

11

PA - APD - 964
ISA 64013

CONSULTANCY REPORT
ON
USA SHORT STUDY TOUR OF SENIOR INDIAN SCIENTISTS
CONCERNING PROJECT SPONSORED BY UNITED STATES
AGENCY FOR INTERNATIONAL DEVELOPMENT AND INDIAN COUNCIL
OF AGRICULTURAL RESEARCH

PROJECT NO. 386-0470
Agricultural Research Umbrella
Sub-project 5
CONVERSION OF BIODEGRADABLE ANIMAL WASTES FOR LIVESTOCK FEED

Submitted by

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Blacksburg, VA

November 10, 1989

I. Introduction

The main objectives were to study the adoption of biodegradable animal wastes in the U.S.A.; to study technology transfer procedures concerning feeding the wastes; and to review the training of scientists (long term) from India involved with the project.

The team of senior scientists consisted of Dr. D. K. Chaturvedi, Principal Scientist, Indian Council of Agricultural Research (ICAR), Krishi Bhoven, New Delhi; Dr. P. N. Langar, Professor of Animal Nutrition, Punjab Agricultural University (PAU), Ludhiana; Dr. Vida Sagar, Head, Department of Animal Nutrition, Haryana Agricultural University (HAU), Hissar; Dr. E. Sivaraman, Head, Department of Animal Nutrition, Kerala Agricultural University (KAU), Trichur.

Locations and persons visited are given in the attached itinerary, October 16 to November 7, 1989 (Annexe A). The consultant accompanied the scientists October 18-29 and November 2-7, 1989. Dr. V. K. Gupta, PAU and Dr. D. C. Sangman, HAU, trainees at University of Illinois joined the group October 19-26, and Dr. M. P. S. Bakshi (PAU) and Dr. K. Singh (HAU), trainees at Virginia Polytechnic Institute and State University, joined the group October 21-29, 1989.

II. Activities and Visits

The scientists were briefed concerning the overall scope

of the study tour. Prior to each visit the main objective(s) were discussed with the scientists. The consultant made the technical arrangements for all visits, including those not accompanied by the consultant, and personnel at Winrock International, Arlington, VA made arrangements for transportation and lodging. The consultant held discussions with the scientists regarding the visits in which the consultant was not present (Oct. 28 and Oct. 29-Nov. 2).

Discussions were held with the scientists concerning the progress of the subproject. Progress is being made at the centers in spite of the fact that two scientists from HAU and two from PAU are participating in the training program in the U.S.A. It was emphasized that persons participating in the training program are expected to work on the subproject upon returning to India.

A. Virginia Polytechnic Institute and State University

Dr. J. P. Fontenot, John W. Hancock, Jr. Professor of Animal Science, made arrangements for visits on campus and in the state. Discussions were held with the Indian scientists concerning past and current research at Va. Tech. The discussions concentrated on research on underutilized wastes (broiler litter, caged layer waste, cattle waste, seafood processing wastes and slaughterhouse wastes), but current research on other aspects of animal nutrition was also discussed.

The scientists were scheduled to visit with graduate students working under the direction of Dr. Fontenot, colleagues on campus and the trainees under the Sub-project (Dr. Bakshi and Dr. Singh). Dr. V. G. Allen, Agronomist and the consultant discussed an experiment on low input sustainable agriculture, at the site of the research.

The scientists toured the Anaerobe Laboratory, which is among the best in the world in this field. Research in this laboratory is with pure cultures of anaerobic bacteria.

A crab processor, who operates three processing plants in Hampton, VA was visited. Mr. John Graham, owner of Graham and Rollins, Hampton toured the scientists through two of his processing plants and made arrangements for a visit to his crab meal processing plant. Wastes have been obtained from that processor for research on processing and utilization of crab processing wastes at Virginia Tech. Mr. Graham discussed the value of crab waste and problems in its utilization. The processors in the area are required to pay for the crab meal processor to use the waste. In spite of this, at times the crab meal plant operates at a loss. Thus, he emphasized the importance of developing alternative processes for the waste.

A number of livestock producers in Virginia, who are feeding broiler litter, were visited by the scientists and consultant. Most of these were arranged by Dr. H. John Gerken,

Jr., Extension Animal Scientist at Virginia Tech. He accompanied us on most of the visits.

Mr. Charles Farriss, Rustburg, VA feeds mixtures of poultry and corn to stocker cattle. He deep stacks the litter and mixes it with corn at time of feeding. He has been feeding it for a few years, and indicated that this practice has increased his profit. Mr. Bob Huffman, Harrisonburg, VA produces litter from his broiler houses with 150,000 broiler capacity. He deep stacks the litter, includes it in his cattle ration and markets over 500 tons per year. Mr. Bob Hughes and Mr. David Hughes, New Market, VA have built a large storage shed (50'x200') with a capacity of 1000-1200 tons litter with assistance from the "Save the Chesapeake Bay" project. He feeds considerable litter to cattle and sells litter for \$8/ton. Mr. Andrew Young (Melrose Farm), Harrisonburg, VA ensiles broiler litter in an oxygen limiting silo and feeds it with corn grain to stocker cattle in drylot or on pasture. He has been feeding litter for over 20 years. His feed costs per pound of gain are 20 cents on pasture and 40 cents in drylot. At present cattle are selling for 70 to 80 cents per pound, so, feeding litter is quite profitable. Mr. Jim Crosby and son (Harry), Staunton, VA, are feeding turkey litter with corn silage to stocker cattle.

B. Regional Project in Animal Waste Utilization.

The Indian scientists and the consultant participated in

a meeting of the technical committee of the regional project, "Animal Waste as Nutrient and Energy Resources in Warm, Humid Climates", at Orlando, FL. Scientists from nine states were at the meeting. The meeting consisted of reports by the scientists on research conducted, problems and plans for future research. The project includes utilization as feed directly, nutrient sources for aquatic plants used for feed, methane generation and land application.

Part of the meeting consisted of visiting a project at Disney World, Orlando, regarding utilization of wastes for aquatic plant production and methane generation. The Indian scientists were given the opportunity to briefly outline the research in India under the Sub-project.

C. Auburn University, Auburn, AL.

Dr. Tom McCaskey, Associate Professor of Microbiology and Dr. B. G. Ruffin, Extension Animal Scientist, Department of Animal and Dairy Science, visited with the scientists and consultant on campus and accompanied them to visits with livestock producers in Alabama. Dr. McCaskey toured the scientists through his microbiology laboratory, and explained his research program and procedures used. Note: Some Indian scientists are scheduled for 5-month training under Dr. McCaskey.

Dr. B. G. Ruffin made arrangements for visits with livestock producers. Mr. James L. McGhee, Extension County Agent,

accompanied the group for most of the tour. Mr. Bill Sanders, Goshen, AL, feeds deep stacked broiler litter and corn (1:1), supplemented with vitamin A and an ionophore. He buys litter for \$10/ton. The mixture is fed to cattle (initial weight, 450 lb) with warm and cool season grasses. Daily gains are 1.5-1.75 lb. Mr. Terry Tillman, Troy, AL, a 200-head feedlot owner, has been feeding broiler litter for 15 years. He feeds a mixture of 35% litter, 15% peanut hulls and 50% corn. He adds 10% water at time of feeding. The cattle gain 3 lb./day. He also sells litter for \$20/ton.

Mr. Thomas Fuqua, Barbour County, feeds poultry litter to beef cows and stocker cattle. The ration for stockers consists of 50% grain, 40% litter and 10% peanut hulls. For beef cows the ration contains 60% litter, 30% corn, 10% peanut hulls and a small amount of hay if no grass is available. The stockers gain 1.75-2.00 lb/day. He has been feeding litter for 4-5 years.

General (Ret.) Henry Gray, Barbour County feeds deep stacked broiler litter to stocker cattle. The mixture of 60% litter and 40% corn is supplemented to winter grazing. Rate of gain has been about 1.9 lb/day. Rate of gain has increased dramatically since he started feeding litter 2 years ago. Mr. Jay Lee Alley and Mr. Lawrence Allen, Barbour County, feed deep stacked litter and corn to stocker (1000) and finishing (400) cattle. The litter is deep stacked under plastic. They use

other by products such as candy waste to mix with the litter.

D. University of California

The scientists and the consultant visited with Dr. W. N. Garrett, Chairman of the Department of Animal Science. Unfortunately, Dr. Ben Norman, Extension Veterinarian, was not available. Dr. Garrett indicated that many by-products are fed to beef and dairy cattle, but little use is made of animal wastes. The cattle industry consists of dairying, beef cow-and-calf enterprises and beef cattle feedlots.

Discussions were held with Dr. Richard Zinn, Animal Nutrition Researcher at the Imperial Valley Experiment Station, University of California, El Centro, CA. He conducted a tour of the research with feedlot cattle. He emphasized that by-products formed the basis of feedlot rations in the Imperial Valley. One of the main experiments concerned protein requirements of calves of different weights, and use of animal by-products (feather meal and meat scraps). He is also studying flaking with and without added moisture.

Dr. Zinn toured the group through a typical 10,000 head beef cattle feedlot, Mr. Jiggs Johnson, Manager. Two types of cattle, Holsteins and cross-bred beef steers are fed, starting with lightweight calves. By-products such as bakery waste, beet pulp and almond hulls are used.

Scientists and Extension personnel were helpful in

locating large dairies to visit in the Los Angeles area. A tour of the Excelsior Dairy, Chino, CA, was conducted by Mr. Bill Ziese. A total of 600 cows are milked in this dairy. Average milk production per cow is 23,000 lb. per lactation. By-products such as almond hulls and beet pulp are used in the ration. It is a very concentrated operation, with about 1200 cattle on 160 acres. Mr. Ed Stueve, Co-owner of Alta Dena Dairy, Chino, conducted a tour of their 10,000 cow dairy. The dairy is subdivided into units of 1500-2000 cows. This is the largest dairy in the world. The cows are managed similarly to cattle in feedlots, except they are milked twice daily. The ration contains by-products such as brewers grain and cottonseed hulls. Milk production averages 60 lb/cow per day.

ANNEXE A

17-OCT-89

ITINERARY

U.S. Study Tour
October 16-November 7, 1989

CONVERSION OF BIODEGRADABLE ANIMAL WASTES SCIENTISTS

Dr. Vidya Sagar, Prof. & Head, Dept. of Animal Nutrition, Haryana Agricultural University, Hisar, INDIA

Dr. E. Sivraman, Prof. & Head, Dept. of Animal Nutrition, College of Veterinary & Animal Sciences, Trichur, INDIA

Dr. P. N. Langar, Prof. & Sr. Animal Nutritionist, Dept. of Animal Sciences, Punjab Agricultural University, Ludhiana, INDIA

Dr. D. K. Chaturvedi, Principal Scientist, Indian Council of Agricultural Research, New Delhi, INDIA

October 16 (Monday)

Arrive Washington, DC (Dulles)

Flight: PA 061 1615 hrs.

Hotel: Highlander Motor Inn
3336 Wilson Blvd.
Arlington, VA
(703)524-4300

Two double rooms have been reserved in Dr. Sagar and Dr. Langar's names.

October 17 (Tuesday)

At Winrock International
1611 N. Kent Street, Suite 600
Arlington, VA 22209
(703) 525-9430

Contacts: Dr. Floyd Williams
Mrs. Surbhi Bhatt

WAAA

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10

October 18 (Wednesday)

9:30 a.m. Visit FDA, Rockville, MD

Contact: Dr. Kristie Smedley
Animal Nutritionist
Food & Drug Administration
5600 Fishers Lane
Rockville, MD
(301) 443-5362

Metro stop: Twinbrook. Walk towards Parklawn Drive or Fishers Lane.

1:30 p.m. Visit USDA/Beltsville

Contact: Dr. L.W. Smith
National Program Leader
Animal Nutrition
USDA/Beltsville
Bldg. 005, Rm. 206
(Rt. 1 - Baltimore Ave.
Intersection of Powder)

4 Dr Stylar

5 p.m. To Hampton, Virginia by car with Dr. Fontenot

Hotel: Hampton Inn
Hampton, VA

Two double rooms have been reserved, \$45 + tax.

October 19-22 (Thursday-Sunday)

Visit seafood processers and farmers feeding poultry waste and Virginia Polytechnic Institute and State University College of Agriculture and Life Sciences Blacksburg, VA 24061

Contact: Dr. J. P. Fontenot
John W. Hancock, Jr. Prof. of Animal Science
(703)231-5136

Hotel: Imperial Motor Lodge
Blacksburg, VA
(703) 552-4011

Two double rooms have been reserved at \$45.

October 23 (Monday)

Roanoke-Orlando, Florida via Charlotte, NC

Flights: USAIR 1801 1350/1431
 USAIR 1039 1520/1644

A mini-van has been reserved for pickup at the airport.

Hotel: Floridian of Orlando
 7299 Republic Drive
 Orlando, FL
 800-445-7299 or (407)351-5009

Four double rooms have been reserved in Mrs. Bhatt's name and guaranteed for late arrival on her credit card.

October 24 (Tuesday)

Participate in Regional Project on Animal Waste Utilization ✓
Technical Committee Meeting.

October 25 (Wednesday)

p.m. Orlando-Auburn, Alabama by car with Dr. Fontenot

Hotel: Best Western Hotel
 1577 South College
 Auburn, AL
 (205)821-7001

Four double and one single room reserved (confirmation #01029799) in Mrs. Bhatt's name and guaranteed for late arrival on her credit card.

October 26-27 (Thursday-Friday)

a.m. Visit Auburn University

Contacts: Dr. Thomas McCaskey, Prof.
 Animal and Dairy Sciences
 209 Animal Science Bldg.
 Auburn University
 Auburn, AL 36849
 (205)844-4160

Dr. B. G. Ruffin

October 18 (Wednesday)

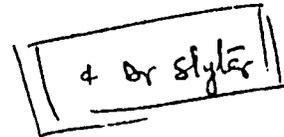
9:30 a.m. Visit FDA, Rockville, MD

Contact: Dr. Kristie Smedley
Animal Nutritionist
Food & Drug Administration
5600 Fishers Lane
Rockville, MD
(301) 443-5362

Metro stop: Twinbrook. Walk towards Parklawn Drive or Fishers Lane.

1:30 p.m. Visit USDA/Beltsville

Contact: Dr. L.W. Smith
National Program Leader
Animal Nutrition
USDA/Beltsville
Bldg. 005, Rm. 206
(Rt. 1 - Baltimore Ave.
Intersection of Powder)



5 p.m. To Hampton, Virginia by car with Dr. Fontenot

Hotel: Hampton Inn
Hampton, VA

Two double rooms have been reserved, \$45 + tax.

October 19-22 (Thursday-Sunday)

Visit seafood processors and farmers feeding poultry waste and Virginia Polytechnic Institute and State University College of Agriculture and Life Sciences Blacksburg, VA 24061

Contact: Dr. J. P. Fontenot
John W. Hancock, Jr. Prof. of Animal Science
(703)231-5136

Hotel: Imperial Motor Lodge
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Two double rooms have been reserved at \$45.

13