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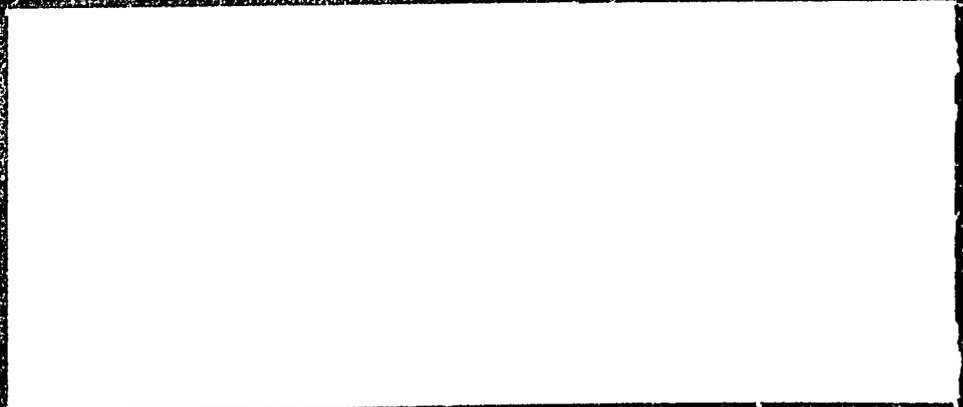
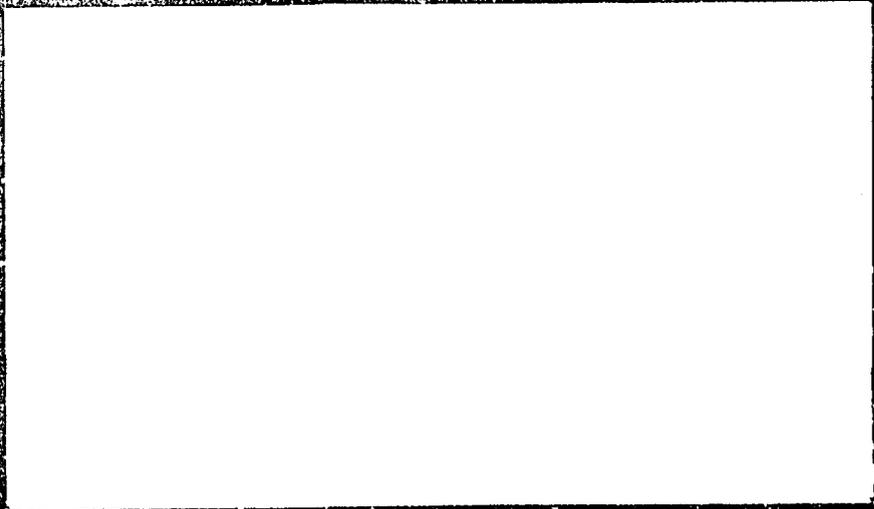
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LA PAZ, BOLIVIA

010/77

REPORT ON SHORT-TERM CONSULTATION

by

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April, 1977

Report on Short-Term Consultation
under Contract GOB/AID 511-96
by
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Topic: Animal Production

Purpose of Consultation: The Consultant will assist the Ministry of Agriculture and IBTA in an evaluation of the current beef and dairy research activities of the Intermountain Valleys and the lowlands of Eastern Bolivia, and identify improvements therein which should be sought to insure appropriate emphasis on increasing the efficiency of beef and milk production within the small farmer sub-sector. The research and training activities related to beef and dairy problems of other departamental entities and universities, as well as those closely related entities within the responsibility of IBTA, will also be reviewed. At the university level, the issues of curriculum and laboratory development will also be addressed.

PRESENT STATUS

Department of Cochabamba

IBTA Stations

Estación Experimental Toralapa - No cattle ^{research} ~~is~~ ^{are} presently being conducted or anticipated at this station. However, experiments with sheep are scheduled soon in which digestibility of three forages will be determined. These values will, of course, be applicable to cattle as well as sheep.

The laboratory associated with the new sheep facility is not well equipped at the moment. Equipment in other laboratories at Toralapa could probably be shared when electricity becomes available.

Overgrazing appeared to be quite severe in the surrounding area. The

only grass species remaining in any significant amount were very fibrous and identified by Station personnel as Festuca orthofila and Stipa ichu.

Estación Experimental Chipiriri. Beef cattle experimentation is just getting underway with the overall objective being to fatten cattle from the Beni for the Cochabamba market. Approximately thirty head of cattle were on hand being used to evaluate recovery of a stylosanthes variety after intensive short-term grazing. Station personnel indicated that cattle investigations would include evaluation of other forage species and studies on the influence of grazing density. Station lands presently under-utilized due to shortage of labor. No laboratory facilities were evident.

*why doesn't
it grow
completely
normal.*

Universidad Boliviana San Simón

The cattle research here has been confined to the dairy sector and apparently to whatever aid in facilities and operating funds is supplied by the Swiss group, Cooperación Técnica Suiza (COTESU).

Facilities for the dairy herd appeared adequate, although they are not the latest in mechanized technology. A bull stud and semen handling facility are under construction and will likely be very well equipped. Furthermore, an excellent forage laboratory has been built and equipped by COTESU.

The dairy herd consists of approximately 60 cows, primarily Holstein and Brown Swiss, and is used almost exclusively for student instruction. Research with this herd is difficult because it is used as a source of funds by the administration. Hence experimental treatments which might

be detrimental to milk production are not approved. Any research effort must be supported by profits from the herd. Some experiments, primarily substitution of certain concentrate feed ingredients, are conducted within these constraints, however.

The forage analysis laboratory is used for teaching, research, and extension. Even with this multi-purpose mission the facility appeared to be under-utilized..

The COTESU project which has supported the construction, maintenance, and operation of these facilities will apparently end this year and not be renewed. The successor project will emphasize farm machinery and seed stocks. This is consistent with University plans for new emphasis on alfalfa breeding and selection.

Ing. Franklin Lastra B., Head, Dept. Producción Animal y Zootecnia, stated that animal science is now offered only as a minor within the Facultad de Ciencias Agrícolas y Agropecuarias. Plans are to initiate and animal science curriculum within two years. Ing. Lastra made a strong plea for well-trained, foreign professors to come and teach at the University under multi-year contracts with some kind of subsidy in addition to the admittedly low salary the University can provide.

Pairumani

This Patiño Foundation dairy, established over 50 years ago, has obviously been largely responsible for the quality Holstein cattle in the Cochabamba Valley. Though the facilities may be declining from their pri-

me, the cow herd appeared in very good condition. A very thorough set of records is apparently being maintained on the dairy herd. It is reported that Pairumani is also engaged in corn breeding.

Private farms

Four farms were visited, ranging in size from 4 cows to 125 cows. Milk production per cow reported by these farmers was positively correlated with herd size. The small herds are further characterized as requiring a large amount of labor per cow, supplied by the farmer's family, for hand milking and moving cattle back and forth among pasture, water supply, and stable. The largest farm, on the other hand, operates on a totally mechanized soil-age system, achieving extremely high production rates from the land. Manure is the only fertilizer input on three of the farms. This practice does not appear related to farm size. Alfalfa and corn production are common to all farms. Other forages used are Dactylis glomerata, Festuca spp. (probably F. arundinacia), and Avina sativa.

From this it appears like
either believing that
small farms are not worth
the effort.

Department of Santa Cruz

Centro de Investigación Agricultura Tropical

Saavedra. The Brangus and Brown Swiss cattle herds are presently in a state of low production. Although the Brangus herd has been maintained as a closed herd at this site for 10 years, there are no reliable records available. Plans are to initiate a sound record system, cull this herd heavily on fertility and weaning weight, and open the herd via artificial insemination.

The Brown Swiss herd was described as containing animals of bad temperament and having an extremely large variance in production among animals, making this herd practically useless for many kinds of experiments.

A forage evaluation program is being initiated with agronomic observations on a number of grass and legume species. This work will be expanded to quality evaluation by in vitro digestion procedures and grazing experiments with promising species mixture.

British Tropical Agricultural Mission

This consulting group, which will eventually reach 10 technicians, is working on a one-to-one basis with counterparts in CIAT. The impetus provided by this group is responsible for some of the new research programs being initiated at Saavedra. Completion of the total group is being delayed at the request of CIAT, since they are unable to fund the entire counterpart contingent at this time. The research plans of this group in the cattle-forage area appear more than adequate.

Cooperación Técnica Suiza

The Swiss mission is in the process of establishing a project aimed at making available genetically superior Brown Swiss and Holstein cattle. Males will be sold at 8 months of age for \$b 6,000 and females at 27 months for \$b 12,000-13,000. Management is based on a total confinement system. Forages presently being utilized do not appear to have sufficient quality to sustain high milk production.

Universidad Boliviana G.R. Moreno

Here, as at Univ. Bol. San Simón, animal science is not offered as a major course of study. In this case it is an option in Carrera de Medicina Veterinaria y Zootecnia which still contains approximately on third veterinary courses. Both Dr. Raúl Grock, Decano de la Facultad de Veterinaria y Zootecnia, and Dr. Andrés Parra, Jefe, Departamento de Zootecnia, independently expressed concern over the lack of personnel within their faculty qualified to teach animal science courses. Both also echoed the plea heard previously for outside support for qualified foreign professors in animal science under multi-year contracts.

The Univ. Boliviana G.R. Moreno operates a demonstration dairy and swine farm known as El Prado. The functions of this facility are teaching and extension. A rather detailed set of management records is being maintained on the dairy herd in an effort to reduce health problems and increase production. On this farm, also, the emphasis is on a silage system of forage supply.

Farm visit

Since time was short, one farm in particular was recommended to us because if its success using a unique combination of practices. It is a large dairy farm (100 cows in the milking herd) using almost exclusively small practices, i.e., (a) Criollo herd upgraded with Brown Swiss semen - (b) hand milking only once daily followed by immediate sale (c) calves nursing at each milking throughout lactation (c) cows grazing improved

pasture (e) silage and soilage produced with small stationary chopper located at the milking barn.

Department of the Beni

Universidad Boliviana M.J. Ballivián

Instituto de Investigaciones Agropecuarias. Although this department of the University is "chartered" to receive 5% of the total University budget, I could find no evidence that it receives any funds for research. Some testing of efficacy of imported rabies vaccines is conducted under the auspices of the Institute. In addition, some of the sales money from the cow herd is spent for maintenance, but none for research.

The University cattle number approximately 4300 head with the purebred cattle (260 head of Nelore, Santa Gertrudis, Charolais and Brown Swiss) maintained at the University site (2 km north of Trinidad) and the remainder at 6,000-hec. ranches known as San Carlos and Monte Carlos. The purebred cow herd is extremely variable as to body conformations and apparent vigor. This is also true of the mixed herd at San Carlos, which is predominantly of Nelore breeding. At the San Carlos ranch, cow nursing calves were obviously in poor body condition.

The mixed herd has only within the last year come under any kind of planned management. A report for the year 1976, describes initial conditions of almost complete chaos. Objectives of the present management are to bring calving rate to 80%, reduce death to 20% and increase growth rate to provide a 200 kg. carcass at two years of age. A considerable

hew.

8.

investment in facilities is anticipated. Notable progress toward the stated objectives was reported. ?

University teaching. Until the present term students had only the kind of option already described for Univ. Boliviana G.R. Moreno. The University (Ballivián) is now being reorganized so that students beginning this year may select one of four courses of study, i.e., tropical agronomy, forestry engineering, veterinary science, or animal science. According to University administrative officers, enrollment is approximately 200 with at least 34 instructors.

The laboratory facility for animal science teaching is not well equipped, and equipment on hand is generally non-functional.

The University also conducts extension shortcourses and provides information via print, radio and, soon, television on a variety of subjects including foreign languages.

Detailed plans are completed for a major expansion of facilities including utilities and roads, classroom, administrative and laboratory buildings and dormitories. Funding is to come from sale of approximately 80% of the land at the present site. This transaction awaits approval by President Banzer.

A few instructors indicated that they need more training in order to achieve personal satisfaction with their performance, especially in the area of research. It is my impression, based on general attitudes that professional pride among much of the faculty must be quite low.

Private farms

Impressions based upon visits and aerial views of the Beni.

- a. Nelore is the prominent breed used for upgrading Criollo cattle.
- b. Overstocking is common, leading to invasion by undesirable species.
- c. In areas where cattle congregate, soil nutrients have increased sufficiently for spontaneous initiation of common bermuda sward when cattle are removed for a short period.
- d. Forage quality appears to be of no particular concern to cattlemen.

RECOMMENDATIONS FOR RESEARCH AND EXTENSION

Department of Cochabamba

The lower milk production reported by campesino dairymen may stem from inadequacies in feed supply, management ability, genetic potential of the cattle, or some combination of these factors.

An increased production of the basic forage crops, corn and alfalfa can be considerable benefit to the campesino. Two routes to increased production are immediately obvious, i.e., improved varieties and improved soil fertility.

- a. The Univ. Boliviana San Simón is initiating an alfalfa breeding program for various micro-climates of the Cochabamba Valley. A rhizobia research program and manure fertilizing program should be carried on simultaneously with the breeding project, using some type of factorial or split-plot experimental design. Dr. T.R. Patterson with the British Mission in Santa Cruz is presently receiving assistance in rhizobia investigations from Brazilian researchers and would be a source of information.
- b. Although a corn breeding program is reportedly being conducted at Pairumani, varieties of this species too may need to be tested throughout the Valley. Here again, variety testing should be accompanied by manure application.
- c. The Univ. Boliviana San Simón dairy is using a manure composting system which is apparently considered an efficient process. If there are unknown aspects of the system, however, these may need

to be investigated either before or in conjunction with the insertion of the manuring treatment into the alfalfa and corn breeding programs.

At least some of the components of improving the genetic potential of campesino dairy herds are already present, i.e., the bull stud and semen handling facility under construction at Univ. Bol. San Simón and the superior bulls at Pairumani. Other parts of a successful artificial insemination program must yet be devised.

1. Delivering information to the campesino to achieve acceptance of the program and education in its use. *et al.*
2. An insemination delivery system where telephone communication does not exist. Possibly information on cows in heat could be relayed via the milk truck driver.
3. Subsidies to bring the cost per insemination down to approximately \$2.

It has been suggested that some of the management problems of the campesino dairymen can be overcome by concentration of cattle into feeding-milking cooperatives. The individual dairymen would receive credit for feed delivered and milk produced and be charged for labor and feed. While this system would provide a number of gains of efficiency, its social acceptability is probably questionable.

As has already been implied, new information, varieties, and methods will be of little value without functioning delivery systems.

In the Chapare, crops such as mandioca and bananas as well as forages are reportedly available for fattening cattle from the Beni. Quite likely they would produce much higher rates of gain than forage alone. *Quite likely they would produce much higher rates of gain than forage alone. see above.*

If the economics of feeding crops of higher digestible energy, e.g., bananas and mandioca, to cattle have possibility of being favorable, trials should be conducted to measure the feed conversion rate and thus allow a more precise economic analysis.

Rainfall records from the station at Chipiriri indicate that sufficient moisture for plant growth is available for the entire year. This fact coupled with high cost of fencing dictate that only continuous grazing, possibly at three of four stocking rates, should be used to test promising forage species.

The forage (and other feedstuffs) analyses laboratory established by COTESU must be maintained if at all possible. This facility, along with the cattle facilities close at hand, will provide ~~an~~ excellent physical nucleus for the initiation of a strong animal science department.

Department of Santa Cruz

Foreign technical assistance in cattle research appears to be quite adequate in Santa Cruz. I do not know whether the stated objectives of the British Tropical Agricultural Mission are concerned with the small farmer. The individual members of the Mission, however, do appear quite aware of the problems faced by the small farmer.

Why didn't he find out?

Department of the Beni

The following stages of research are suggested as a guideline to provide information on a major cattle problem in the Beni, i.e., insufficient feed supply.

Phase 1. Acquisition of basic data

- A. Percentage of land area covered by water during the rainy season.

What is its rate of progression and recession with time? This data may be readily available through earth satellites - *info is avail.*

*did the country
with cattleman
own!*

- B. Soil nutrients. Is there a difference between soils at higher elevations and those at lower elevations? Is there a difference between areas where more desirable and less desirable species grow? The answers to these questions dictate the type of experiments conducted in later phases of research. *some info is available*

- C. Prevailing stocking rates, calving percentages, death losses, carcass weight marketed for land areas definable by satellite.

Phase 2. Manipulation of the sward (may overlap with Phase 1.)

- | | | |
|------------------------------|--|----------------------|
| A. Application of herbicides | | "small" plot studies |
| B. Application of fertilizer | | |
| C. Introduction of legumes | | |

While one or more of these may presently be considered totally unfeasible, economically, the information is necessary to an intelligent solution to the problem.

Phase 3. Continuous grazing, stocking rate experiments based on data from Phases 1 and 2.

Phase 4. Economic analyses based on all available data.

Investigations into the mineral deficiencies of cattle in the Beni, currently being initiated by University of Florida researchers, should be encouraged. While mineral deficiencies are basically problems of the soil, they are most efficiently remedied by direct supplementation of the cattle.

Cattle herds of the Beni appear to be moving rapidly toward to Nelore breed. Since the criollo undoubtedly has some desirable characteristics to offer, a purebred Criollo herd of animals selected for conformation and temperament should be established soon lest the more desirable individuals of the breed disappear entirely. It has been suggested by Dr. John Wilkins, of the British Mission, that Criollo-Nelore crossbreds may have the calf-hood vigor often lacking in purebred Nelore. Thus, a carefully planned crossbreeding program between these two breeds appears in order.

Regarding the purebred cattle herd being maintained at the University site, the Charolais and Brown Swiss cattle should be culled due to low numbers and apparent loss of vigor in this climate. If the Santa Gertrudis herd is to be retained, new blood should be introduced through artificial insemination.

The proposed importation by the University of significant numbers of the three major Zebu breeds must be seriously questioned in view of the other research priorities in the Beni. In order to supply good quality bulls to ranchers of the Beni, the objective of the importation, a few

outstanding Nelore bulls might be acquired to be bred to good Nelore females which the university already owns.

Rabies and foot and mouth vaccines reaching the Beni are reported to be consistent in quality. In order to obtain consistent, high quality vaccines, a production facility may have to be established as a subsidiary of Universidad Boliviana M.J. Ballivián.

Should say low quality?

RECOMMENDATIONS FOR TEACHING

Among the three universities surveyed, none had a functioning animal science department, although they do have animal science sections within other curricula. The Univ. Boliviana M.J. Ballivián ^{where is it} is presently establishing an animal science department and curriculum, while the other two universities are contemplating such a move.

At all three locations, however, the staff is insufficiently trained to provide a strong animal science curriculum. At each location, the administration asked for foreign assistance to train staff members and to obtain one or two foreign professors to teach animal science courses while the staff is being trained. Although the diplomatic atmosphere created by North American professors teaching in South American universities is thought to be quite perilous, the need for professional assistance is sufficiently great that a workable solution must be sought. For example, it is entirely possible that a sufficient number of trained Bolivians, now living in other countries, could be employed. Salaries offered, of course, would have to be much higher than are now commonly paid by these universities.

who says so?

Also the need for assistance can be reduced by centering animal science training at one location. The ability of the Bolivian University system to support more than one strong animal science department in the intermountain valley and lowland region must be carefully scrutinized. The need, in terms of numbers of students, must also be examined. From the standpoint of climate and present facilities, Univ. Bol. San simón is the logical location for a single animal science department.

The distribution of my time allowed a much more through examination of the situation at Univ. Bol. M.J. Ballivián. The size of the faculty in relation to student enrollment appears extremely disproportionate. Cutting the faculty by 60% and distributing the salary-saving to the remaining faculty may provide a much needed boost to professional pride and, hopefully, to quality of teaching.

General Comments

With time I have become more convinced of a conclusion reached earlier in my tour, i.e., that rapid progress in solving those problems which can be attacked by teaching and research will not come until adequately trained ^{Bolivian} nationals are on hand to take the lead. And this, apparently, will not happen until salaries are sufficiently high to bring them home from other countries.

--0--

The present regulated one-price cattle economy appears to be a major deterrent to a cattle industry which could expand to the point of providing

significant export revenues. Dr. John Wilkins has suggested that sufficient incentive could be given to the cattle industry, while still maintaining much of the price stability sought by the government, by maintaining present price restrictions on the low quality beef most common in the market while freeing the price of higher quality beef. Such a scheme, of course, requires a grading system for that beef purporting to be of higher quality. Just how meat grading might fit into the present marketing system would need to be determined.

Acknowledgements

My deepest gratitude to Dr. Winston Suárez Araúz, whose assistance provided a view of the Bolivian cattle industry not otherwise possible. Also my thanks to those listed in the appendix, who provided information and assistance for this report.

Appendix

Julio Almaza, Dairy farmer, Cochabamba

Ing. Julio Alandia, Dept. Chief, Agricultural Ministry, Cochabamba

Dr. Carmelo Aponte, Director Instituto de Investigaciones Agropecuarias,
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Antonio Cammarata, Architect, Univ. Bol. M.J. Ballivián.

Ing. Edgar Castro, Manager, University Dairy, Univ. Bol. San Simón,
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Claudio Corrales, Dairy farmer, Cochabamba

Dr. Kenneth Ellis, CID, Cochabamba

Alfonso Gondeck, Dairy farm manager and co-owner, Cochabamba.

Dr. Raúl Grock, Decano de Facultad de Veterinaria y Zootecnia, Univ.
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Ing. Hernan Gonzales, Estación Experimental Chipiriri

Ing. Saúl Herbar Camacho, Agricultural Ministry (Quechua translator),
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Dr. Robert Rivero, Lawyer and dairy farmer, Cochabamba

Dr. Carlos Rodal, Profesor de Reproducción, Univ. Bol. M.J. Ballivián
Melchor Rychen, Director, COTESU at Todos Santos, Santa Cruz.

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Dr. E. Boyd Wennergren, Chief of Party, CID, La Paz

Dr. John Wilkins, British Tropical Agricultural Mission, Santa Cruz

Dr. Luis Zambrano, Vice-Rector, Univ. Bol. M.J. Ballivián.