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LIVESTOCK PRODUCTION TRAINING IN DEVELOPING COUNTRIES

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Problems in Production

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Experience at CIAT leads our training group to place emphasis, in beef cattle production training, on management, the soil-plant-animal complex, and communication skills. It is in these areas of major importance, in increasing livestock production, that recent university graduates are least competent. This is especially true of veterinarians in Latin America who make up the majority of those responsible and available for work in improving livestock production.

In support of this conclusion is the categorization by Mullenax and Norman (1968) of the various losses from 200 Colombian ranches and 30.000 animals over a 2-year period.

FACTOR		Relative Importance		
1.	Poor management	Greatest single factor		
2.	Low reproductive rate			
	poor management poor nutrition brucellosis bull infertility	50% of losses 50% of losses at birth 15% of losses in reproduction 5% of losses in reproduction		
3.	Diseases, parasites and infections in nursing calves	15% to 20% loss of calf crop		
4.	Weaning to market: (poor nutrition and management, parasites, diseases, etc).	6% of this age group		

Factors Affecting Beef Cattle Production in Colombia

Type of loss	Percent of total	
Reproductive losses Losses from birth to weaning Losses from weaning to market Losses in production at all ages	50% 15% 5% 30%	

Summary of Production Losses

They state that 75% of these problems could be solved with existing knowledge and, that by applying this knowledge at a cost of Col.\$90 per cow per year, the calf-crop could be improved by 62%, death losses reduced by 400% and the number of poor-doing (thin) cows reduced by 100% to 230% in one year. This adds up to a 400% increase in income with a 444% return on investment².

We could divide these returns in half and still have strong reasons to strive for stronger, more concentrated efforts in training programs designed to move knowledge of and skills in existing technology form the minds of a few to the multitudes that need it so desperately.

Existing Technology

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A vast amount of animal production technology exists and is not being adapted and used in the developing countries. A few of the practices (technology) that are known to contribute to production increases would include :

 The use of hormones and enzymes as implants or as feed additives to increase growth rate and feed efficiency.
(Considered to be one of the greatest advances in livestock feeding of this century).

- 2. Crossbreeding for hybrid vigor (natives and exotics).
- 3. Seasonal breeding to increase reproduction rate, to facilitate management, and to reduce calf loss.
- 4. Use of non-protein nitrogen (NPN) to increase the utilization of cellulose during the dry season, or in intensive fattening programs.
- Mineral supplementation (phosphorous) of the breeding herd to increase conception rate.
- Vaccines and drugs to control contagious diseases, parasites and infections.
- 7. Artificial insemination heat detection and estrus synchronization to contribute to genetic improvement. (This probably has contributed more to the improvement of the dairy industry).
- Proper equipment and facilities for handling livestock to increase efficiency and reduce losses.
- 9. Improved varieties of grasses and legumes to increase production per land area.
- 10. Forage preservation to reduce waste in the wet season and to prevent weight loss in the dry season.

The forming of this technology into a package of production practices is difficult because there is no ideal rancher. There is no standard soils and climate, or plant and animal population, or standard socio-economic system. Therefore we must train people who will have necessary competence to analyze the situation and to determine what is appropriate for a particular ranch.

A basic criterion for this depends on understanding those factors on the ranch which are continuous variables-- "continuous factors" such as soil fertility and plant nutrition, animal nutrition, genetic-climate interaction in plants and animals and the economic implication of all these. Dr. Pino concluded similarly when he said, "Our best chance for success if thrugh the improvement of the environmental factors or management/versus the genetic factors"³.

Comparative Advantage of Livestock Production Training Courses at an International Center

Periodically, the question is raised as to whether international centers should be involved in production training, either in crops or livestock. The question is raised more often by the research scientists than by those working in the training programs. They do not question the need for production training but rather who should do it.

I think the centers do have a role in production training for at least three reasons:

- 1. When the effort is directed towards the establishment of training programs within national institutions.
- 2. Because this type course serves as an excellent feedback linkage from the farm to the scientist, through his interaction with the trainees who are discovering new problems and/or solving existing ones at the ranch level.

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- 3. Because little is being done at the national level, somebody must establish the credibility of production training and get it incorporated into national programs. Some of the <u>advantages</u> of production training programs at the international centers are as follows:
 - 1. Highly qualified and multi-disciplinary staff.
 - 2. Apolitical

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- 3. Greater flexibility to meet changing demands
- 4. Adequate funds and facilities
- 5. Stability in programs
- 6. Intellectual stimuli for learning
- Greater motivation factor by working with dedicated and demanding scientists
- 8. Greater concentration of world-wide technology
- 9. Opportunity for exposure of the trainee to the culture of another country
- 10. Atmosphere stimulates in the trainee a sense of urgency to work for his country as a part of the global fight against hunger and for the well being of people.

There are however, certain <u>disadvantages</u> in doing production courses at international centers, some of which are as follows:

- In some cases, it is more costly than a national program because of travel, stipend, family relocation, etc.
- 2. The course will, by nature, be held outside of the trainees socio-economic and ecological environment.
- It only partially fulfills the objective of establishing in-country training programs.

- Students'unrealistic expectations of an international center may result in discontent.
- 5. Motivated trainees returning to a stagnated (lethargic) program may suffer great frustrations which leads to discontent and abandoning of their government positions.
- The course, of necessity, must deal with some areas of subject matter not represented in the scientific staff of the center.

At CIAT we are seeking a program to maximize the advantages of both systems by doing part of the training at the center and the rest within the country.

History of Livestock Production Training at CIAT

The first course began at CIAT in the fall of 1969 and ran for approximately one year. The trainees were Colombians, all veterinarians but one, an animal husbandry graduate. Possibly, because of the fact that the leaders of this program_were veterinarians, the course was heavily oriented towards animal health. The trainees gained a lot of field experience in clinical and preventive veterinary medicine but gave only passive attention to other problems such as animal management, pasture management and forage production, record keeping and farm management. At the end of the course, however, they listed several of the above categories as being more important than animal health in improving animal production.

The second one-year course began in May, 1972, and the number of hours spent in animal health was reduced and re-oriented.

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Instead of numerous class hours on specific subjects such as pathology, microbiology, virology, laboratory tests and description of specific diseases, the students learned to look at the epidemiology relating to the presence or absence of disease and parasitism with a preventive medicine approach rather than a clinical one. Along with this, they learned how to collect, preserve and package animal tissue samples which could be sent to a laboratory where specialized people are equipped to make a proper diagnosis.

The time gained by reducing the animal health input was replaced by additional concentration on pasture production, animal nutrition, weed control, and training and communication skills. The eight-month field phase put more emphasis on analyzing the ranch as a business or production unit and identifying those problems most limiting productivity. These factors almost always relate to poor management and a lack of year-around feed supply.

Other variables were added that year in that the course became international (1 to 3 trainees from 7 countries) and trainees were admitted from three professional backgrounds, i.e.: veterinary medicine, animal husbandry, and agronomy. Cultural, professional and academic backgrounds were more varied. This resulted in some problems and unrest within the group as well as for the imstructors.

The third course was similar to the second, but with further reduction in the animal health input and giving more time to

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agronomic, economic and social factors involved in livestock production. Agronomists were admitted, and again conflicts arose within the group. Some instructors had difficulty in planning their presentations so that the entire group would understand and benefit.

During the three-month basic phase, this group conducted several experiments related to animal management and/or feeding. The experience gained justified the exercise, but trainee enthusiasm was low as the short experimental period did not allow sufficient time to reach valid conclusions.

The fourth livestock production specialist training program was started March 1,1975. This time we admitted trainees from only two countries (9 Colombians and 11 Paraguayans). The group is made up of 18 veterinarians and 2 animal husbandrymen. After 2 1/2 months, we have had no compaints related to professionalism.

This group is also doing field exercises at CIAT in addition to their classwork; however, instead of working with animals, their practical work involves pasture establishment, soil fertility, weed control and forage evaluation. The system has satisfactorily introduced the trainees to experimental procedures while helping them to learn more about the various disciplines.

The previous courses also had a significant swine production input taught by the CIAT swine team. The swine production trainees attended the theoretical portion as part of their overall program. The present course is limited to beef production

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and a separate course in being planned for swine production.

The latest course revision giving the various disciplines, activities and time allocation during the three-month lecture/ practical phase are as follows:

•	CIAT			
Discipline	Theory (hr)	Practice (hr)	Total (hr)	Ş
Farm management	31	42	73	19.1
Ruminant nutrition	12	• 45	57	14.9
Communication	16	37	53	13.9
Pasture and forages	12	28	40	10.5
Animal health	32	4	36	9.4
Weed control	10	21	31	8.1
Soils and plant nutrition	8	21	. 29	7.6
Planning methodology	16	9	25	6.5
Cattle management	24		24	6.3
Monogastric nutrition	8		8	2.1
Experimental design	6		6	1.6
	175	207	382	

Initial Three Month Phase at

The difference in total hours taught between the first and the fourth course is only four hours (378 vs 382); however, some notable changes have occurred. The present three-month phase is approximately 50% theory and 50% practice whereas this phase of the first course was approximately 90% theory.

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Time allocated to farm management increased from 5% to 19%; in nutrition from 3% to 15%; in communication from 3% to 14%; and in animal health the time allocated decreased from 25% to 10%.

The changes obviously were influenced to a degree by changes in the supervisory staff; however, the periodic evaluation made by the staff and trainees of each course has been most influential in establishing priority areas and improving methodology.

General Structure of CIAT's Livestock Production Training Program

The instrumental objectives of the livestock production specialist training program (LPSTP) are:

- To re-orient traditionally disciplinary trained professionals to be able to think and function at the commodity level.
- 2. To provide opportunity for these professionals to learn the basic inputs, concepts and methodology necessary to organize and carry out production training courses within their own countries.

The basic objectives are to assist the commodity program, in this case beef, to accelerate the transfer and adoption of technology capable of increasing beef productivity and production.

The process begins during selection. Since CIAT's production training programs are oriented toward preparing production specialists who will be instrumental in organizing production courses within their own countries, we seek the right type of person to be trained. Recruiting the right people is the first step towards achieving the final objectives of the course.

If a production trainee at CIAT is to fulfill our expectations, he must be intelligent, well-trained in the basic sciences, willing to work, willing to accept new ideas, certain hardships and sacrifices, and be able to get along with people. Said another way, ideally, we would like all our trainees to be recognized and dedicated leaders within their own institutions. As we encounter few ideal types, we select the best available and try to develop the lacking traits to the extent possible.

Someone within the country usually nominates potential trainees. These nominators may be leaders within the Ministry of Agriculture, universities, credit institutions, research organizations or international organizations. Once candidates have been identified, a member of the CIAT training staff visits the country to interview and select, in his opinion, the candidates with the greatest potential. At the same time, he has an opportunity to visit with the trainee's supervisor and peers and to discuss possible ways the training may be effectively utilized later.

,After candidates are selected and pass a physical examination, they are issued necessary documents for travel to CIAT. All trainees are granted official visas by the Colombian government.

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Phases of the Course

The course is divided into three phases, as follows:1. The first phase, three months, is at the CIAT headquarters in the Cauca Valley.

The objective of this phase is to inform the trainee, on a disciplinary basis, of the existing knowledge (new and old) and how it relates to other disciplines and applies within the concept of beef production as a commodity, in preparation for entering the second phase of the course. The students'time is divided between classroom lectures (50%) and field exercises (50%). The three months of activities are programed, to the extent possible, so that the discussions and practicals are presented in a building block fashion and are always directed towards production practices.

The first exercise the trainees complete might be compared to the electric shock treatment physicians use in treating certain mental disorders. The students are divided into small groups and each group has 3 days to visit, to evaluate and to make recommendations for the improvement of ranching operation in the Cauca Valley. They are given pencils, paper and transportation, the rest is up to them. After they have presented their reports, as a seminar, to a critical CIAT staff and selected technical assistance professionals working in the Valley, they are quite ready to attend

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classes. They are beginning to identify what they do not know.

2.

The second phase of the course (eight months) is referred to as the ranch phase. The objective of this phase is to provide trainees opportunities to exercise their own initiative and to put into practice, knowledge and ideas gained during the first phase, in collaboration with a private rancher and under the supervision of the LPSTP staff.

They leave the CIAT headquarters to live (one per ranch) in selected private ranches for the following eight months. Ranches and ranch owners are carefully selected based on the following criteria:

- a) The rancher's willingness to provide adequate room and board.
- b) The rancher's expressed desire to improve his ranching operation. (usually, this means he has a development loan).
- c) The ranches' accessibility by jeep throughout the year.
- d) The ranches' main enterprise must be a cow-calf operation.
- e) The ranch location must be close enough to the training base to permit regular supervision of the trainee by the training staff.

During this 8-month period, the trainees have certain tasks they must accomplish as follows:

- 1. Ranch inventory evaluation (technical and economical)
- Development of a ranch improvement plan (short-term and long-term)
- 3. Implementation of the improvement plan
- 4. Attend semi-monthly lecture-discussion sessions
- 5. To teach ranch personnel improved management techniques
- Participate in organized visits to others segments of the livestock industry.
- 7. Introduce new technology through field demonstrations
- Serve as part time instructor in local agriculture vocational schools
- 9. Organize and conduct a field day

Problems encountered in managing the ranch phase are numerous and unpredictable. They range from personal clashed with the ranch manager to trainees marrying the rancher's daughter. The highly motivated trainee is generally most dissatisfied with the rancher's apparent lack of interest and enthusiasm. Close support from the training supervisors is necessary to keep the program moving.

(3) For the third phase, which lasts at most one month, the trainees return to the center. The objective of this phase are:

- To give the trainee time to review his training and to write a final report.
- 2. To provide the trainees and instructors with opportunities

to interact in round table discussions.

3. To discuss with the trainees the pros and cons of the course they have just completed and how the basic concepts might be adapted and institutionalized in their countries.

BASIC TRAINING STAFF REQUIREMENTS

The people selected to work in livestock production training must be qualified technicians who have a desire to help others learn animal production. In the same manner that commodity teams are made up of discipline specialists, a training component should have the basic disciplines represented on its team. Representatives of animal nutrition, animal health, agronomy, agriculture economics and communication are considered as a minimum to form a production training team. As some question might be raised by the naming of a communication specialist, I would like to expand on this proposal.

In our courses, we treat educational methods as a practical application of communication as a behavioral science. Before getting into the practice of communication and teaching, we concentrate on such topics as communication as a process, the psychological factors affecting attention and understanding, how people learn and acquire meaning, the sociological factors influencing acceptance and adoption of ideas and practices, the sensory structural, motivational, and learned determinants of perception, and how to express instructional objectives in terms of specific behavioral change or performance.

The instructional approach is primarily inductive in which the trainees analize their own reactions in individual and group exercises and, as a result begin to understand themselves better. We believe this generation of concern about understanding oneself is instrumental to learning how to work more effectively with others either as instructors, supervisors, or peers.

Before the end of the course, the trainees plot and analyze their own reactions, good and bad, to the entire training course, and we help them analyze how these are likely to occur in the training situations they organize and various ways to handle situations when they arise.

Finally, they study the formal organizations in which they work as communication system and discuss various strategies for mobilizing resources for and obtaining approval of the ideas they wish to implement upon returning home.

Throughout the course, in sessions with scientists and instructors, as well as in their own exercises, they experience a wide range of communication practices and skills. These include organizing and leading discussions, interviewing and counseling farmers, preparing and using simple audio visual materials, presenting a formal seminar, writing a technical report, organizing and conducting a field day, and designing and managing a demonstration plot. Needless to say there are few communication specialist working in the developing world, and whatever we can do to make these production specialists more communication competent is a great dividen.

While this team should be basically responsible for running the course, they need the support and involvement of the research staff for specific lectures and consultation on problems encountered in the field. At CIAT, we draw heavily on the discipline scientist for teaching because of his expertise and availability. This also adds a great deal of credibility to the instruction and the total course.

One person is needed to program and coordinate the logistics of the course. There must be someone to maintain an overall continuity and to assure that everyone involved in teaching the course performs when and where he is scheduled. Experience in the CIAT production training programs has shown that the courses have been and must remain dynamic to keep pace with technological developments as well as field problems encountered. Also we must continuously juggle teaching schedules to fit the unpredictable travel and meeting schedules of the scientists.

During the practical phase, field assistants or drivers may or may not be needed to maintain and move equipment, thus reducing the amount of time the instructos spend doing busywork. We presently have, for the field phase, one program leader, three training assistants, one field assistant and,

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one driver; also with half-time support from one research assistant in weed control and one research assistant in animal health.

Experience with National Programs:

The success that we have had to date in establishing production training programs within national institutions has not met our hopes, but probably our realistic expectations. There are some indications of success, at least a beginning.

Two Colombian universities have adapted variations of the CIAT program into their required syllabis. This has come about after each had a staff member complete a CIAT program, and also important, continual interaction between the institution and CIAT. One university requires a student to spend 3 weeks in the field for each "species"production course he takes, i.e. 3 weeks in beef cattle production, 3 weeks in dairy production, etc. The other university requires each student group, during the final semester, to live and work in a beef cattle ranch for 2 months. Both universities have serious problems in providing logistic support and field supervisors. Neither university has made any basic curriculum changes to better prepare the student for the field practice.

One university in Paraguay has modified its basic veterinary medicine curriculum to include agronomic courses which relate to animal production plus a 6-month field program. To do this, they extended the degree program from 5 to 6 years.

In an effort to assist in the formation of this new production-oriented curriculum, CIAT has 11 Paraguayans in the current livestock production course. They will return to work in this program. This opportunity came at a time when we were arriving at the principle that we should train more people from a given institution or institutions within a country. Previously, we had been training a few people from several countries, but found that we were having essentially no impact. To complete the "training teams" approach, we still need to train some discipline specialists from the research organizations to support the production specialists in the field.

Production Training: Short and Long Term

Training people to meet the immediate needs to increase production on a short term basis is more critical and perhaps should be approached differently. Here we are talking about the extension type worker who needs to be brought up-to-date in technology. However, it is difficult to take him away from his job for an extended period of time.

Assolution might be to first identify, if possible, the most limiting factor within a zone, country or region and hold short courses of up to one month dealing with that one subject and then insure that these people are properly equipped and supported to solve the problem. If they cannot be supported adequately in the field, the course should not be given.

The long term training, or the training of future production specialists, must eventually find its home in the educational institutions. This means convincing college administrators that their product (the recent graduate) is not qualified to do the job for which he is trained and that curriculums must change to fit client needs. If someone can accomplish this near impossible task, then we must help prepare professors to teach the animal production-oriented courses.

I would not be so presumptuous as to think that universities could turn out accredited production specialists, but I do think that a student graduating with a good background in applied animal production would get to be an animal production specialist much faster than one who is graduated in a specific discipline.

It has been suggested that the least painful way to introduce livestock production training may be by starting it in a new institution where traditional agricultural and veterinary medicine courses have not been established.¹

Speeding up Production Training

While there can be no substitute for actual experience in learning how to produce agricultural products, we can use certain tools to speed up the learning process and at the same time broaden the capabilities of the student.

In the more developed countries many of the basic concepts and fundamentals are no longer communicated to the student by an instructor. These materials are recorded as bulletins, books, slides/cassettes, video tapes and, in some cases, films. Students first get the subject matter in this form, repeating

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the exposure as frequently as need dictates and time permits. Thus the student-professor contact time that follows is used for discussion aimed at clarification and application of the material.

At CIAT, we find that many of our trainees coming out of national programs (in all subjects) have not been adequately prepared in the basic sciences to grasp material being presented in the training programs. Thus the scientist must spend valuable time (both his and the training programs) teaching background information. This at first does not sound like much, but if he has to repeat this for each course, and sometimes, on a consultation basis with each trainee, the time mounts at an alarming rate.

We hope to develop a unit at CIAT that, in collaboration with the scientist, will be able to package those materials considered fundamental to the discipline into self-instruction units. Pre and post-examinations may be used to determine when and if the student needs to study these materials. Also, "how to do, packages will be produced for the trainee to review before he actually does the operation". This system will be useful in pulling the disciplines together to give the trainee a commodity conceptual approach at some time during his training program.

While this may partially solve our problem at CIAT, it does not eliminate the problem at the source. The quality and content of instruction at the university level will have to be improved. Well prepared instructional aids on animal production in the tropics will have a place in enhancing the learning process in universities.

This year our livestock production trainees will receive some six sets of slides with written or recorded scripts from the various disciplines involved in tropical animal production. Little of this type of material exists for the tropics and that produced for temperate zone agriculture has limited applicability.

I have corresponded with many deans of agriculture in Latin America about livestock production training and the use of instructional aids. Most of them say that they have no production training program and few visual aids because of the lack of funds and/or personnel.

Summary

This paper has expressed the urgent need to increase the production of animal products in the developing countries and presented a brief description of the methodology presently used at CIAT to train beef production specialists.

There is nothing sophisticated or new about this type of training; but merely a step that is being left out in the preparation of most of our young professionals who are responsible for bringing about improvements in livestock production. It does require competent instructors who are dedicated to training young production specialists and who are not afraid to combat the elements of the humid tropics to do so. The farmer's basis of reasoning and decision making cannot be taught in the classroom, and until the technical advisor understands his clientele, (their problems and frustrations) he will not be able to communicate effectively with them nor bring about change. We cannot wait for his rapport to develop through costly years of experience, but we can concentrate the same experience into a much shorter time period. We cannot do this unless more people (influential people) get more concerned and involved in improving the training process for students of today who must feed the world tomorrow.

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