six member team consisting of experts from different fields of Agricultural Sciences such as horticulture, fisheries, extension, soil science, education and rural sociology. The team MUCIA advisor at IAAS. The tour was professionally gainful and interesting. On our way to Indonesia, we stayed three days at Bangkok where we visited ADC Thailand and Kasetsart University Bangkok.

At the College of Fisheries, Kasetsart University, Dean Wit Pravit Suraniranant explained the academic activities and field programs of the college. The dean arranged a field trip to the fish farm located at Bangkhen where the farm in-charge explained the Clarias fish culture in circular concrete tanks having six meter diameter and 15 cubic meter capacity with recirculating water system. Clarias were fed on commercial floating fish-pelleted feed containing 30% protein. These fish were being experimentally grown to assess the growth in such enclosed water bodies. Clarias being a highly relished fish in Thailand, its production on a commercial scale by using such techniques assumes great importance.

At Bangkhen fish farm, nylon net was found to be erected to a height of one meter from the ground level around the nursery and rearing ponds by using bamboo poles to protect fingerlings from predators.

We spent three weeks in Indonesia visiting different universities and agencies like USAID. In Jakarta, on the first day, we were taken for an air car drive at Taman Mini Indonesia Indah (The beautiful Indonesia in miniature). The air car drive gave an overall impression of how Indonesia looked like with many islands all having oceanic boundary. One could easily assume that Indonesia, like other ocean boundered countries, might have a flourishing marine fisheries. Later on, during our three weeks stay in Indonesia, it was experienced that fish (fresh water as well as marine) was a major food item in restaurants throughout Indonesia. Bali beach restaurants served an amazing variety of marine fish. An Indonesian museum in Jakarta, a variety of traditional Indonesian fishing crafts and gears were found to be preserved and displayed. Bali beach wood carvings very often depicted fishermen with a haul of fish in their nets. During country side drives throughout Java, it was observed that almost every house having water facility maintained a couple of fish ponds. All these gave an impression that fish is a relished and widely accepted food item in Indonesia.

IPB Bogor (Institute Pertanian Bogor i.e., Agriculture Institute Bogor), Indonesia, was of special attraction due to its strong fisheries faculty as well as its involvement of students in field laboratories. It has a faculty trained in various foreign countries in different fields of fishery science such as fishing techniques, aquaculture, living aquatic resources management, combination of fisheries economics and fishing technology, fish diseases and treatment, fish breeding techniques, fish genetics and mass production of fish food organisms like Artemia. At IPB Bogor, it is compulsory that students take an active and responsible role in field work which is a part of their course.

One staff member showed me a series of aquaria in IPB campus that were designed and assembled by students for their research and field work. Students were found making culture of Artemia to feed fish.

IPB Bogor has its fresh water as well as marine aquaculture stations. A visit was arranged to the Demaga fish farm site (which is a practical teaching unit under IPB Bogor) where Dr. Eang Harris and Dr. Kamar Sumantadinata explained the Clarias breeding technique in specially prepared ponds designed by these scientists. In this design, more emphasis is given to the psychology of fish by making a series of box like structures on the side of the pond interconnected by holes through which the broodfish feel secure to go from the main pond into these compartments for courtship and parental care. The young ones will stay in these compartments into which Artemia produced in a side pond is continuously flowing through water by gravity. Artemia serve as food for these hatchlings.

Dr. Eang Harris told that there was an ever increasing demand for Clarias fingerlings from the farmers who wanted to keep Clarias in rice fields because Clarias could be sold at a higher price than carps in Bogor.

At Demaga, there is an excellent field laboratory where students can do their practical work. This is under IPB. Students are responsible for growing broodfish (Clarias) in specially made floating baskets kept in ponds. A group of students were found involved in designing barrels with running water facility for carp culture. Their target, according to Dr. Eang Harris, was to produce 50 kg carp per cubic meter of the barrels in three months. These students are not given financial assistance from IPB for making these barrels and growing fish. They convince the farmers about the technology and high yielding, to provide fund for making these barrels. In return, after finishing their course work, these barrels will be given to the farmers for growing fish. Thus the farmer gets technology and the students get financial assistance from the farmer.

Although we could not make a visit to BIOTROP (Regional Centre for Tropical Biology) which was only three kms away from IPB Bogor. We learned that it also had fisheries related programs. Similarly, scientists told that Diponigoro University, Serang, Central Java, had a very strong fisheries department.

Fisheries persons at the University of Gadjah Mada told that young marine crabs caught from sea were cultivated in fresh water ponds by feeding rabbit meat! These crabs were doing well in fresh water ponds.

Mr. Gato Murdjito, a fisheries faculty member at the University of Gadjah Mada drove me to Suronandan (Mingir Yogjakarta) where in a farmer's field they were having an experimental pond and a chicken house financed by the university. The pond had fresh water running from a canal growing the giant fresh water prawn Macrobrachium rosenbergli (Udang Galah in Indonesian language). This was an extension program. The pond and chicken house were to be handed over to the farmer after a successful cultivation of prawn. If convinced, the farmer would continue the program and the villagers would be motivated in due course of time.

At the University of Airlangga, Animal Science has got a project on the parasitology of sheeps and goats. They were thinking to include fish parasitology under this discipline.

The University of Brawijaya, Malang, Indonesia, has got a faculty of fisheries and animal husbandary providing extension service to the rural people. The fish recommended to the farmers for growth are: Tilapia, Clarias, Puntius, brackish water fish like Chanos and the giant fresh water prawn Macrobrachium rosenbergli.

On the way back to Nepal, we visited the IDRC (International Development Research Centre) at Singapore where we met Dr. Jingjai Hanchanlash, Director, IDRC, who encouraged Dean B.P. Sinha for further involvement of IAAS with IDRC through more research programs in Agricultural Sciences and Fisheries. It is worth it to mention that IAAS had a Fish Poisonous Plants Project supported by IDRC. IDRC office provided us with booklets having list of their publications including fisheries.

On our way back from Singapore to Kathmandu, we visited DTCP (Development Training and Communication Planning) which is under UNDP. DTCP has a very ambitious fisheries extension program.

NAMES AND ADDRESSES OF PERSONS FOR FUTURE CORRESPONDENCE FOR EXCHANGE OF PROFESSIONAL EXPERIENCE AND INFORMATION.

1. Dr. Wit Pravit Suraniranant
   Dean
   College of Fisheries
   Kasetsart University
   Bangkok, Thailand

2. Dr. Michael Morfit
   American Embassy
   3 Medan Merdeka Selaton
   Jakarta, Indonesia
   Tel. 340001 Ext. 222/229/235

3. Dr. Sumardi Sastrakusumah
   Professor of Ecological
   Physiology
   Dept. of Aquatic Biology
   Bogor Agricultural University
   Bogor, Indonesia

4. Dr. Eang Harris
   Clarias breeding expert
   Dept. of Fisheries
   Bogor Agricultural University
   Bogor, Indonesia.

5. Dr. Kee-Chai Chong
Affiliate Scientist
ICLARM (International Centre for Living Aquatic Resources Management)
MCC P.O. Box 1501
Makati, Metro Manila
Phillipines.

6. Sri. Kumalaningsih
Food Science and Technology Wing
Brawijaya University
Malang, (East Java)
Indonesia.

7. Dr. Jingjai Hanchanlash
Director
IDRC Asia Regional Office
Tanglin P.O. Box. 101
Singapore 9124
Republic of Singapore
Cable: IDRECENTRE
Telex: RS 21076 SINIDRC
Telephone: 2351344

8. Dr. F.Brian Davy
Senior Program Officer, Fisheries
IDRC Asia Regional Office
Tanglin P.O. Box. 101
Singapore 9124
Republic of Singapore
Cable: IDRECENTRE
Telex: RS 21076 SINIDRC
Telephone: 2351344

U.S. Department of Agriculture Short Course

K.R. Tiwari and Dainik Nepali, Lecturers in Animal Science, participated in the USDA Short Course, Economic Management of Small Crop and Livestock Farms, Colorado State University, Ft. Collins, Colorado. K.R. Tiwari sent the following letter to the Animal Science Advisor. It is generous in content. With the permission of Mr. Tiwari, the text of the letter is reproduced here with parenthetical identification of persons named. Due to the vagaries of international postal service, the letter was not received until after the participants and departed Colorado.

The letter of K.R. Tiwari:

318 Prospect Way
Apt #225
Ft. Collins, Colorado
6th July '83

Dear Dr. Combs:

"Namaste" from Fort Collins!

Hope you are o.k. at Rampur along with your wife. Here I am o.k. along with Nepali and we are now towards the last phase of our training program. First of all let me thank you for sending us to Colorado, which I liked very much--the city, the mountains, and the people. The training on farm management is conducted by the department of Economics and so naturally they are giving more emphasis on cost benefits, credit policies, farm budgeting, and linear programming which were all new for me. Any way, I actively took part in all those Courses and discussed with the instructors on the problems of Nepal. We had many exercises in micro-computer (Linpro, Visicalc) and one in the terminals. In the remaining week, they are teaching some methods on project evaluation and I think it very important for our conditions. Yesterday I gave a seminar on Nepal and I did well. In brief, I enjoyed the programme as a whole and feel that it has increased my horizon of thinking. Last Tuesday I called Ardell (Ardell Ward, Assistant Campus Coordinator, Mucia/Nepal Project, Michigan State University) and had a talk on return journey via Hawaii. She told that everthing was set and was sending tickets to us. Thank you very much for making this possible. We are staying 2 days in Hong Kong and 2 days at Bangkok at our expense and will be back to Nepal on 28th July. How was your trip to Mediterranean with the groups? I guess it must have been interesting! How is the weather there? Has the monsoon started? How is the Leucaena Project? I had written to Dutch students (volunteers Anne Waanders and Helmich van Rees) few days back asking about the project and hope that they got it. O.K. so much for today. Please convey my "Namaste" to your wife, Dr. Thorne and Dr. Whittier.

K.R. Tiwari
Lecturer in Animal Science and Chairman of Department
In 1984, appointed Campus Coordinator, USAID/WORLD BANK IAAS II Project.

TOUR REPORT

PREPARED BY

B.B. Panta with M. Sapkota and N. Shah

A study tour to Cyprus, Greece and Italy was proposed by Dr. Weslie Combs, Animal Science Advisor in consultation with the Dean, IAAS, Rampur, Nepal. The objectives of the tour were to find out whether the Damascus goat and Chios sheep could be introduced in Nepal for meat and milk purposes and also find out the possibilities of Mediterranean buffalo as a substitute for Murrah buffalo, a common breed in Nepal. The tour was finalized by the Dean and the Team Leader, MUCIA/USAID project and financed by the latter. The participants of the tour were:

1. Mr. M. Sapkota - Lecturer, Animal Nutrition
2. Mr. B. Pokharel - Lecturer, Agri. Economics
3. Mr. J.L. Yadav - Lecturer, Livestock Management
4. Mr. B.B. Panta - Lecturer, Agronomy
5. Mr. N. Shah - Lecturer, Dairy Technology
6. Dr. W. Combs - Animal Science Advisor, MUCIA/USAID

June 3, 1983

We left Kathmandu for New Delhi at 6 PM by Royal Nepal Airlines. The plane, however, was scheduled to leave Kathmandu at 3:35. We arrived New Delhi at 7:20 PM and stayed at Hotel Sidhartha.

June 4, 1983

We left the hotel at 4 AM and reached the Palam Airport in about one hour. At 6:30 AM we left New Delhi for Larnaca, Cyprus, by Kuwait Airways. In route we had to change a plane in Kuwait Airport where we spent almost one and half hours. At 14:30 (local time) we arrived at Larnaca Airport, where we were welcomed by Mr. Andreas Soteriou from the Department of Agriculture, Nicosia, Cyprus. Mr. Soteriou drove us to the capital city of Cyprus, Nicosia, nearly 42 miles away from the airport. We stayed at Excelsior hotel.

June 5, 1983

The day being a holiday, our schedule was open. We, therefore, hired a taxi and drove to Limassol through the Mount Trodos. Trodos is located at about 3000 ft. from the sea level and in some respects it remembles Palung and Tistung areas of Makwanpur district in Nepal. There we noticed people grazing sheep (Chios) along the way.

Limassol, the second biggest city of Cyprus, is located on the sea-shore. When we were driving to Limassol from Trodos, we saw a number of grapevine orchards grown on terraced land.

June 6, 1983

We visited village Akaki a famous livestock and sheep production area.

Mr. Andreas Soteriou and Mr. Kleanthis Marphakis, both from the Department of Agriculture, Nicosia, Cyprus, led our group and the first farm we visited was that of Mr. George Afimio. He had 60 Damascus goats.

The Damascus breed is very popular in Cyprus and resembles Jamanpari in appearance a breed found in Terai regions of Nepal. This breed has Roman nose, long pendulous ear and looks chocolate red in color.

In our discussion with the farmers, we found out that the does/nannies are milked for a period of 140-150 days. On an average this breed yields 160 kilogram of milk per lactation. The kids are weaned after 5 months. At maturity, an individual weighs about 60 kg, although some may weigh as high as 85 kg.

The milking goats are given an allowance of 0.8 kg of concentrate for each kg of milk produced. Both male and female kids are fed the same concentrate for three and four months, respectively. The feed contains 16 percent protein. Nearly 6 percent kids of this breed are hermaphrodite which is due to dominant gene for polledness.

The second farmer we visited was Mr. Christas. He had 170 heads of sheep which included Chios, Chios x Local, and Chios x Friesian crosses in his herd. According to him these sheep have an average lactation period of 144 days and yield about 135 kilograms of milk per animal per lactation. According to him the weight of the lambs at birth varies with sex the male and the female lamos weighing 4.16 kg and 3.8 kg., respectively.

Similarly, the average daily gain in weight, too, was found to be greater in male lambs (327 gm) than in female lambs (302 gm). Just like the goat, the sheeps too are weaned at an age of 5 months and at that time they attain an average weight of 25.98 kgm. After weaning, the lambs are given a fattening ration. A well fattened sheep weighs about 60 kilograms on an average.

In Cyprus, the sheep are sheared only once in a year, and shearing is done usually in April. The sheep yield two kilograms of wool per animal, the wool is not of good quality though.

Halloumi is a famous cheese made from sheep and goat milk. Similarly, Yaorti or the yogurt is prepared for domestic consuption. The cheese made from whey is known as Anari. However, most of the farmers process their milk either for Halloumi cheese or for yogurt.

Thereafter we visited the Comet Farm Limited, which is the biggest farm in Cyprus. There we met Mr. Savvas Papaestathiou, the owner and managing director of the farm. He had three flocks of 150 sheep. The breeds were Chios and Chios x East Friesland crosses. The Comet processess all the milk produced in the farm and exports its produce to other countries as well.

June 7, 1983

The group visited government operated livestock production farm at Athalasa. There many types of animals are maintained for breeding and research purposes were besides, sheep and goat separate units of pigs poultry and cattle also are established. In the goat and sheep unit, Shami (Damascus) breen of goat and several breeds of sheep were maintained. The Awassi breed was introduced from Syria, Chios from Greece, and East Friesian from Germany. The Awassi breed have a fat-tail, and to facilitate mating of these sheep tailing is necessary. Mouflon is a wild breed of Cyprus which is being crossed with all the breed maintained there.

To reduce the amount of fat deposition in two, the local breed has been being crossed with Chios and East Firesian. These breeds are very prolific, too.

The cattle unit has Friesian and Holstein...breed. Also we saw a biogas plant which was established just a year ago. Due mainly to shortage of roughage in Cyprus, the cows are provided with relatively more amount of concentrate than the roughage. In the beginning the young claves are given "milk replacer" for a fortnight and thereafter their ration also includes both lucerne and pellets. The pellet has the following composition:

Grain - 77%
Soyabean - 17%
Wheat bran - 5% and
Mineral + Vitamins - 1%

In the Experiment Station, only female calves are reared (maintained) for replacement and breeding purposes. Well-fed healthy calves get ready for mating in about 13 months.

Thereafter we went to the Department of Agriculture and Economics. In Cyprus alfalfa, barley, and oat are cultivated for fodder purposes. And good quality seeds of adapted varieties are imported from the USA.

June 8, 1983

At 7:30 AM, we left Excelsior hotel and reached the airport at Larnaca at 8:20. From there we left for Thessaloniki (Greece) by Olympic Airlines and arrived at Athens International Airport at 11:30 local time. In Athens we had to wait for another airplane until 3:35 PM when we left Athens for Thessaloniki by the same airlines and arrived at the airport at 4:15 PM.

In the airport we were received by Mr. and Mrs. Panayotis Rotsis from the American Farm School and Prof. N.P. Zervas from the University of Thessaloniki. At the American Farm School (AFS) the gate was decorated and a red cloth was hung displaying "Welcome to our Friends from Nepal".

June 8, 1983 (Contd.)

After a brief stop-over at AFS, Mr. Panta and Mr. Yadav who were not feeling well for a couple of days were taken to Clinic for medical check-up. That night we stayed at AFS's dormitory.

June 9, 1983

In the morning we visited several units of AFS. They were Poultry farm, Dairy farm, Feed mixing unit and Forest Nursery. Mrs. Morgan who had been looking after the nursery, expressed her desire to come to Nepal and pay a visit to our Institute as well.

In the evening, we left AFS at about 1:30 PM. Thereafter we stayed at Queen Olga hotel. Mr. Panta and Mr. Yadav, who had been suffering from stomach problem consulted another doctor for their medical check-up.

June 10, 1983

We visited the National Cereal Research Institute and the University Farm of the University of Thessaloniki. There we met several university staffs among which Dr. John Balios, a South Dakota Alumni, Dr. Alihanidis, Dairy Technologist and Dr. Trimis, a representative from the Feed Grain Council of the United States of America were of much help. At the University Farm there is a good milk processing facility, too.

From there we went to the Aghios Mamas Research Station where Chios and Kymis breed of sheep are maintained. The Station has 1000 milking ewes and research facility (and 1000 ewe milking facility). We were able to get very few information about the Chios and Kymis breed. Ours was a frustrating experience in that Station since none of us could speak Greek.

Mr. Yadav and Mr. Panta took complete rest as advised by the doctor and therefore, could not join the group.

June 11,1983

In the morning we visited the Meat Market of Thessaloniki. Thereafter we drove to Chalkidaki. On our way back to Thessaloniki we stopped at Prof. Panayotis Rotsis's dairy farm.

Mr. Panta joined the group but Mr. Yadav continued his bed-rest.

June 12, 1983

The day being a Sunday the schedule was open. All of us, however, visited the Museum at Thessaloniki and the wild life Sanctuary.

June 13, 1983

We drove to Diavata and observed the laboratory facilities of the artificial insemination center. There AI is done in horse, cattle, sheep and pig. Collection, examination, and processing of semen is done in their laboratory. Also they have their own liquid nitrogen plant for freezing and preserving the semen for future use.

June 13, 1983 (Contd.)

From there we went to Animal Research Institute which is located at Giannitsa, Greece. There Mr. George T. Gabrilidis, incharge of the institute and several other staffs accompanied us. The farm maintains about 2500 heads of animal : mostly cattle, sheep (both local and exotic) swine (Land-race and Yorkshire), rabbits, and chinchilla. Also a native breed of cattle is maintained in the Institute which is aggressive but very resistant to diseases. Karagouniko, Chios, and Lesvos are the important breed of sheep maintained there.

The institute also has a biggest government farm in Greece which is about 1000 acres in size. There the institute grows most of the feed and fodder crops.

Mr. George T. Gabrilidis, incharge and several staffs of the institute took us around and provided with useful informations.

June 14, 1983

We left Thessaloniki for Metsovo at 9:30 in the morning. On the way we are our lunch at Larissa and arrived at Kalambaka, Meteora at about 4 O'clock where we stayed at Divani hotel. In the evening we visited the Meteora Monasteries and spent a couple of hours there.

June 15, 1983

We left Kalambaka at 8 O'clock in the morning and reached Metsovo at about 10:00

Metsovo is a village located in the central part of western hill of Greece. There we spent almost one hour and a half in observing the village cheese factory and various types of products.

From Metsovo we drove back to Larissa for Athens. On our way back to Larissa, we stopped at Trikala where Karamichos export Flokati O.E. is located. This factory manufactures excellent carpets from sheep wool. Some of us bought them as souvenir. Thereafter, we drove to Athens. On the way we stopped at a place past Larissa where we ate our lunch and arrived at Athens at 8:30 PM. We stayed there at Hotel Divani Alexandras.

June 16, 1983

As we were tired on the previous day, some of us slept long in the morning. And since the schedule was open, in the evening, we did some shopping.

June 17, 1983

We went to Acropolis to observe the Parthenon. From the vicinity of Acropolis we have collected some seeds of a legume shrub called *Medicago arborea*. This plant is supposed to be rich in protein.

June 18, 1984

In the morning we went to see the Museum of Athens and in the afternoon went for a site-seeing.

June 19, 1983

At 6:00 AM we left the hotel by a taxi cab and arrived at Athens International Airport in one hour. We departed from Athens at 8:20 hours and arrived at Leonardo daVinci International Airport, in Italy at 10:00 AM local time. From there it took about an hour for us to get the Central Railway Station in Roma by limousine. There we ate some snacks and left Rome by train at 12:50 hours. We arrived at our destination, Caserta, at 15:01 hours. There we stayed at Europa hotel which is near by the Railway Station.

June 20, 1983

There is one Italian Buffalo Breeder's Association at Caserta. The Association has its office within a couple of minutes' walk from the Hotel Europa. There we met with Dr. Detrancieis who took us to Mr. Jemma's Farm--Torre Lupara. His the biggest buffalo farm in Italy. He owns 1800 buffaloes including 800 milking cows. Also he has 200 hectares of land where he produced suffcient amount of fodder for his animals. Generally, he grows barley in winter fallowed by corn for silage in summer. Also he grows alfalfa in his farm.

In his farm high producing buffaloes are separately housed and given better diet as compared to medium and low producers. On an averave the daily allowance of high producers' consists of 20 kgs of silage, 4 kilogram of concentrate, 3 kilograms of alfalfa, and 1 kilogram of straw along with some brewers grain and cotton seed. The concentrate contain 16 per cent crude protein.

Everything is mechanized in that farm. The milking parlour is excellent and has 24 stalls. The farm has one artificial insemination laboratory equipped with modern facilities. Addionally, the technicians have been trying for embryo transplantation as well.

All the milk produced in the farm gets processed into mogarella cheese which is used for making pizza in Italy and abroad. Most of the cheese is exported to USA.

June 21, 1983

On this day, too, the officials of Italian Buffalo Breeders' Association extended their help to us. Realizing the communication problem they facilitated us with help of an interpreter.

The first farm we visited was that of Mr. Jiamcarlo Pettrellia, he lives in village Borgo Appio near Caserta and owns 50 buffaloes. Also he has five hectares of land where he produces feed and fodder for his animals. Due mainly to marketing and processing problems, he milks his buffaloes in the monring only. According to him 30 buffaloes yield about 300 litres of milk per day.

Thereafter we went to the farm of Mr. Caetano Petrilla who is the younger brother of Mr. Jimcarlo Petrilla. He had 7 hectares of land and also 53 buffaloes, one bull and 20 calves in his farm.

June 21, 1983 (Contd.)

There, too, the buffaloes are milked only once a day with a production of 7-8 litres per day per animal. The owners, however, used to live outside the village leaving only one man to work for him in the farm.

The third farm we visited was that of Mr. Luciano Anjelina. There we found 70 heads of buffalo being raised on natural pasture. The farmer used to purchase concentrates only, however, The average milk production of the farm was claimed to be 9.5 litres per day per animal.

June 22, 1983

At 6:13 AM, we left Caserta for Rome and arrived at Rome at 8:35. In Rome we stayed at Hotel Tiziano. In the afternoon some of us went to see Mr. V.P. Dhital, Senior Administrative Officer, Mr. A.O. WiGnell, Seed Certification Officer, Mr. I.C. Pokorny, Fellowship Officer, and Mr. Torodo, Agri. Economist. Most of the time Mr. Bhola Pokharel and Panta were together.

June 23, 1983

All of us went to the Animal Production and Health Division of FAO/UN. There we had a meeting with Mr. Bruno Rumich and Dr. A. Demiroren both animal production officer. Also we met Dr. R.B. Griffiths, editor, World Animal Review.

June 24, 1983

We left very early in the morning for Chiusi by train and visited a Chianina cattle farm. This breed is roubust and looks bigger than Haryana which is a familiar breed to us. Although Chianina used to be milked in Italy in the past, their use as a dairy cattle has been declining. These days Gelbvieh, a German dairy cattle breed, are being introduced in that province.

Including Italy, at present these animals are extensively used for beef cattle breeding programs in Canada, the United State of America and other places. This is of no relevance to Nepal, though. Furthermore, we were also told that the breed had been used for draft purpose in Italy in the past.

June 25, 1983

In the morning we went for a sight seeing tour in Rome. In the evening however, we went to see Mr. Prayag D. Tiwari and Mr. R.C. Malhotra who are working in International Fund for Agricultural Development (IFAD) at their residence in Via Del Serafio.

June 26, 1983

We got started very early in the morning and visited several historical places of interest, Museum, and finally arrived at St. Peters Square in Vetican city. There, we listened to the Preachings of Reverened Pope John Paul II.

June 27, 1983

We started from the hotel Tiziano at about 10:00 and arrived at Leonardo daVinci International Airport at 12:30. We departed from Rome to New Delhi by Japan Airlines at 2:35 PM. It took about five and half hours to reach to Abu Dhabi where the plane stopped over for about one hour. Thereafter, we continued on the same plane to New Delhi. We arrive New Delhi at 4:00 AM.

June 28, 1983

We left New Delhi at 8:30 AM by YETI (RNAC) and arrived Kathmandu at 10:00 AM.

OVERALL OBSERVATION

1. Lactation and Climate: Cyprus is situated at 35° North latitude and 33° East longitude. Similarly in Greece Thessaloniki, Larissa and Kalambaka are the places located around 40±1°N latitude and in between 22-24°E longitude. In Italy, Chiusi is located at 11°30' E latitude and 43°N longitude, Caserta lies south of Rome and is situated at 14°30'E latitude and 41°N longitude.

   The typical climate of the area is known as Mediterranean which is characterized by hot and dry summer from mid-May to mid-September, and rainy, rather changeable, winter from November to mid-March. Both Autumn and Spring seasons are short which are characterized by rapid changes in weather conditions (1,2).

   The annual precipitation, for example in Cyprus, ranges from a low of 300mm in the central and the flat south eastern part to nearly 1200mm at the top of mount Troodos. Snow occurs rarely in the low lying areas and on the Kyrenia range which, at present, is occupied by Turkish Cypriot. However, snow falls frequently every winter on ground above 1000m in Troodos range.

2. Research on Livestock

   I. Sheep: Cyprus Fat-tailed is a predominant breed of Cyprus characterized by rather low milk yield and poor growth rate of the lamb. However, it is hardy and has adapted well under extremely unfavorable environmental conditions in Cyprus (4,38,42).

   The Chios are a native breed of Greece and are used as a dual purpose animal for the production of both milk and meat in Cyprus (42). According to Mason, Louca, and Lawlor as cited by Mavrogenis et al, this breed is characterized by high prolificacy (1.8 lambs born per sheep), high milk production (267 kg in 220 days), early maturity (mating at the age of 8-9 months), and moderate rate of growth (.02-25 kg per day). In another experiment conducted by the same author and others, the litter size, litter weight and net body weight loss were found to be higher in Chios breed as compared to Cyprus Fat-tailed and Awassi breeds (41). These authors thought it to be associated with high prolificacy of the breed and suggested that the good body conditions at partirition predisposes the sheep (Chios) to higher production. Also their findings strongly suggest that the milk production is a management responsive character and depends upon the plane of nutrition (41).

   The other important breed of the Mediterranean area is Awassi. Awassi sheep are characterized by fat-tail and are not as much prolific as the Chios or East Friesian are under both high and low leverl of feeding, Awassi

Sheep (Contd.)

breed yields as much milk as do the Chios and perhaps even more under medium level of feeding but the breed is disliked due to heavy pendulous tail. Also we were told that such a fat-tail as is present in Awassi and local sheep would interfare with mating ewes with ram, too.

The Chios which belong to semi-fat tailed group are, therefore, used in breeding programs to upgrade the Cyprus Fat-tailed sheep. However, progressive farmers who can provide better feed and management are also found keeping Chios in pure-breed flocks (35). Furthermore in a study designed to investigate the effect of suckling regime on growth rate and lactation performance of sheep, Louca (35) found out highly significant differences in milk yield and lactation length. The average figures for Cyprus fat-tailed and Chios ewes were: 159 and 265 kg for milk and 158 and 209 days for lactation length, respectively.

Both in Cyrpus and Greece, the Chios are most widely accepted and throughly investigated breed of sheep. Should we introduce the breed in Nepal for breeding purposes, the findings which may be of interest to us, are as follows:-

A. Nutrition and Management

1. Suckling for 12 hr. a day had no adverse effect on milk yield of ewes or the growth rate of lambs. But the no-suckling regime adversely affected both milk yield and lactation length of sheep, (13) although these were less pronounced for Chios (35).

2. On an average multiparous ewes produce 23% more milk than ewes lambing for the first time (13).

3. A low level of feeding during pregnancy affects lamb birth weights, the efects being more pronounced in ewes bearing twins rather than in ewes bearing singles (41).

4. The ewes milked twice a day yield more (28%) compared to those milked only once a day. Milking frequency does not affect fat percentage (46).

5a. Year and season of lambing affect milk production and lamb growth rate.

5b. Male lambs consume more milk and grow faster than the female ones, both before and after weaning on 42 days.

5c. Post weaning weight is virtually the same irrespective of type birth i.e. single or twins. (23,39).

B. Heritability and Genetic Factors

1a. Litter weight at birth and at weaning differe widely and are influenced by the type of litter or the litter size at birth. The estimated heritabilities for the birth and weaning weight of female lambs were found to be 0.16 ± 0.11 and 0.47 ± 0.17, respectively. These characters had a genetic correlation of 0.82 ± 0.28 and phenotypic correlation of 0.38 (37).

1b. Both 90-day milk production and total milk production were affected significantly by lactation number or parity ($P < .05$), lactation length ($P \leq 0.01$), and sire ($P \leq 0.01$).

1c. The relationship between lactation length and milk production is quadratic.

1d. The estimated heritability for 90-day milk production pooled over both lactation was 30 ± .13.

1e. 90-day and total milk productions are correlated both genetically (0.98 ± 0.08) and phenotypically (0.66) (37).

2. Past-weaning daily gain and body weight at 15 weeks of age had a heritable estimate of 0.56 ± .15 and 0.75 ± .17, respectively (42).

3a. The estimates of heretability and standard error for under type (.41 ± .13), under circumference after milking (.40 ± .13) under depth (0.35 ± .12) and also the length and diameter of teats were moderately high.

3b. Selection for high 90-day milk production may result for larger udder depth and udder circumference(3).

II. Goat: Shami (Damascus) goats are kept as dual prupose animal for the production of milk and meat, noth much information is available on goat as is on sheep. However, a cursory review of the literature would reveal the following:

A. Nutrition and Management

1a. More amount of marketable milk can be produced by weaning kids at 48 hour than by weaning at either 35 or 70 days after birth.

1b. The kids weaned at 48 hr. do not differ significantly from those weaned at 70 days.

1c. The milk let-down mechanism of Shami-goats is comparable to that of dairy cows in which the stimulation provided by milking machine is nearly as effective as that provided by suckling (36).

2. Life time performance or the cumulative milk yield; number of kids born alive and weaned, total kid weight at weaning; and cumulative milk days were found higher in goats first kidding as yearlings than in those kidding at 2 years or age (38).

3. Under the same plane of nutrition, male kids grew faster and became heavier (24, 40).

B. Heritabilities and Genetic Factors

1a. In all types of mating between horned and/or polled males and females, significantly more males were produced (53.1%) compared to expected 50 per cent (9).

1b. 6 percent inter-sexes were produced when both parents were polled (pp x pp) (9,31).

2a. The effect of lactation number on 90-day milk yield was quadratic with a peak in the third lactation (3).

2b. Udder circumference after milking (0.60 ± 0.18), teat length (left 0.5 ± 0.17, right 0.75 ± 0.18), and teat diameter (left 0.52 ± 0.17, right 0.70 ± 0.18), were highly heritable. Furthermore, the udder circumference (0.78 ± 0.18 and depth 0.33 ± 0.34) were genetically correlated to milk production (3).

2c. Milk production was phenotypically correlated only with udder circumference (.59), udder depth (0.37), and test-day milk yield (0.84) (3).

3. Both 90-day and 150 day milk yields were found to show high and positive phenotypic and genotypic (0.92 ± .03) correlations (3)

III. Buffalo: The leading countries in buffalo production are India, China, Pakistan, Thailand and the Philippines. Nepal ranks 6th in the world production and has over 3.5 million buffaloes which are mostly non-descript.

In Nepal, buffaloes produce milk, meat and to some, extent draft required by the farmer. They are, therefore, rightly considered as a triple purpose animal. Since our buffaloes are mostly river type, they are more suitable for milk and meat purpose than for draft.

Buffaloes are variously used as double or triple purpose animals. Some of the important features of buffaloes are as follows:

A. Nutrition and Management

1a. Buffaloes grow slower and live longer than cattle,

1b. The annual rate of replacement is 23% in buffaloes and 50% in cows,

2a. The average growth rate of buffalo calves weaned at 50 days was 707.8 gm and that of ones weaned at 40 days was 639.8 gm.

2b. Buffaloe calves weaned immediately after birth adapt more easily to artificial feeding. (10)

3a. Buffaloes are excellent converters of coars roughages into proteins and are superior to cows in having higher coefficient of digestibility for the feed stuffs.

3b. Because of difficulties in heat dissipation, buffaloes respond well to provision of shade and spinkling of water (5).

4. For feed efficiency and good meat production all calves should be dishorned at or before 6 months of age. The males should be castrated at the same time (8).

B. Heritability and Genetic Factors

1a. In genral, the Mediterranean breed have smaller calving interval (362-455 days) as compared to Indian or Pakistani breeds (467 days). The age at first calving, too, was smaller for Mediterranean breed (32-45month) than for Pakistani breeds (44 month). The gestation period, however, is almost same for most breeds and ranges from 280 days to 331 days with an average of 310 days (5,47).

1b. Calving interval is a question of feeding and breeding techniques (5).

2. The heritability estimates for breeding efficiency, age at first calving and longevity are 5,0, and 2 per cent, respectively. Similarly, the estimates for gestation period, birth weight, and fat percentage are found to be 31, 56, and 50 per cent, respectively (5).

3. Research in Feed and Feeding

Whatever be the purpose of keeping livestock, the aspect of feeding them is very important. Since 70 per cent of the digestion is completed in the rumen, ruminants (cattle, buffalo, sheep and goat) can consume roughages or low substrate forage diets and produce milk, meat, wool, hide or draft required by us.

Although ruminants are of low productivity in their natural environemtn (15) they have evolved on diets made up largely of forages. If the diets are not supplemented with high levels of cereals, they cannot maintain a rapid rate of growth, early maturity, large litter size, high milk yield or similar characters of economic importance. The plane of nutrition has a tremendous bearing on breeding programs than in production programs. This is so because the genetic potential upon which the selection of an animal is based cannot be accessed without adequate nutrition. Therefore, feed and feeding are the two aspects of the same problem.

In the following paragraphs the approaches taken and findings made by research on feeds and feeding livestock in Mediterranean area has been considered:

1. When animals fed-on low concentrate rations are abruptly switched on to high levels of concentrates such as barley, wheat, corn, sorghum, sweet-potato or potatoes, they suffer from acidosis. To overcome this problem, ruminants should be adapted to concentrates gradually (in about 2 weeks)and the following points should be kept in mind.

   a) Roughage component of diet should constitute 40% of dry matter of the total ration.

   b) Concentrate should be given more than once daily (15).

2. The chemical conposition of feed-stuffs is affected by many factors including climate, soil fertility, cultivar, and stage of harvesting. Hence in, order to formulate the balanced diet for livestock, the determination of chemical composition of locally produced feed-stuffs is very necessary (25, 27).

3. In order to evaluate the feed-stuffs on the basis of their nutritional worth and to enhance the utilization of locally produced feed-stuffs, stientist at the Agriculture Research Institute, at Nicosia, Cyprus, are currently working on such feed-stuffs as broad bean, carob-meal, citrus pulp, grape marc, pultry litter, barley hay, urea-treated straw etc (3).

4. The high dependece of ruminants on concentrates is due to lack of grazing land and to the shortage of forages. Traditionally, barley has been used as the only supplement for ruminants (diet). However, under extensive management system, it dan be replaced by sorghum, wehat or corn (17).

5. As compared to barley straws, of leguminous corps as common vetch (Vicia sativa) Mavrachyro (Vicia termnifolia), and Cyprus vetch (Lathyrus ochrus) possess higher percentage of digestible organic matter, gross energy, and metabolizable energy. The farmer, however, does not have any digestible crude protein (3).

6. Spraying straws with (400 ml/kg of) urea solution (10% W/V), covering with plastic for 60 days, and exposing to air for at least 24 hrs prior to feeding increased the dry matter digestibility of Damascus goat, significantly. Also, the straw intake, daily milk yield, milk fat content, milk protein output, and pH were not affected (3).

7. In countries lacking good quality forages, low quality roughages are important part of ruminant diets. However, even under conditions of maximum intake cereal straws cannot meet the maintenance requirments of even dry animals. This is due to low nitrogen content of cereal straws. The addition of small quantities of urea along with some barley grain and mineral-vitamin mixture is, therefore, very helpful. This increases not only the nutritional value of cereal straw also the intake of straw, energy and nitrogen. Therefore, to compensate for the energy expended during walking, grazing, and other activities, the ewes should be given an allowance of 10 gm urea daily (14,16).

8. In a feeding trial with buffaloes in Iraq, Ashafak (5) found that the total requirements of protein and total digestible nutrients (TDN) for buffalo could be met by using molasses and urea upto 40 and 50 per cent, respectively. Also he reported that the daily gain in live weight of buffaloes fed on molasses and urea ration was 0.854 kg against an increase of 1.030 kg on conventional ration. He did not find any significant difference in meat, fat, and bone ratio but found a substantial cut (43%) in the cost of feed (6).

9. In sheep acceptability to urea-countaining diet was comparable to the diet without it. Feeding urea to

lactating ewes had no significant affect on either milk yield or their fat content. However, a slight increase in amount of dry matter, metabolizable energy, and crude protein consumption was observed (30).

10. a) In a study conducted to study the protein requirment of sheep during maintenance, the digestible nitrogen requirement, measured as gm N/Kg $W^{0.73}$, for maintaining the equiblrium, was found higher for soybean (0.195 ± 0.0237) than for urea (0.188 ± .0099).

    b) In the same experiment, the increase in the digestible nitrogen intake resulted in concomitant increase in the amount of retained nitrogen. The intake, however, was upto 0.370 gm/kg $W^{0.73}$ for urea. Furthermore, with the addition of starch in diet, a slight increase in the extent of energy intake and a decrease in crude fibre digestibility occurred. The straw intake, too, was reduced significantly (43).

11. With a change in the crude protein level, the lambs feed on high concentrate diets showed a higher amount of rumen microbial protein and increased urinary outpur, the crude protein level, however, had no effect on carcass measurements. In the same experiment, a non-significant difference in apparent digestibility of dry matter and crude protein, too, was noticed. The results of the experiment, further indicated that the crude protein requirement for male lambs would be about 16% and that for the females ones perhaps, lower than 14 per cent (23).

12. In a similar experiment investigating the effects of crude protein at various stages of growth of goat, the diets containing 18 or 20 per cent crude protein were fed to kids. During the early stage of growth (60-102 days) all kids responded similarly as to daily gain, feed intake and feed to gain ratio on both levels of CP. However, during the late stage (103-156 days) the female kids required about 16 per cent crude protein on dry matter basis while the male kids required the same amount (18%) to maintain a satisfactory growth trend (24).

13. a) To meet the energy requirements of sheep during maintainance, the daily allowance should consist of 25.8 gm. of digestible organic matter per kg $W^{0.73}$.

    b) The net weight change of ewes, the birth weight of single or twin lambs, or even the weight of placenta is not affected by the plane of nutrition. However, the daily allowance should be increased by 7MJ of ME to meet the additional requirements of energy for multiple births and activities and also to compensate for the wastage of feed during feeding (14).

13. Studies were conducted to see the effect of inclusion of saliva salt in sheep. Feeding diets containing 40 gm saliva salt per kilogram of feed resulted in a significant increase in the molar proportion of ruminal acetate and rumen dilution rate. Also a non-significant decrease in propionate was observed. The ruminal NH_3-N concentration tended to increase but the increase in total amino acid nitrogen (TAA-N) was nonsignificant. It was, therefore, concluded that the inclusion of saliva salt in the diets of milking ewes might cause an increase in milk production efficiency of sheep due to reduced degradation of the feed protein within the rumen (29).

4. Farming System: Problem and Prospect

a) Animal

When availability of land does not impose any restrictions on the size of holding then a pasture provides feed at the lowest cost, because the animals do the job of harvesting themselves. Such a system which is prevalent in Greece and Cyprus does not seem to have any relavance to Nepal. Furthermore, even in those countries, the losses associated with trampling, defecation and fencing cost seem to be prohibitive, and therefore, farmers are switching on to systems feeding stored-food in confinement.

In Greece, sheep farming is one of the most old and important branch of livestock industry and contributes more (28.3%) than any other type of livestock enterprise to the gross return of the industry. Of the total number of sheep, nearly 80% are pastural while the remainder are home fed and migratory. The farmer type of sheep farming is based on grazing in extensive semimountainous and mountainous pasture from April through October while the latter type is based on home grown feedstuffs and own meadow. The pastural type is successful if a large number of sheep is raised in extensive pasture and in addition, the wages paid for the sheepherds and the price paid for the feedstuffs (purchased in winter months), too, are low. The profitability of such farms, however, depends upon how well the marketing cooperatives are organized for meat and milk products. The second type, on the other hand, is based on keeping highly productive sheep and utilizing land intensively. This is done by combining land, labour, and capital at optimum level (32,33,34).

Similarly, in Cyprus, too increase in productivity per animal is considered more profitable than increasing their members. In a survey designed to study the type of production, the meat and milk production was found superior than all meat production. In addition, the study also indiciated that the latter type of production might prove successful under high level of grazing and unavailability of skilled labor.

Each year Cyprus imports large amount of feed and the government subsidizes it (25). The present price permits fattening of lambs and kids only. Since the in-door feeding involves use of concentrates and forages at larger amounts, the net returns for pastural type are more than double than for home-feds (25).

In Cyrpus, the average feed requirement for sheep and goat is about 132 and 120 kgs per animal per year, respectively. In addition, approximately 0.1 ha of land is required to produce the green forages necessary for one animal. But in Greece, the same amount of forage is produced in only 1/16 (0.06) ha. Apparently, inadequate rainfall or irrigation facilities and/or predominantly coarse textured soils are mainly responsible for such low yields.

b) Crops

Partly because of lack of suitable varieties for higher forage yield and partly because of inadequate land for grazing purposes, the Cypriots have to depend on foreign markets for their feed supply. Every year, the have to face the problem related to uncertainly of prices for the feedstuffs at the International Market and therefore, are trying to alleviate the problem ba making improved cultivars of a number of crops locally available.

At present, they are studying the effects or annual precipitation and its distribution on the grain yields of dry land cereals such as barley and durum wheats (18,19,22). Both introduction and hybridization programs are going on (18,19,21). The effect of cutting at different stages of growth; the effect of stage of growth and cutting height on dry matter and on nutritional value; the effect of seed rate, of spacing, and that of method of sowing on yield; nutritive values of different kinds of hays, of straws, and that of cultivars are a few typical examples of researches being conducted on forage crops.

As has been pointed out earlier, the type of by-products or the crops which are available for feeding purposes in those countries are neither available nor adapted to our conditions. However, their approach in feed research may be worth trying in our Institute, too.

5. Suggestions for Strengthening the Animal Science Department at IAAS

In fact, if we want to get started with a livestock breeding program in the institute, such a program should go hand-in-glove with a forage development program, as well. At present, we don't have any policy or, say, a long-term program for Dept. of Animal Science, hence we would like to make a few suggestions on this regard. They are as follows:

Main Recommendation

The present department of Animal Science should be reorganized and, for the time being, four divisions, with well defined objectives, should be established: Later on more divisions or units may be added to the list of course in commensurate with the need of the department.

The divisions would be named as follows:

a) Livestock Breeding and Production
b) Animal Nutrition and Health
c) Forage Production and Development
d) Production Marketing and Extension

Related Recommednations

A. Breeding and Production

The livestock breeding and production division should comprise the following units:

a) Sheep and Goat Breeding Unit
b) Cattle and/or Buffalo Breeding Unit
c) Artificial Insemination and Production Unit

Breeding

Functions of the Breeding units should be collection of exotic and indigenous breeds and breeding and selection for use in Nepalese conditions. The livestock suitable for breeding purpose are as follows:

i) Sheep and Goat

Here it is worthwhile to mention that the Chios sheep or Shami goat may be imported to Nepal for local goat and sheep improvement. Chios are prolific and may respond better even under moderate feeding programs. As has pointed out earlier, they, not only resemble Jamunapari in appearance but also yield more milk. Therefore, both of these breeds should be imported and tried to produce F_1. If promising crosses are obtained further crossing using a prime lamb shire can intensify the desirable characteristics.

ii) Cattle and Buffaloe

Since bullocks are widely used for various purposes by the farming community in Nepal and since indigenous animals are not sturdy enough to provide sufficient draft required for certain type of tillage equipment (as for example those developed by ICRISAT, Hyderabad, India) it would certainly be desirable to start a breeding program very soon. Since the characteristics of animal useful for draft purpose are much the same as those useful for meat purpose, use of Chianina breed in our cattle improvement program should be justified.

This can be done relatively easily using semen imported from the USA. (Here it would be worth-while to mention that improving cattle is a long-term program, however, as compared to sheep and/or goat breeding).

The Mediterranean breed of buffalo which was observed in 'Jemma's Farm, near Caserta are comparable to Murrah as far as the milk production is concerned. Keeping in mind the level of management at Jemma's farm, it would not be justified to say that Murrah are inferior to Mediterranean buffaloes. Under the same level of feeding and management, Murrah, too, would produce almost as much milk, if not more, as do the Mediterranean ones. Although it would not harm trying both breeds, we would prefer the Murrah, at least, in the beginning.

Animal Production

Production of various classes of livestock in adequate number should be the main objective of this unit. Again, it should be clearly understood that the crux of the problem lies in supplying animals in adequate number (as and when demanded by the researcher) but not in meeting the demand from the market. If the herd or flock is maintained well and reserved for future use, the product generated in the meantime would be used by public anyway.

The second objective should be the maintenance of useful records such as pedigree, date of birth, weaning, abortion, length of lactation, parity, litter size, sex of the kid etc.

The third objecti e should be collection and preservation of semen from outstanding sire and provision of service to farm animals as well as the livestock of Chitwan district, whenever possible.

B. Animal Nutrition and Health Division

This should have a well equipped laboratory and corps of scientist who should carry out the following:

1. To determine the chemical composition of locally available feedstuffs.
2. To seek and evaluate alternative source of nutrients.
3. To formulate various types of ration and conduct trials to see the response *in vivo* .
4. To make recommendations for use, and
5. To handle disease prevention and control programs as necessary.

C. Forage Production and Development

The success of the division responsible for this program lies in producing adequate feed and fodder required by all classes of livestock kept in the farm. Research should be done to develop and popularize fodder trees such as ipil ipil (Luecaena sp.), Badahar and others that can be planted in fence rows, farm roads, stony terrain etc. In addition some forage crops*also should be grown to supply adequate roughage for the animals of the farm. This from the standpoint of food grain production at the national level, we are afraid, may be subject to criticism equivolably. However, one cannot deny the possibilities of cultivating forage crops in marginal, unproductive and unirrigated land which would otherwise remain follow and be subject to erosion. Therefore, keeping in mind the large hectarage of land which remains follow during the winter, (also this is a season of short supply of green forages, too), it would not be unjustified to launch a program in that direction.

In brief the objectives of this division should be as follows:

1. To introduce exotic varieties and evaluate for the following:
   a) Yield and quick recovery
   b) seedling vigor
   c) persistence of stand
   d) early maturity (annual)
   e) disease and insect resistance
   f) forage quality
   g) seed yield
2. To investigate cultural practices
3. To produce forage and fodder tree seed or seedling, and
4. to coordinate with field crop agronomist and animal nutritionist for the development of cropping system and the determination of quality forages, respectively.

---

* The promising forages are:
1. Egyptian clover (Trifolium alexandrinum)
2. White clover (T. repens)
3. Horse gram (Dalichos biflorus)
4. Chickling vetch/Khesari (Lathyrus sativus)
5. Stylosanthes gracilis
6. Napier grass (Pennisetum perpurium)
7. Teosinte (Euchlaena mexicana)
8. Barley (Hordeum vulgare)

D. Marketing Research and Extension

The institute of Agriculture and Animals Science is a unique institution which can contribute a lot through research in marketing problem and in extension. By establishing such a division within the Department, the efforts made by other division can be made more meaningful and practicable.

In Nepal, marketing of livestock and livestock product is not an easy job. Since milk is perishable, it is produced and marketed only in the vicinity of sub-urban and urban areas. In some places, milk is produced also in the collection centres of Dairy Development Corporation. Otherwise, it is produced only for family consumption. In villages, whenever milk is produced in excess, it is processed for 'gheeu' making. Traditionally, cheese making is almost unknown to Nepalese farmers.

Among meat animals, goat is reared by all castes. Large amount of meat demand is met by goat and buffaloes followed by poultry and swine.

Mostly meat animals are sold in the farm-gate. After collection, they are driven on foot by the brokers or middle-man, Seldome are such animals transported in trucks using crates or boxes. The result is that the animals lose a large part their weight before reaching the destination. The quality of meat therefore, is rendered poor. Thus from the standpoint of development the market is still in the stage of infancy in Nepal.

The objective of the division as to marketing should, therefore, be as follows:

1. To survey the potential areas of livestock production and find out what type of animal can be produced in those areas.
2. To findout optimum farm plans for each problem situation and advise farmers about the best combination of land, labor, and capital.
3. To analyse cost factors or losses associated with marketing and suggest alternatives for reducing marketing cost margin.
4. To analyse farmers attitude and other socio-economic, geografic and related factors of marketing livestock product and suggest how farmers can be orgainized fo form a cooperative so that the common goals are achieved (e.g. using a bull/sire, starting a cheese processing plant/wool knitting and weaving work, livestock auctioning and/or hauling firm, etc.)

References

1. Anonymous, (1973). Statistics of Temp. and R.H., Ministry of Agr. and Nat. Resources, Nicosia, Cyprus. P 23

2. Anonymous, (1976). Basic meteorological Features in Cyprus, Ministry of Agr. and Natural Resources, Nicosia, Cyprus. P39

3. Anonymous, (1983). Annual Report, Cyprus Agr. Res. Inst., Ministry of Agr. and Nat. Resource, Nicosia, Cyprus. P87

4. New Methods of Sheep Management for Mediterranean Countries, U.S. Feed Grain Council, via XX Settembre, No 5, Rome, Italy.

5. Ashafaq, M. (1974). Some Economic Parameters and Breeding Biology of the Water Buffalo of the Indo-Pakistan Sub-continent, Iraq, and the Arab Republic of Egypt. Proc. of First Int'l Seminar on World Buffalo Development, pp 49-88.

6. Comparative Studies on the Growth, Feed Costs, and Carcass Composition of Two lots of Young Male Buffalo Calves on Conventional ration of Cereal and Experimental Ration of Urea and Malasses, Proc. of First Int'l Seminar on World Buffalo Dev. pp 155-174

7. Bettini, T.M. (1974). The Water Buffalo Improvement. Proc. of First Int'l Seminar on World Buffalo Development, pp 253-268

8. Cockrill, W.R., (1974). The Water Buffalo: A Wold Picture. Proc. of First Int'l Seminar on World Buffalo Development. pp 15-31

9. Constantinou, A. Lauca, A. and Mavrogenis, A.P. (1981). The effect of the gene for polledness of conception rate and litter size in the Damascus goat. Ann. Genet. Sel. Anim. 13(2) P. 111-118.

10. Franciscis G. and Zizarelli, L. (1974). Early weaning and growth rate in water buffalo calves. Proc. of First Int'l Seminar on World Buffalo Development.pp 175-186.

11. Droushiotis, D. (1980). Effect of Seed Rate and Method of Sowing on Yield of Irrigated Luecarne, Tech. Bull. 30, Nicosia, Cyprus. P11

12. Droushiotis, D.N. (1980). The effects of stage of growth and of cutting height on the yield of irrigated lucerne, Tech. Bull. 36, Nicosia, Cyprus. P. 11

13. Economides, S. (1980). Factors affecting the performance of ewes fed ad libitum until weaning and the performance of their lambs. J. Agric. Sci., Comb, 95:493-495.

27. Hadjipanayitou, M., Economides, S. and Hadjidemetriou, D. (1983). The Chemical Composition of FeedStuffs Commonly used in Ruminant Diets. Misc. Reports 9, Nicosia, Cyprus p.10

28. Hadjipanayiotou, M. Economides S. and Koumas A. (1981). In the take and Nutritive Value of hay Produced from awned and Hooded Barley cut at Different Growth Stages, Tech. Bull.37, Nicosia, Cyprus p 12

29. Hadjipanayiotou M., Harritson D.G., and Armstrong, D.G. (1982). The effects upon digestion in Sheep of the Dietary Inclusion of Additional Salivary Salts. J.Sci. Food Agric. 33: 1057-1062

30. Hadjipanayiotou, M., and Louca A., (1980). Feeding urea to lactating Chios Ewes. Tech. Bull. 31, Nicosia, Cyprus, p.9

31. Hancock, J. and Louca, A. (1975). Polledness and Intersexuality in the Damascus Breed of goat, Anim. Prod. 21:227-231.

32. Kitsopanidis J. (1972). Types of Farming in Central Macedonia, Greece: A comparative Economic Analysis. Agri. Economic Review, 8(1) p. 17

33. - - - , (1973). Productivity of various types of farming in central Macedonia Greece: A Comparative Economic Analysis "Agri. Econ. Review", Thessaloniki, Greece, P. 38

34. Martika, M. and Manos, B. (1980). Economics of production and Marketing of Sheep Farming. Aristotelian University of Thessaloniki, Department of Agriculural Econ. Res. p. 31,

35. Louca, A. (1972). The effect of Suckling Regime on Growth rate and Lactation Performance of the Cyprus fat-trilled and Chios Sheep. Anim. Prod. 15:53-59.

36. Louca A., Marvogenis, A. and Lawlar, M.J. (1975). The effect of early weaning on the lactation performance of Damascus goats and the growth rate of the kids. Anim. Prod. 20:213-218

37. Mavrogenis A.P. (1982). Environmental and Genetic Factors influencing Milk Production and Lamb Outpur of Chios Sheep. Livestock Prod. Sci. 8:519-527.

38. - - - , and Constantinou, A. (1983). Peformance of Damascus goats bred as Yearlings or as two year olds. Tech. Bull 45, Nicosia, Cyprus p 4

39. - - - , and Economides, S. (1980). Relationships between Ewe milk Production and Lamb Growth. Tech. Bull.33, Nicosia, Cyprus p9

40. Louca A. and Hancock J. (1979). The Effect of Dietary Protein Levels on The Performance of Damascus Kids. Tech. Bull 27, Nicosia, Cyprus. p 11

41. Hancock, J. and Louca A. (1980). The Effect of Body Weight changes during Pregnancy and Lactation on the Performance of Three Breeds of Sheep. J. Agric. Sci. Combs. 95,357-363

42. Louca, A. and Robison, O.W., (1980). Estimates of genetivc Parameters for Pre-weating and Post-Weating Growth Traits of Chios Lambs. Anim. Prod. 30. 271-276.

43. Papas, A. (1977). Protein Requirements of Chios Sheep during Maintenance. Animals Sci. 44, (4):665-671.

44. - - - , (1977). Protein Requirement of Lactating Chios Ewes J. Anim. Sci. 44(4): 672-679

45. - - - ,and Papa Christodoulou, (1975). Factors affecting the Economics of Sheep and Goats. Econ. Report No. 4, Nicosia, Cyprus, p 29.

46. Papachristoforou, C. Raushias, A. Mavrogenis A.P. (1982). The Effect of Milking Frequency on the milk Production of Chios Ewes and Damascus Goats. Anim. Zootech. 31 (1): 37-46.

LIVESTOCK TOUR REPORT

Nagendra Shah
Lecturer, IAAS

Livestock Study Tour 3-27 June, 1983

Objectives:

The livestock study-tour to Cyprus, Greece and Italy was proposed by Dr. Weslie Combs, Animal Science Admisor to IAAS, Rampur, Nepal in his End-of-tour report. The purpose of the tour was to study the livestock system of these countries which may be of particular interest to develop the livestock system of Nepal. The basic goal of the tour was (i) to find out whether the Damascus breed of goat, which is bred for milk and meat purposes, could be introduced in Nepal for the local goat improvement (ii) to evaluate Greek Chios and other breeds of sheep for milk, meat and wool production and to find out the possibili of importing (iii) study and evaluate the Mediterranean buffalo as a substitute for Murrah buffalo which is common in Nepal. (iv) evaluation of milk and milk products of goats, sheep and buffaloes and study of processing techniques.

Participants:

The participants of the tour were: M. Sapkota, Lecturer (animal nutrition), J. L. Yadav, Lecturer (Livestock management), B. B.Pant, Lecturer (Seed technolog B. N. Pokharel, Lecturer (Ag.Econ.) N. Shah, Lecturer (Dairy processing) and W. Combs, Animal Science Advisor (Livestock Development and Animal Breeding).

June 3, 1983

We left Kathmandu, Nepal for New Delhi at 6:09 p.m. by Royal Nepal Airlines. We arrived New Delhi at 7:20 p.m. and stayed at Sidarth Hotel.

June 4, 1983

We left New Delhi for Kuwait by Kuwait Airways at 6:30 a.m. and continued on the same flight to Larnaca (Cyprus) after one and a half hours stop over in Kuwait. We arrived Larnaca airport at about 2:30. We were welcomed by Andreas Soteriou from the Department of Agriculture, Nicosia, Cyprus. Mr. Andreas drove us to Nicosia about 42 miles away from the airport.

Cyprus June 5-8, 1983.

We hired a taxi and drove to Limassol through Mount Trodos to see the agricultural areas-of the Island. Trodos is located at about 3000 ft. above sea-level and it resembles Palung and Tistung (places in Makawanpur district in Nepal) in some respects. People grazing Damascus goats and Chios sheep were seen on the way. Limassol, the second biggest city of Cyprus, is located on the sea-shore. On our way back from Limassol, we saw a lot of terraced grape vine orchards.

Visit to Akaki Livestock Area

We were accompanied by Mr. Anderas Soteriou and Kleanthis Morphakis from the Department of Agriculture, Nicosia, Cyprus. First of all, we visited Mr. George Afthimio's farm. He owned 60 Damascus goats. They were milked twice daily. The total production was 160 kg per lactation, that is, about 1 kg per day. The kids are weaned after 50 days and then the does are milked for about 150 days. The weight at maturity was upto 85 kg averaging 60 kg. About 0.8 kg of concentrate is provided for each kg of milk produced. They were also fed potatoes and cereals. The concentrate containing 16 percent of protein was fed to both he-goats and she-goats for four and three months respectively. About 6% of the kids were intersexual because of polled males x polled females. No intersexual case was reported in case of at least one parent horned.

The second farmer, we visited, was Mr. Christos. He owned 170 heads of milking ewes. He had Chios, Chios x local, Chiosx Frisian crosses in his herd. He reported that the average lactation period was 144 days with milk production of 135 kg per animal. The lambing weight was 4.16 kilo for males and 302 grams for females kids. The average shearing was done once a year with a yield of 2 kg wool per year. Shearing was done in April. For fattening the lambs, only concentrate was fed upto 5 months after weaning and the fattened lamb weighed 60 kg.

The third farm, we visited, was CCMET; CCMET is the biggest farm in Cyprus. CCMET owns three flocks of each 150 heads Chios sheep and Chios x East Frisian crosses.

We visited several other small farms

<u>Anari Cheese</u>:- The whey is being heated in another vat to a temp. of 80 to 90°C, albumin heat precipitated, forced to the surface, collected into cheese cloth, pressed and left to drain for about one hour, cut into blocks, salted.

The drained curd is cut 5x10x15 cm blocks, immersed in boiling whey and left for 40-80 minutes. The vat is being covered with a lid so that the whey is kept as near to 100 C as possible. Light movement of the stock during cooking. When cooked blocks are seen floating, cooked for another 5 to 10 minutes. Taken out of the vat, spread on wooden racks, sprinkled with fine salt (5%), leftf for 2-4 hours, tranferred in 15 kg cans.

Cheese making is a traditional cottage industry in Cyprus and cheese is made in almost every village where sheep and goats are bred. About five-sixths of milk produced in Cyprus comes from sheep and goats.

The national cheese is Hallowmi which is unique to Cyprus. Next most popular is the Greek Feta. Yoghurt is the second important milk product made from sheep and goat milk. Halloumi is rather hard cheese. It is made either from sheep or goat milk or a mixture of both. The processing equipments are very simple. Anari cheese is made from the whey. This cheese is very popular because of low price.

For Halloumi cheese, the fat content should not be less than 6%. Renneting at 32-34°C, coagulum is cut into 2-4 cm. cubes in 40 minutes, gentle stirring immediately after cutting, simultaneous heating to reach 38-42°C (takes 15-20 minutes) Curd is left to settle on the bottom of the vat, formed into a cylindric mass. As much whey as possible is then taken from the vat and the curd gently pressed so that it mats together. Cut in blocks of 10 kg., transferred into cheese cloths and pressed by hand, cover with the cloth, piled in four, pressed with weight and left to drain.

Govt. Livestock Production Farm Complex, Athalassa

Damascus goats, Chios sheep, local, fat tailed Awassi, breed of sheep plus poultry maintained, Mouflon is a wild breed of sheep which is being crossed with domestic sheep. The local, fat tailed, was being crossed with Chios and East Friesian to eliminate the fat tail problem.

We visited experimental dairy unit. Friesian dairy cattle, Chios milk sheep, Damascus milk goats. Biogas plant, the first plant in Cyprus, was seen. The cows are fed maximum of concentrates and minimum of roughage, because of the shortage of roughage in Cyprus. Only female calves were raised for breeding The calves were fed milk replacer and from 16 days they were fed income and pellets. The composition of the pellets was: 77% grain, 17% soyabean, 05% wheat bran, 01% mineral+vitamins.

Greece (-19 June, 1983)

American Farm School

The first night of Greece we stayed in the American Farm School's dormitory. We were warmly welcomed at the School. We toured thw School's physical facilities, The Holstein dairy herd, poultry farm, feed mixing unit, forestry nursery etc.

We visited University of Thessaloniki farm and National Cereal Research Institute adjacent to the university farm. We met the university staffs such as, Dr. John Balios, a South Dakota Alumni, Dr. Alihanides, Dairy Technologist, Prof. Nicholas P. Zervas, head of the Dept. of Animal husbandry, Dr. Tony Trimis from Feed Grain Council of USA. Major programs in the Animal husbandry Dept. are dairy goat.

Dr. Alihamides arranged a tour of the dairy processing facilities: I was very much impressed with their facilities. They have a good milk processing facilities at the university farm. The extensive facilities for research in milkpprocessing emphasize the basic economic importance of milk production to livestock economics in Greece. Greece is leading country in cheese consumption. Greece has the highest per capita cheese consumption in the world. Approximately 50% of the total milk production in Greece is used for cheese making. Milk produced from cows is used almost exclusively for drinking, and that produced from sheep primarily, and from goats largely, for cheese making.

Following are the major types of cheese made in Greece:

	Feta		Kefalotiri
Soft---	Teleme	hard---	Kaseri
	Galotyri		Graviera

Feta is the best known cheese of Greek origin. The best is made from sheep milk, but it can also be made from mixed sheep and goat milk. Feta is most popular in Greece. The curd is cut crossways (2.5 cm), transferred to mould or cheese cloth, ends of the cheese cloths fastened and hung, assumes spherical shape, cut cubes into two, salted with coarse salt (size of rice grains) up to 6%. After 12 hours salted on the other side. The cheese should remain on the table and the curd for 8-15 days for the development of the typical microflora of feta cheese. Ripening is done in underground room with sufficient humidity to prevent evaporation and loss of weight. With sheep milk the yield is 28-30%.

National Cereals Research Institute:

The National Cereals Research Institute is located across the road from the university farm just like Rampur Agricultural Station. A gene bank is maintained for crops.

Milk Sheep Breeding Station, Aghios Mamas.

One thousand ewes milking facilities, Chios and Kymi breeds of sheep, two milking parlours of 48 (2x24) units. There was no body who could speak english and none of us could speak Greek. However, we received some valuable information about the performance of Chios and Kymi breeds of sheep and the farm records. The Chios is larger in size, more prolific and higher in milk yield than Kymi.

Artificial Insemination Center, Dávata, Thessaloniki

Insemination is done in horse, cattle, goat, sheep and pig. Breeding bulls, rams, bucks, boars and stallions are maintained at the farm. They collect and process the semen in the farm laboratory. They have automatic straw filling machine (0.5 ml straws). They have their own liquid nitrogen plant.

Livestock Research Institute Giannitsa:

We met Mr. George Gabrilides, Director of the research station. The farm maintained 2500 heads of animals, mostly cattle, sheep-local and exotic, swine-Landrace and Yorkshire, rabbits and chinchilla. Research work with furbearing animals is conducted. A wild cattle, Grey Steppe, was maintained at the farm to conserve native breeds of livestock. This was very resistant to the disease. In sheep milking flocks of Chios, Karagovniko sheep are maintained.

This was the biggest farm in Greece with 1000 acres of land and grew most of their feeds and fodders.

We started for Metaora in the morning. We ate our lunch at Larissa. On the way to Kalambaka flocks of sheep and goat were seen. Stayed in Kalambaka. We visited Meteora monasteries. Monasteries were built on the top of hills and nets were used to lift people and goods.

Village Cheese Factory:

Visited the mountain village, Metsova, where a cheese factory is established. Metsovo is famous for making and export of cheese. The village is about 1700 meter from sea level. We toured the cheese factory, although we had linguistic problem.

On the way to Athens, we stopped at the Trikala flokati factory and I purchased a souvenir we arrived Athens at about 8:30 p.m.

Because of the sudden death of Dr. Nicholas Drouliscos, a good friend of our Animal Science Advisor, the tour was unscheduled in Athens. We visited National Archaelogical Museum and Acropolis of Athens. We collected some seeds of legume shrub, Medicago arborea, that was grown all over the Acropolis of Athens.

Italy (19-27 June 1983)

We left for Rome early in the morning by Alitalia. Arrived Rome at 10:00 a.m. local time. We travelled by airport bus from Rome airport to Rome bus terminal, then we walked to the adjacent Rome central railway terminal and rode the train to caserta about 200 km from Rome.

Buffalo farms Jemma Farm:

We visited Italian Buffalo Breeders Association's office and the officials were kind enough to arrange an interpreter, Signorina Rosa.

We visited Ugo Jemma Farm, the biggest buffalo farm in Italy. The farm owned 1800 buffalo cows and milked 800 cows. The farm produces sufficient alfalfa, maize, barley to supply the fodder needs of the farm. The farm owned 170 ha of land.

Calves are allowed to suckle their mothers for 1-2 days and fed additional colostrum for 5-6 days. Cows are used to suckle four to six cow calves at once as the cows' milk is less valuable than buffalo milk. The high producing buffaloes (10 liters and above) were kept separately from medium and low producers (5-7.5 lits). High producers were fed 20 kg of silage, 4 kg of concentrate (16% C P) 1 kg straw and 3 kg of alfalfa along with some brewer's grain and cottonseed. The milking parlour was excellent one with 24 stalls. Everything was mechanized in this farm. They had their own AI lab facilities. They were also trying embryo transplant.

The farm operates a cheese factory. All the milk produced in the farm is processed into Mozzarella cheese used in pizza making. The cheese yield from buffalo milk is 22-25%. The whey is also used for ricitta cheese making.

We visited several small buffalo farmers. The first farmer we visited was Mr. Petrella of village Borgo Apio near Caserta. He owns 5 ha of land and 50 heads of buffalo. The buffaloes are milked only in the morning. The average production was about 8.00 litres.

The second farmer we visited was Gainto Petrella. He owns 10 ha land and 53 buffalo heads. The buffaloes are milked only once with average production of 7-8 liters. Alfalfa, maize, barley, oats are grown at the farm.

Luciano Amiliva's farm :

He owns 20 ha land and 50 heads of buffalo cow one milking per days. He raises the animals on pasture. He purchases concentrates only.

Alessandro Orlando Cheese Factory:

Mr. Orlando owns 150 buffaloes. All the milk produced is processed into Mozzarella cheese. With 100 kg of milk he was getting 25 kg of Mozzarella cheese and 5 kg of ricotta cheese.

While cows are the main milk producers in northern Italy sheep and goats and water buffaloes are prominent in central and southern Italy. There are varieties of cheese made from cow's, sheep's and goat milk besides Mozzarella cheese from buffaloes.

Italian Varieties of Cheese:

Cow's milk - very hard - Parmesan
semi-soft-provolone
bel paese
mozzarella
Sheep milk - pecorino
Whey cheese-ricotta

Mozzarella is made originally from the high fat buffalo milk is southern Italy, it is now made from cow milk all over Italy. The yield is less from cow's milk (11.5 to 15%) as compared to buffalo milk (35%). Mozzarella is an unripened cheese and can be consumed as soon as brined. It may be described soft and waxy in body food and agricultural organization, Rome.

We visited several officials at FAO. We met Mr. Bishru Dital. We also visited animal production division of FAO and had discussions with Mr. Bruno Rumich, meat and dairy service of FAO. Dr. A. Demiruren, sheep and goat speciali We also met Mr. Farlkner, the editor of the world animal review.

We went to chiase by train and visited Chianina cattle herd in Siena. The Chianina is very large breed of cattle. Previously chainina were used for draught in Italy but now they are used for beef purpose.

Conclusions:

The Damascus breed of goat is definitely a good breed which could be imported in Nepal. The only constraint, I feel, is that is may not be possible to feed the same amount of concentrate they are fed in cyprus. Otherwise the breed may be proved to be superior to Jamunapari in all respects in Nepalese conditions.

The Chios breed of sheep is also very good breed for introduction to Nepal. The Mediterranean buffaloes, that we observes at Jemma farm, were comparable to Murrah breed of India as far as the milk production is concerned. Because of the high level of management at Jemma farm, it may not be justified to say that the Mediterranean buffaloes are superior to Murrah. It is certain that if the Murrah buffaloes get the level of feeding management they would produce more milk than Mediterranean buffaloes.

As far as the milk of these animals are compared, the sheep milk contains almost double the solids than cows and goats' milk, The ability to make a kilo of hard cheese from every four liter of ewes' milk, makes it an extremely economi milk to use in cheese making compared with the ten liter per kilo usually require of the other two. This is one of the advantages of sheep, milk. It is believed that goat's milk is more acceptable to people who can not tolerate cow's milk. It has recently been shown that some patients, unable to digest either cow's ot or goats's milk, have had no trouble with ewe's milk.

The Chianina breed of cattle is a beef breed with very heavy muscle. They may not be used for draught purposes in the hills. The crosses can be used for draught purpose for Terai.

A REPORT OF AN OBSERVATIONAL TOUR

by
Jagat Lal Yadav, Lecturer in Animal Science
IAAS, Paklihawa Campus, Bhairawa

Summary and acknowledgement

An observational tour was organized by the Institute of Agr culture and Animals Sciences, Rampur (Chitwan). This tour began in June 3 and ended in June 28, 1983. It was financed by MUCIA project of IAAS, Rampur. Maheshwar Sapkota, Lecturer in Animal Science, Jagat Lal Yadav, Lecturer in Animal Science, Dr. Nagendra Sah, Lecturer in Animal Science, Bhadra Bilas Pant, Lecturer in Agronomy and Bhola Pokharel, Lecturer in Agriculture economics were in the group. This group of five faculty members from different departments of IAAS, Rampur was headed by Dr. Weslie Combs, Animal Science Advisor in IAAS, Rampur. This report of the tour has been prepared based on the personal communications with the farmers, officers and personal visits of those countries, i.e. Italy, Greece and Cyprus. During our visits we came in touch with a large numbers of farmers, visited Agriculture institution, Animal breeding and nutrition centre in those countries. This tour was highly educational if we think it in terms of studying the livestock and agriculture of Italy, Greece and Cyprus and their possibilities to be introduced in Nepal. The observations of livestock began in Cyprus and ended in Italy.

At the outset I express my heartiest gratitude and thank to the Dean of Institute of Agriculture and Animal Sciences for making such an extraordinary efforts to go on an observational tour to Italy, Greece and Cyprus. I also thank the United States Agency for International Development and MUCIA project for financial help for successful running of this observational tour. I also extend my heartiest thank to government of Italy, Greece and Cyprus for their appreciating co-operations. Thanks are also due to the farmers and officers of Italy, Greece and Cyprus who did not hesitate in giving informations about the livestock and agriculture there.

A Report of an Observational Tour to the Meditranean Countries

To,
The Dean
Institute of Agriculture and Animal Sciences
Central Campus
Rampur (Chitwan).

Reference: A Report of a Tour.

Honorable sir,

Here I would like to draw your kind attention to go through the report on the observation tour to the Meditranean countries especially Italy, Greece and Cyprus organized by the USAID financed/MUCIA project for a period of about 26 days i.e. from June 3 to June 28, 1983. This tour was completed by a team of five faculty members constituted by our Dean, IAAS and was headed by Dr. Weslie Combs, Animal Science Advisor in IAAS, Rampur, This tour was highly educational if we think it in terms of studying the livestock and their possibilities to be introduced in Nepal. The sum and substance of the tour goes as under:

On Friday 3 june, 1983 we departed from Kathmandu to New Delhi and stayed there at night in the Hotel Sidharth. We got up at about 3 in the morning. We caught up Kuwait Airlines and reached Kuwait at about half past eight in the morning. We waited there for about 2 hours. From Kuwait we landed on the Larnaca Airport in Cyprus, a beautiful island in the meditranean region. We were received by one of the faculty member of the department of agriculture Nicosia in Cyprus. The people of Cyprus were highly friendly to us and gave us a warm welcome. They were ready to render anytype of services we needed there. They took us to different centres of sheep, goat and poultry. From 5 June, 1983 to 7 June 1983 we visited a lot of private farm in Nicosia. Firstly, we came in contact with a private farm in Nicosia. George Auriass was the owner of this farm. He was rearing Chios-sheep and damascus-goat from a commercial point of view. He fed us with with varieties of informations in connection with his farm

and sheep, goat. He was keeping sheep and goat solely for milk production. According to him they get feeds at a very subsidized rate from the government of Cyprus. That is why this husbandry is quite profitable. The performance of these animals were quite satisfactory there. There are not much disimilarities in the climatic conditions of Cyprus and Terai region of Nepal, so they can be imported to Nepal to see their adaptability of Nepalese conditions and near these animals for milk production. Since, goat is called the poor's cow, such types of goat be recommended for the poor masses. On 7 June, 1983; we also went to see Agriculture Research Institute, Cyprus established in the year 1962. We mainly got acquinted with livestock production department as well as breeding farm. We got the following informations there: 1) Their main works were on sheep and goat. 2) They were having four main breeds of sheep viz a viz local one, fat tailed sheep, Chios from Greece; Friesian milk sheep from Germany. 3) They are crossing different breeds of sheep to develop a breed of sheep possessing the desired meat and milk traits. 4) They got 165 percent lambing. 5) Peak milk production is achieved in the 3rd lactation in case of sheep and goat, which are almost similar to that of cattle and buffalo. 6) They were also making a cross between the wild sheep of Cyprus with that of domesticated one.

In addition to the informations regarding animal husbandry, we were also exposed to important places of Cyprus and enjoyed their beauties. We also came in contact with their socio-culture environments. At length I can say that the tour was concluded nicely in Cyprus.

Trip to Greece

On 8 June, 1983 we left Cyprus and set out for Thessaloniki, Greece. At last we reached Thessaloniki and stayed at American Farm School. Our night was spent at that farm school. In the morning of 9 June, 1983, we toured to different disciplines of the American farm school. Firstly, we went to see departments of dairy. We observed Jersey and Holstein Friesian cows there. These two breeds of cattle were having extraordinarily outstanding performance. Secondly, we also saw modern indigenous potter

works there. Students were taught to make varieties of modern pot using the indigenous soil available at the farm school. Besides these informations we also came across nursery raising and others too. We were extremely astonished to see such types of practical oriented works there being taught to the students. These works were really useful to them.

In the evening of 9 June, we got our lodging transfered to a Hotel Queen Olga in the heart of Thessaloniki situated just at the shore of sea. We could view the nooks and corners of the city from this multistoried hotel. I had my long awaited desire to utilize every item of the tour organized in Thessaloniki. But as my ill luck would have been it, I fell ill on June 9 in Thessaloniki and could not share the please of the tour organized from June 10 to June 12 to visit different departments in connection with Animal husbandry in particular and sight seeing programmes in general. However, by the grace of almighty god, I got rid of my illness and participated in all items of the tour organized thereafter.

On 13 June, 1983 at about 8 in the morning we booked a mini-bus and went to see one of the biggest artificial insemination centre under the Ministry of Agriculture Greece. They had maintained a lot of cattle, horses, sheep and swine there. They used to send frozen semen of cattle to different AI centres, in Greece. They had automatic machine for sealing and filling the straw of 0.5ml semen containing about 25 million alive spermatozoa. They charged a nominal amount of money for the first service. If the cow did not conceive, the second and the third inseminations were given free of cost. Among the breeds of cattle were Brown Swiss, Holstein Friesian, Charolais breed of France. They took semen once a week from each bull and two ejaculations per bull. The semen of both the ejaculations were mixed together for further preservation. In addition to different breeds of cattle, they had also Friesian sheep about 180 rams in number. Their major works were concentrated on cattle and sheep. A part from these works, they had a little works on Saanen goat and Large White Yorkshire breeds of swine.

On June 13, 1983 also we went to see Animal Research Institute at Giannitsa, Greece. There were 205 animals of 10 different breeds of sheep. There were also a few short horned local breed of cattle which were primarily a wild type animal extremely resistant against various diseases. They are very agressive animals. They had also maintained 400 swine of different breeds. Among the breeds of sheep there were 1) Chios-sheep for milk purpose. 2) Karagöniko sheep. The characteristics features about Chios-sheep observed there were: 1) High milk production. 2) A lactation period of about 212 to 220 days and 3) Milk production was highest at about 3 weeks after lambing. In addition to the above mentioned animals, they were also rearing New Zealand White breed of rabbit. Now there is a felt need of the people that the increasing demand of meat can be fulfilled through the rabbit production on commercial scale. This Animal Research Institute had focussed their works on two technical aspects viz a viz 1) Breeding 2) Nutrition. They had a very successful Research works being performed by a team of highly experience nutritionist and breeders. They had owned 100 acres of land and it was biggest research farms both in the private and in the public sector.

On 14 June, 1983 in the afternoon we were called on by one of the faculty member of the Department of Animal Husbandry in the Aristotle University of Thessaloniki, Greece. No sooner we reached there than the faculty members came to receive us at the gate. They took us informations about researches being carried over there by a team of scientist. We were very much impressed to see their very successful co-operative research works. We were supplied with a lot of informations in connection with animal husbandry as well as economics. They presented us few books on animal husbandry and economics published by their departments.

On 15 June, 1983 we were ready to leave Thessaloniki. At about 8 in the morning we drove to Athens through surface. On the way, we stopped at Meteora and a sight seeing programme was arranged there on hills. We went to see an old church on high hills. This church was historically important in Greece. People from distant places and far away countries

were gathered there to see and study that historical church. Truely speaking, it was a worth-seeing divine place in Greece. Meteora although a small town but it has its own natural beauty for which this place was highly famous. There was always a mammoth gathering of people at church on hills in Meteora. At night we stayed there in a hotel.

At about 8 early in the morning we set out for Athens through surface. On the way we halted at one of the place called Metsovo. This place was famous for making cheese. A lot of cheeses of different varieties to see one of the Metsovo cheese factory. Greece processing huge quantities of milk for cheese each year. Of the milk processed for cheese were cow milk 15,00,000 litres, sheep milk 300,000 litres and goat milk 150,000 litres. After seeing that place, we left that place.

While we were driving to Athens on 16 June, 1983, we came across a carpet factory on the way. Export quality carpets were manufactured there. Few of our friends purchased it too. This was one of the best carpet factory in Greece.

At about 5PM in the evening of the same day we reached Athens and stayed in a hotel there. We stayed from 17 to 19 June in Athens. During our stay there different programmes were privately arranged to see varieties of places in Athens. Athens, the capital of Greece, is really a most beautiful place. It has its own colored and decorated natural and artificial beauty to be worth seeing. Those who visit Greece must spend a few days in Athens to enjoy its beauty. Athens was the end point of our trip to Greece. Thereafter we were prepared to leave Athens on June 20, 1983.

Trip to Italy

On 20 June 1983 we flew from Athens to Rome. From Rome we caught an express train and reached Caserta, Italy. Our nights were spent there in a hotel. At about 8 in the morning of 21 June we went to see a Jemma Buffalo farm at Pastorano, Caserta in Italy. On arrival there

the owner of the farm gave us a heart touching welcome and arranged for us to see performance of his buffaloes at his farm. He also hosted us a big lunch on his farm. We are really very thankful to him for warm welcome he showed towards us. He gave an introduction to us of his farm. He told us that it was the biggest private buffalo farm in Italy. There is no such big buffalo farm even in the government sector. Informations supplied to us were as follows: 1) It has maintained 1800 buffaloes of which 800 were in milking stage. 2) The average milk production of buffalo on his farm was 2000 litres in a lactation period of 270 days. 3) These buffaloes were housed, bed, bred and managed skillfully and farm was earning a lot of profits each year. 4) Intensive pen feeding was practised and there were no grazing of buffaloes on his farm. 5) Milk contains 6.5 percent butterfat. 6) Milk gave 20-25% Mozerella cheese per 100 kg milk in addition to 3 kg whey and 1 kg butter. 7) They have a calving interval of 14-15 months. 8) Age of buffalo at first calving was 3 yrs. 9) Birth weight of buffalo was 38kg which is more than anyother breeds of buffalo. 10) High, medium and low producers were grouped separately on the basis their production level; High producers were yielding 10-12 kg milk a day. The feeding schedule of high producers was green maize 20kg; Maize plus tomato silage and 4 kg concentrates containing 16 percent D.C.P. About a kilo of straws, 3 kg alfalfa hay and cotton seed 1 kg per animal. There was difference only in the level of concentrate so far as the feeding schedule of high, medium and low producers were concerned. They were doing machine milking of buffaloes there on his farm. 660 buffaloe cows were milked in about 3 hours i.e. 24 buffaloes at a time in 8-9 minutes circling.

This farm was one of the nucleus farm centre for buffaloes semen in Italy. They sent frozen semen to different places in Italy. This was the first laboratory of buffalo semen in Italy. On 22 June we visited a large number of private buffalo farms and mozerolla cheese factory in Caserta. Some of the farms visited were petrella buffalo farm at the same place; Luciano Angilina Buffalo farm and many others on the way. These farms were maintained by the individual farmers on small scale

for their own livelyhood. However, they had run the farm in profits and were very happy with that profession. Those farmers supplied us all informations about their farms. Wherever we went, they gave us heartly welcome and offered coffee at every places.

In the evening of 23rd June, 1983 we came back to Rome by train and stayed in Tiziano Hotel, Corso Vittorio Emanuele, 110 Rome. Next day, on June 24 we made a programme to visit the FAO of the United Nations. On our arrival there we were received by one of the officer working in Livestock Production Section there. We sought an appointment to meet few officers in the livestock section there. They took us to different units of the FAO office and equipped us with a variety of informations in connection with Livestock Development and food programmes. It was all about the programme on that day.

At about 10 AM of June 24, we went few miles away from Rome by an express train. It was a journey of about 5 hours to reach the Ciuffi cattle farm. On our arrival there we were received by two experts of the farm. Meat type Chianina breed of cattle were maintained on that farm. These were very healthy and heavy animals quite suitable for lean type beef. This breed of cattle was previously called the Royal cattle of ancient Rome. This was one of the strongest breed of cattle kept entirely for meat purpose. The body weight of cattle varied from 400 kg to 900 kg. It was all we visited there on that day. On our way back to Rome, we have had our lunch in a small restaurant. Few of our friends ate the delicious meat of that very Chinina breed of cattle which we had seed on Ciuffi cattle farm. In the evening we came back to Rome by train.

On June 25 we did not have any official programme to go anywhere; so we made our own individual schedule to go around Rome on own expenses. We went to see different places in Rome.

On June 26 we again made individual schedule to see Vatican city. It was Sunday and Pope was about to come out to deliver message of God to the people as usual. We waited for quite a long time to see him and ultimately our dream to see him came to be true.

As usual on Sunday, 26 June he came out at noon to meet with his disciples. There was a mammoth gathering of the people from nooks and corners of the world to listen to his divine message. Ultimately our tour ended with the godly message of Pope in the Vatican City. We came back to our hotel and started preparing for our return to Nepal.

On June 27 we had our flights by Japan Airlines. We reached New Delhi at 6 in the morning. We return to Kathmandu by Royal Nepal Airlines at 9.30 in the morning.

Conclusion

As a matter of fact, this observational tour to Italy, Greece and Cyprus was highly educational and we gained a lot of experiences in connection with the animal husbandry in particular and their socio-culture in general few of the livestock i.e. the Damascus goat and chios-sheep could be introduced in Nepal for the purpose of milk production. These animals could be tested for their adapatability, in Nepal and crosses can be made to introduce the trail of milk production in our indigenous sheep and goat. In Italy people are making Mozerella cheese out of the milk of buffalo and are earning a lot of money for their livelyhood. The farmers of our country are quite unknown of making such products from buffalo milk and as a result they are bound to sell their products at very nominal rate. If they get such training to make cheese out of buffalo milk, they can defenitely raise their standard of lively above the povertyline. At the end I can say that such an observational tour should be organized in every discipline of Agriculture and faculty members should be sent to study the livestock and agriculture in those countries so that they will be able to develop the livestock and agriculture of their country based on the knowledged and experiences gained in those couhtries.

Report on the Educational Tour of India, 17-29 June, 1984
"Livestock and Veterinary Section"
I.P. Dhakal, Assistant Lecturer, Animal Science

INTRODUCTION:

The "Educational tour of India" for IAAS faculty was one of the good opportunities provided by the MUCIA/IAAS project. Because of the similarity in culture and environmental effects, most of the technology of India can easily be adopted in both the agriculture and livestock fields of our country. Most of us have our Bachelor or Master's degree from Indian Universities and their systems of evaluation academic programs, etc. We can compare the development done by them in research, teaching and extension programs at present time. The Indian Universities are also very young; on an average 10 to 20 years old, just like our IAAS but the progress done by them is tremendous. So, this educational tour was very beneficial for IAAS in terms of recognition of IAAS products by the Indian Universities as well as for the study of the development of organizational set up and academic programs.

This tour was guided under the leadership of MUCIA team leader Dr. Herbert L. Whittier along with Dean Sinha and 8 IAAS faculty from different disciplines. It was organized very smoothly and systematically though it was a very tight and short program. We received nice reception and hospitality in most of the places. We did not feel any misunderstandings among the participants and the MUCIA team leader, so the cooperation done by the team leader and Dean Sinha is unforgettable.

Objectives:

1. To get acquainted with the livestock development programs in the Indian Institution dealing with teaching, research and extension programs.

2. To discuss breeding and animal health programs.

3. To get acquainted with the academic programs in different Indian Institutions

4. To know the experience of the Indian Institution in opening veterinarian college or Animal Science College to get ideas for IAAS

5. To discuss the recognization of IAAS product by different Indian Institutions.

Places Visited:

1. Indian Council of Agricultural Research (ICAR) - 18th June 1984.

2. Indian Agricultural Research Institure (IARI) Dairy Farm - 19th June 1984.

3. Andhra Pradesh Agricultural University (APAU) Veterinary College - 21st June 1984.

4. International crop research institute for semiarid tropics (ICRISAT) - 22nd June, 1984.

5. Sukhadia University Udaipur, Dairy Science College and Livestock farm - 25th June, 1984.

6. Gobind Ballabh Pant University of Agriculture & Technology (Veterinary College) - 27th June, 1984.

I.C.A.R. (18th June, 1984)

Director General of ICAR, Dr. C.P. Gautam addressed our team at Krishna Bhawan on the 18th June, 1984. Dr. Gautam mentioned history of ICAR and its role in the coordination of Indian Agricultural Institution.

ICAR was established in the year 1929 in pursuance of the recommendation of the Royal Commission on Agriculture 1926. The main functions of ICAR are:

1. To coordinate, aid and promote higher Agricultural Research and Education in India.

2. It provides incentives and leadership for the development of agricultural education in India.

3. To achieve uniformity of standards in agricultural education between different institutions.

4. To provide well trained man power needed to give a scientific technological base to India's Agriculture.

5. The council gives assistance to agricultural universities and colleges for their developmental programs such as, construction of laboratories, libraries, hostels, purchase of books and equivalants.

6. It also provides technical guidance in the development of curricular materials, revision of syllabi and production of books.

7. It is also responsible for organization of summer institutes and inservice training programs award of scholarship and fellows to the students, organization workshops, seminars, symposia and development of inter-institutional training programs, etc.

8. Provision of foreign exchange, foreign training of faculty members and acquiring the services of foreign experts are some of its other important activities.

ICAR set up under its aegis Indian Council of Agricultural education (ICAE) in the year 1951. The main functions are:

1. To coordinate agriculture education programs (including education in animal husbandry and dairy) so that uniform standards might be achieved throughout the country.

2. To prepare modern syllabi for adoption by various colleges.

3. To advise the state government on problems of agricultural education and to develop a concensus with regard to reforms that needed to be introduced in agricultural education.

The 1st joint Indo-American Team recommended the composition and functions of ICAE was also published from 1958 to 1964. With the re-organization of ICAR in 1968 the formation of the division of agricultural education in the ICAR, ICAE was replaced by the standing committee on agricultural education and animal science education. However, in 197 the standing committee of the agricultural education was discontinued and a combined scientific panel on agricultural education was formulated representing various disciplines.

Dr. Gautam has also mentioned there are 32 research institutes in different parts of the country. He also emphasized that agriculture University has intimate relationship with state government and state government has no right to interfere day to day program of University. So far as budget is concerned 40% from the central government and 60% from state government.

Deputy Director General for research was also present at that meeting. He emphasized collaborative research between the two countries.

II. IARI Dairy Farm (19th June, 1984)

Mr. Tej Ram the technical assistant of LARI dairy farm has guided us to the farm. He mentioned that this farm was in large scale in past days but nowadays all the processing plants are already transferred to Kernal dairy farm. This farm is maintained only to show the farmers and provide mild to the staff of IARI. This farm consists of 72 cattle but only 20 cows are milking ones. The cattle breeds are Holstein Friesian, H.F. x Sahiwal,; Jersey' Jersey x H.F.

The animals are kept in loose house mostly but thebreed-ng bull are confined in the barn . We reached there during milking period when the cows were at the milking barn. So far as the milk yielding capacity is concerned, they were having a crossed H.F. x Sahiwal cow, whose mild yield was 42 litres/day. Unfortunately we could not see that cow, which had died few months back. They have got expereince of H.F. cows yielding 30 litres/day; J x S gives 12 to 14 litees; J. x H.F. x Sahiwal gives 18 to 20 litres/day. According to Mr. Tej Ram 15 cows of that farm should be milked 4 times in a day.

III. A.P.A.U. (21st June, 1984)

The principal of veterinary college has arranged a meeting on 21st June at Rajendra Nagar. The APAU was started functioning on 12th June, 1964 with the following objectives:

1. To make provision for the education mainly for a rural people of the state in agriculture and allied sciences.

2. To promote research field and extension program in agriculture and agricultural production. The University has 3 facilities. (a) Agriculture (b) Veterinary and (c) Home Sciences and has 6 colleges:

Rajendranagar:	College of Agriculture
	College of Veterinary Science
	College of Home Science
Tirupathi:	S.V. Agricultural College
	College of Veterinary Science
Baptala:	Agriculture College

Veterinary faculty of APAU at Rajendranagar is providing Master as well PhD. degree. It consists of 15 departments which provide undergraduate and M.V.Sc. degree but only 6 departments is awarding Ph.D. degree. They are doing research in cattle breeding, poultry production, sheep production; Swine production, animal nutrition and feed technology, reproductive physiology and animal health:

(A) Cattle breeding: Coordinated research project on cattle is started with the objective of evolving a suitable breed of dairy cattle for the local Ongole cows by cross breeding with H.F., Brown Swiss and Jersey bulls for improved productive and reproductive efficiency.

Traits	Breed combination			
	Ongole	H.F.xO.	B.S. xO	J.x
1. 1st lactation yield (kg)	658	3093	2251	2223
2. Lactation length (days)	163	246	384	338
3. 300 day production (kg)	384	2390	1885	2011
4. Avarage daily mild yield (kg)	2.8	2.7	6.3	6.5
5. Butter fat %	8.45	8.77	8.70	8.85
6. Milk protein %	3.44	3.30	3.28	-
7. Reproduction				
a. Age at conception (days)	-	616	645	498
b. Age at 1st calving (days)	-	928	951	813
c. Average conception rate %	27	39	40	58
8. Growth				
a. Birth weight (kg)	-	28.1	27.2	21.8
b. Wt. at 12 months (kg)	-	164	154	142
c. Wt at 24 months (kg)	-	306	243	287

(B) Poultry Production:

All India coordinated research project on poultry for eggs was established at Hyderabad with the objective of evolving the strain of poultry with high egg production potential from the best available germplasm produced from within and outside country.

Several research work are carried out in the department of poultry science which is the 2nd oldest poultry science in the agricultural University of India as mentioned by Dr. P.B. Rao (Head Department of Poultry Sciences. In studies of hatchability in chicken it was found that egg shape but not egg size and a highly significant positive correlation with hatchability whereas in ducks the egg size but not egg shaped was found to influence hatchability. Hatchability was found to decrease by about 4.3% with an increase of one day in pre-incubatic period.

In Studies Broiler Production: Debeaking during 1st week resulted in better feed utilization compared to debeaking at a later age. It was observed that broilers could be raised on less than 1 sq. foot floor space and that the kind of litter material did not affect the growth of broiler.

Studies are now being carried out to find out the influence of different housing system on productive traits on chicken under tropical climatic conditions.

(C) Sheep Production:

The coordinated research project was established to evolve suitable mutton breed of sheep which can give higher return to the farmer by cross breeding local breeds, i.e. Mandya and Nellore with the exotic rams of suffolk and Dorset breeds.

Traits	Genetic Groups					
	Nellore (N)	Mandya (N)	Dorset XN	DXM	SuffolkXN	SXM
1. Birth wt. (kg)	2.73	1.99	3.36	2.73	3.45	2.73
2. Weaning wt. (kg)	12.2	9.7	14.9	2.9	14.9	13.5
3. 6 months wt. (kg)	17.1	16.1	21.3	20.7	19.4	17.6
4. Feed Utilization (dry matter gain)	4.83	4.57	4.93	4.43	4.04	4.58
5. Feed lot wt. at 6 months (kg)	25.5	23.7	40.1	29.1	29.9	25.7
6. Wool grading (gm)	-	350	490	400	290	370
7. Carcass yield %	53.9	57.8	58.5	55.5	55.1	54.0
8. Meat bone ratio	2.9	3.9	4.0	3.9	3.1	3.4

(D) Swine Production:

Large white yorkshire pigs from two different farms were obtained as the foundation stock for the all India coordinated research project on pigs. The production performance of the herd was improved by selective breeding for 5 generations. The birth wt. increased from 1.2 kg, 1.4 kg and weaning wt. from 7.2 to 13.2 kg. Pre-weaning and past-weaning daily gain also increased significantly. Age to reach to 70 kg body wt. was reduced from 300-230 days. The carcass length and meat to bone ratio of 5.3. The fat thickness, 74 cm carcass length and meat to bone ratio of 5.3. The generation wise performance of pig is presented in the following table:

Traits	Generations				
	1	2	3	4	5
1. Birth wt. (kg)	1.19	1.17	1.35	1.21	1.35
2. Weaning wt. (kg)	7.21	3.96	9.57	11.02	13.67
3. Litter wt. at weaning (kg)	60.7	72.9	66.7	84.2	90 1
4. Livability to 8 weeks %	78.6	88.7	90.4	91.7	94.4
5. Pre-weaning gain gm/day	108	139	147	175	220
6. Wt. at 22 weeks (kg)	28.7	30.9	39.4	34.0	45.7
7. Wt. at 32 weeks (kg)	36	58	63	67	75
8. Post weaning gain gm/day	171	292	319	331	336
9. Feed efficiency (feed/grain)	4.4	4.3	4.2	4.2	38
10. Age to reach 70 kg (days)	305	274	235	232	213

(E) Animal nutrition and feed technology:

Research on utilization of agricultural by products and industrial wastes for evolving economic ration was carried out. A number of by products were identified as useful for incorporation in animal feeds. Tamarind seed could be included either soaked or cooked in palce of maize without reduction in growth rate palatability and nutrient digestability. The seed hulls rich in tannins improve the utilization of protein.

De-oiled salmeal could be economically used in the rations upon a level of 10% for calver up to 5% for swine and from 10-15 for sheep and buffaloes without any bad effects.

It was found that sunflower seed cake can be advantageously used in concentrate feeds to the extent of 67% without effecting palateability and digestability.

Addition of water hyacinth hay was found to improve the feeding quality of paddy straw. Promising results were obtained with silage prepared with chopped sugarcane tops and dried poultry wastes.

(F) Reproductive physiology:

1. Some of the important problems studied relate to the breeding season, gestation period and parturition in Ongole cattle as well as infertility problems in cows and bulls. The incidence of testicular hypoplasia was studied in cross breed cattle.

2. The seasonal variation in semen quality of Thurparkar and Jersey breeds were investitated. The semen characteristics, preservation and A.I. in swine were reported for the 1st time in India.

3. Synchronisation of estrus in buffaloes by using cronolon and estrumate pessaries was reported. Some of the indigenous drugs for e.g. fertility pill (Aloes compound), fertivate (clomophane citrate), and prajana are are found to have no significant effect in inducing estrus in an-oestrous animals.

4. Studies in sheep production in relation to A.I. revealed that the average conception rate due to A.I. was 69.6% while the conception rate due to natural service was 75.6% conception rate was higher under farm conditions (69.6% than underfield condition (51.1%). Conception rate was found to be better in egg yolk citrate dilutor (71.2) than with egg yolk phosphate (67.0%).

(G) Animal health:

1. Incidence of various livestock disease of public health importance was surveyed in this state. 45% of the buffaloes 2.3% of cows end 2.2% of goats were found positive for brucelosis in sheep on incidence could be recorded. The level of incidence of cysticercus celluloses was found to be 3.38% among yorkshire pigs.

2. None of the 3 indigenous galactogogue e.g. Rasol, galogueand when administered orally produced any increase in the yield of cross-breed cows in their declining phase of lactation.

3. The efficacy of sulpha drugs was found to be enhanced when supplimented with chlor-letracycline in the treatment of coccidiosis in chicks.

4. Survey of infections bursal disease (IBD) and marek's disease was conducted in Andhra Pradesh. The incidence of IBD was found to be 6.3% and that of MD was 34.1% which was based on Argargel precipitation tests.

IV. ICRISAT (22nd June 1984)

ICRISAT was established in July 1972 at Hydrabad, India it is located 28 k.m. North west of Hydragad on 1394 ha. provided by the Indian government. It has established training programs since 1974 to improve the background and qualification of agriculturalist. Scientific in plant breeding, physiology, entomology, pathology, microbiology, Socio-economics, land and water management, Crop

production and management, genetic resources, farming systems and extension methods collaborate in ICRISAT's research and training programs.

We got a chance to observe farming system research, pulse, sorghum and groundnut programs, guided by a No. of scientists from the corresponding fields. Because of my interest in animal traction, I have mentioned importance of wheeled tool carrier.

THE ANIMAL DRAWN WHEELED TOOL CARRIER:

Animal drawn wheeled tool carrier is a multipurpose machine designed to perform agriculture operations and provide transportation where animals are the main source of the power. It can perform all operations that a tractor can. It has been designed to be pulled by oxen although it can also be pulled by buffaloes, horses, mules and camels.

Various models are now available, the Tropiculator and Likart are two examples. The Tropiculatar was designed by French Engineer, Jean Nolle and was the 1st wheel tool carrier successfully used at ICRISAT. The Likart is a newer model of wheeled tool carrier designed by the National Institute of Agricultural Engineering U.K. and Collaboration with ICRISAT.

USE OF THE WHEEL CARRIER:

1. Tillage
2. Planting and fertilizer application
3. Inter-row cultivation
4. Harvesting
5. Transportation
6. Land shaping.

ADVANTAGES OF THE TOOL CARRIER:

1. Reduces drudgery for the operator, who can ride on the machine instead of having to walk behind it.
2. Provides more uniform operation through good depth control; the more uniform draft that results is also less tiring to the animals.
3. Allows year round use because of its multipurpose capability.
4. It can be used as a cart for transportation.

DRAWBACKS OF THE TOOL CARRIER:

1. It costs more than the small farmer can afford, although these costs can be spread over many operations in larger areas.
2. Requires maintenance, specially of pneumatic tires that may not be available under village condition.

V: Sukhadia University Udaipur (25th June 1984)

The Sukahdia University Udaipur originally established as Rajesthan Argicultural University July 1962 came into being as a University of Udaipur in Oct. 1963 with several faculties. Semester system and external grading system of

examination was introduced in the agriculture and allied faculties from July 1964. The University has re-introduced the traditional system of examination in agriculture and allied faculties at undergraduate level from the session from 1982-1983. University has 3 functions, teaching, research and extension. Its teaching campuses are located at Udaipur, Jubner and Bikaner with the following institutions: College of Agriculture, College of Technology and Agriculture Engineering, Home Science, Basic Science, and Humanities, Dairy Science and College of Law are located at Udaipur, College of Veterinary and Animal Science is located at Bikaner.

College of Dairy Science:

Dr. M.S. Rathore informed me that the College of Dairy Science was established as one of the constituent college of Sukhandia University with effect from 14th Nov. 1982. B.Sc. (DT) classes were 1st started at in Rajesthan College of Agriculture, Department of Dairy Science from 18th Oct. 1978. The dairy technology program was started on the instance of the state government to meet the growing need of technically trained persons for developing dairy industry in the country. To give the best training to its students the college functions in an integrated pattern of teaching with teachers also drawn from the different units of the University. The college is headed by Dean which supported by qualified teaching, technical and ministerial staff. The objective of this program is to provide suitable training background for the job responsibilities involving.

1. Procurement and processing of milk.
2. Manufacture of various milk products including western and indigenous dairy products.
3. Sanitation and quality control of dairy plant including bacteriological and chemical tests.
4. Operation and maintenance of dairy plant equipment.
5. Economics of dairy plant operation.
6. Teaching, research, planning and extension work.
7. In plant training in commercial dairy plants.

I have seen a large dairy plant at this college but it is used only for teaching purposes in these days. According to Dr. Rathore, it was in the commercial scale in the beginning.

Mr. N.P. Lal, Farm Manager Livestock farm of Udaipur informed me that they are keeping large number of cattle, few buffaloes, and some sheep. They are having 150 cattle, out of them 52 are mild yielding cows, 2 dry cows and rest of them are heifers.

Lifestock farm consists of both indigenous i.e. Gair and Rathi as well as exotic breeds, i.e. S.F. and Red Dane. The exotic breeds are only 62%. The cross breeds of Gair X Red Dane, Rathi X Red Dane; H.F. X Gair or Rathi are present in the farm. So far as the milk production is concerned. the local breeds are giving only 3.5 litres/day where as the cross breeds are producing 5.3 litres/day on an average in the herd.

The buffaloes are very few in number containing only surti heifers. The sheep breeds are corridale, sonadi and their crosses.

VI. Gobinda Ballabh Pant University (27th June, 1984)

The G.B.P.U. of Agriculture and Technology is the 1st Agricultural University of India established in 1960. This is residential University having its own township with a common campus for all constituent colleges e.g. College of Agriculture, Home Science, Veterinary Science, Basis Science and Humanities and College of Technologies and Directorate and extensive central library with 2 Lakhs 30 thousand books, and Academic supports to the campus.

College of Veterinary Science:

Dr. I.P. Singh, Dean College of Veterinary Science addressed me at his office on 27th June 1984. He mentioned that College of Veterinary Science was named as the College of Veterinary medicine and all the disciplines were organized into 4 departments until 1976 then the college is named as College of Veterinary Science with 10 departments having 65 academic and 61 supporting personnels. College is equiped with modern facilities for teaching, research, extension and clinical programs.

(A) Teaching: Veterinary college is the 1st only college in the country where Hindi has been adopted as medium of education in B.V. Sc. and R.H from July 1971. However, an English section is run separately. They are running Internship program in the undergraduate level since 1980. This program is jointly financed by ICAR and State Government. The object of Internship is to provide extensive training in the farm management, poultry farming, piggery, sheep and wool Technology, Biological products, 1 chnology, Animal Reproduction, Health care and Hospital management.

Besides awarding undergraduate training the college offers masters Degree programs in 10 disciplines. The college also offers Ph.D. programs in 8 disciplines.

For the benefit of the students and practicing veterinarians emphasis is laid on production of books and laboratory manuals.

Dean Sinha has raised the question about the opening of Animal Science and Veterinary college at Nepal, due to the importation of exotic breed we are inviting large number of disease to our stocks. He emphasized that health is most important than management because the farmer can manage his herd but is unable to treat. In S.V. Sc. and A.H. course 60% of the course is in the health side and 40% in the husbandry side. He also advised to do a long National level seminar or debate between the livestock and veterinary people.

(B) Veterinary Extension: According to the Dr. H.C. Joshi Head of department, veterinary medicine, the veterinary extension program is important activities of college of veterinary science carried out by the department of veterinary medicine. This program is designed to transfer the new technology of the livestock production from the scientist to the livestock owners through the extension workers. The veterinary extension program covers 40 livestock and 41 poultry farms having around 900 animals and 80 thousand birds.

Veterinary extension program is designed to provide technical knowledge to the farmers at their doors in respect of better respect of poultry and dairy, husbandry, mixed farmings protection of livestock health, through timely preventive measures, sound herd/individual animal health cover and also to have feed back in order to formulate problem oriented research. The veterinary extension service are aimed to protect the health of livestock/birds through vaccination and regular deworming. Some of the extension activities are as follows:

1. Short term training program for young farmers:

The veterinary college organizes short term training program on poultry keeping, dairying and pig rearing 2 to 3 times in a year. These training programs are of 10 to 15 days duration and aimed to educate the landless/ marginal farmers educated unemployed youths and the poultry or dairy owners so that they can run a poultry/dairy/pig enterprize efficiently for their living. During this short term of 10 to 15 days, the farmers are given training in hygiene, rearing, vaccination, dehorning, management and disease control aspect of the livestock as well as poultry keeping.

2. Organization of kissan mela:

Department of veterinary medicine has established a livestock information centre for the livestock and poultry farmers to benefit the visiting farmers during kisan mela and on the other occasions as well as create interest among them for the livestock as well as poultry activities.

The farmer all over the country have a contact with the department through correspondence on their livestock problems. Such problems were discussed among the staff members throughly and a solution is seen to the farmers immediately. This type of correspondence helps in the uplift of the livestock.

3. Organization of Poultry and Livestock Symposia:

For proper dissemination of the achievement of research and to training the farmers, extension workers and research scientist together, the department organizes poultry and livestock farmer's symposia of 1 to 2 days duration regulary. 15 to 20 scientific topics having direct bearing on poultry and livestock production are discussed by the scientists engaged in research in the field oriented problems. The farmers are also encouraged to deliver lectures on livestock poultry problems, achievements and their experiences besides participating on the deliberation after each lecture.

4. Diagnostic Service:

A well organized diagnostic service is available in the department where clinical samples from various sources human and animal patients are received and analyzed forthe conformation of diagnosis. There are excellent facilities for all the tests including electro-cardio-graphy and clinical bio-chemistry on an average 60 samples of blood, urine, feces, serum and semen of human and animal are analysed daily.

5. Students poultry training "Earn while you learn" program:

The department of veterinary medicine had been encouraging the veterinary students to voluntarily take up poultry production project since 1974. Earlier only a few students use to participate in the project but during 1975-77, 110 (33%) students had taken up the project thus providing its popularity as a source of practical education as well as income. The participants get a clinical training in the field oriented poultry production as well as confidence to handle even the largest poultry farm in the country.

(C) Research:

An efficient practice of medicine is the back bone of animal health cover. Emphasis on cross breeding program has created greater demand for providing proper health to these valuable animals. The faculty members of veterinary college have so far published less than 900 research publications and get enough opportunity to participate in symposia and conferences in and outside the country.

Department of veterinary medicine has completed 3 research project recently and 4 projects are on progress. Most of the research projects are sponsored by G.B.P.U. whereas some of them are by ICAR.

Recently Dr. H.C. Joshi has completed two research projects.

1. Studies on chronic Bovine hematuria. This disease occur due to the intake of braken fern. Carcinoma develops in the urinary bladder and the animal dies. It can be prevented in the early stage by stopping the feed but in later stage there is no treatment.

2. Micro-filariasis in buffaloes and horses:

It occurs due to the bite of mosquitoes. There is nodule formation in different parts of the body ear sore and summer bleeding. The incidence has been recorded as 23.5% in buffaloes of Terai. This disease causes great economic loss due to reduced productivity and mortality. Therapeutic trials with various drug combination revealed combined therapy with Anthiomaline and unicarbazane as the treatment of choice for better recovery.

GENERAL IMPRESSION OF THE TOUR

1. A.P.A.U. is running a Rural Work Experience program. In this program each student will stay for a semester in the village along with the farmers and get oriented with the technical problems. 80% attendance is compulsory as well as a report should also be submitted at the termination of a semester.

2. In C.B. Pant University Library there is a system of providing books to both teachers and students in 50% subsidized rate. Each individual can purchase 6 books/year. Regarding the rent test books are also concerned a student can borrow 10 to 20 books at the rent of Rs. 2/- per trimester.

3. As mentioned by the Dean of Technology, GBPU there is no defect in the system of education but it depends upon how we are going to handle it. Nowadays, most of the Indian Institution are shifting from one system to another. For e.g. Udaipur is shifting from Trimester to semester system.

4. The animal drawn wheeled tool carrier a multipurpose machine using at ICRISAT is attractive to me because it permits tilling planting, fertilizing, weeding in greater speed and also provides transportation.

5. Student poultry training "Earn while you learn" program run by the veterinary college at Pantnagar is important for the students to acquire practical education in the particular field as well as income.

6. In most of the Indian Institution there is tremendous competition between the two disciplines or staff of the same discipline. in performing individual research as well as interdisciplinery research works. They are publishing large number of books, journals, laboratory manuals, class notes pamphlets, leaflets etc. in their corresponding fields.