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A Planning Guide for Small Scale Livestock Projects

by Gordon Hatcher

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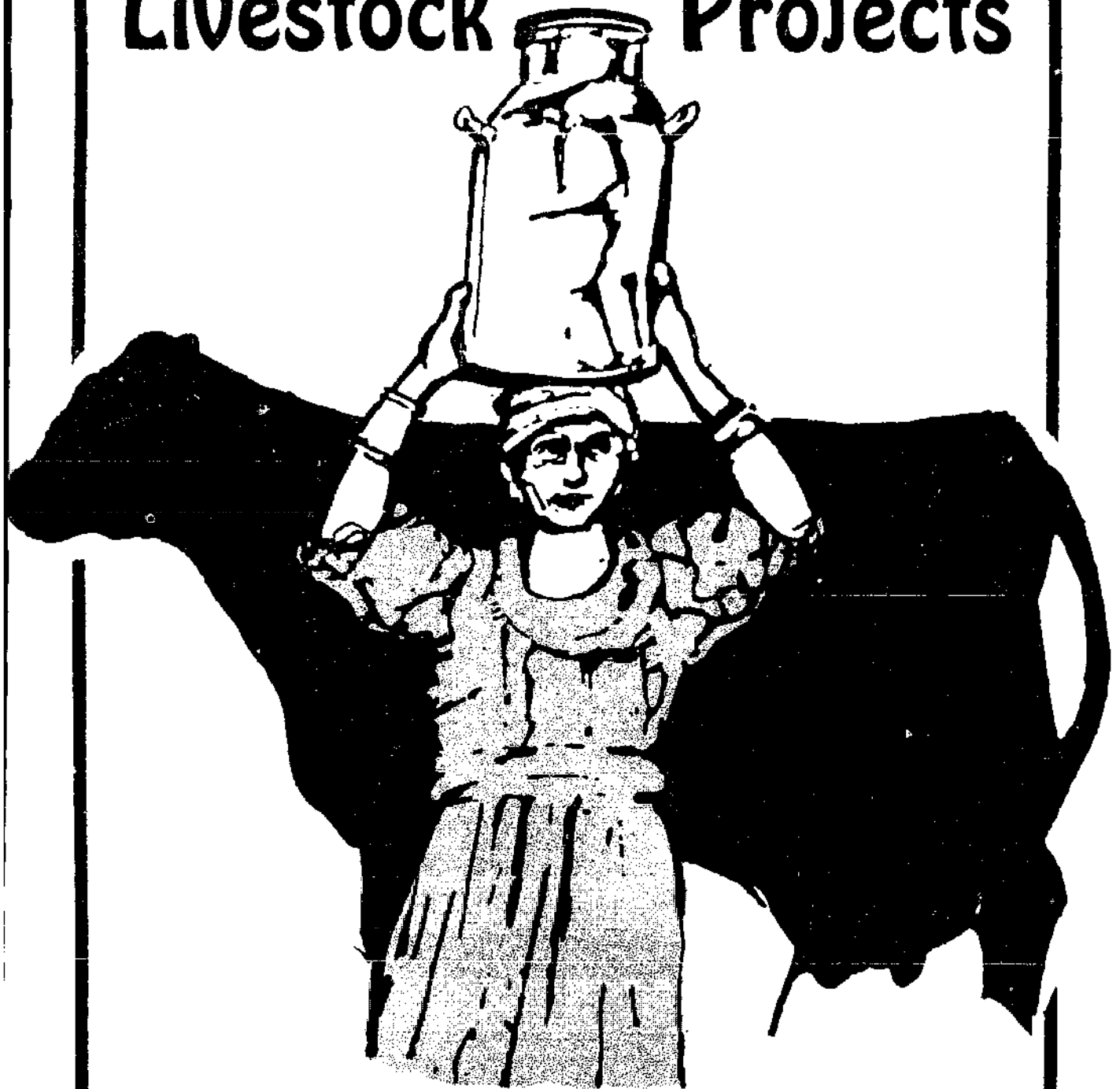
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A Planning Guide For Small Scale Livestock Projects



By Gordon Hatcher, DVM



HEIFER PROJECT INTERNATIONAL
P.O. Box 808, Little Rock, Arkansas 72203

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By
Gordon Hatcher, DVM

In collaboration with
Jerry Aaker, MSW
James DeVries, PhD

A publication of Heifer Project International

HEIFER PROJECT INTERNATIONAL, INC.

P.O. Box 808

Little Rock, Arkansas 72203

U.S.A.

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The Purpose Of This Guide

Our purpose is to assist groups or individuals who have little or very limited experience with animals, but who wish to undertake a livestock project. The term "livestock" is used here to include many of the animal species commonly used by the small-holder, and therefore deals also with poultry, fish, and bees. The author recognizes that there are other important domestic animals which could have been covered, but it is not possible to include all the species which are related to agriculture. However, the general principles for a good animal project remain the same and the basics outlined in this guide can be applied to the species which are not specifically mentioned. It is our aim, first, to help you analyze the feasibility of the project you are considering. If such a study encourages you to proceed, we hope you will use this guide to assist you in step-by-step planning and preparation for the project.

This handbook is intended for the person who is working with the small-holder, the landless or nearly landless rural family, or with women's or youth groups. Those who may find the information useful include:

Field workers--community/rural
development
Missionaries
Volunteers with private voluntary
organizations
Extension workers
Village leaders
Agricultural promoters

Obviously, adequate information on animal husbandry would fill several volumes. This guide does not attempt to give such instruction, but it does list some books to study before you invest time, effort, enthusiasm or money in a livestock project.

It is not our purpose to deal with social aims, per se, or the sociological and philosophical aspects of development. We are hoping that the inexperienced person will find here practical information for preliminary studies, and also for later planning of successful animal projects.

You will note that the book stresses tropical conditions. This is because the area between the Tropics of Cancer and Capricorn includes most of the less-developed countries, generally speaking. Of course conditions vary widely within these latitudes--from deserts to humid jungles; from below sea level to the high Andes. Approximately 60% of the world's cattle; 50% of the sheep; 90% of the goats; 95% of the buffalo are located in this zone.

This guide assumes that you already have a thorough knowledge of and sensitivity to your community's needs; and that you are a person or a group with influence and/or leadership ability to whom will be listened. These qualifications are prerequisites for making effective use of this material.

Foreword

This guide is based upon years of field experience in animal agriculture, community development, and extension programs with the rural poor in Africa, Asia, Latin America and the Caribbean. Each of us has lived overseas for extended periods and has been involved in livestock projects and training programs. We have studied animal improvement programs (successful and unsuccessful) in many parts of the world.

Each of us has been a Program Director for Heifer Project International, a voluntary agency which has pioneered the development of animal agriculture with small farmers in many countries. (See the last chapter.) In addition, we have worked for and with various church-related as well as other voluntary organizations, agencies of the U.S. Government, international and indigenous organizations, educational institutions and ministries of agriculture in numerous countries.

It is our hope that some of the things we have learned "the hard way" will help you to avoid mistakes and disappointments. It is not necessary to "reinvent the wheel"--you can build your project on a foundation of the experience (good and bad) of groups which have already done what you are planning to do.

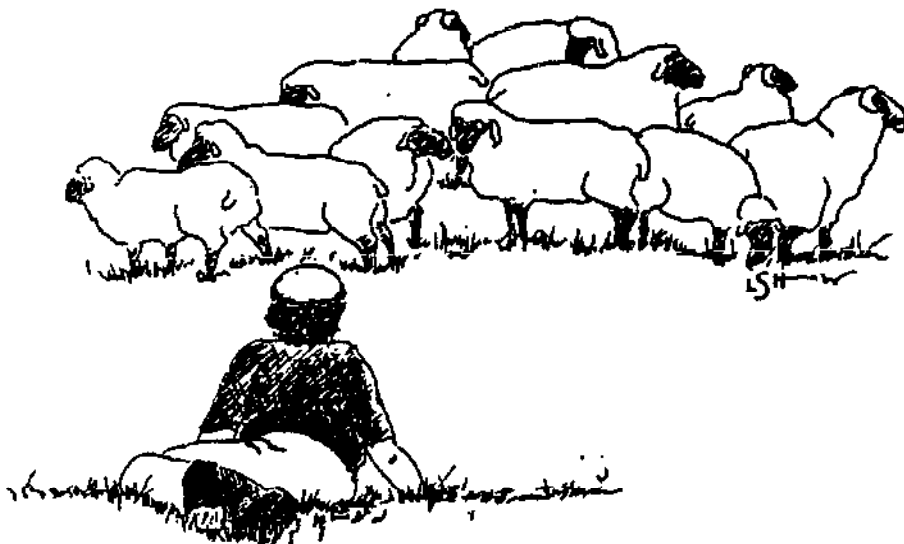
This guide does not present new information, but is rather an attempt to gather useful material in one place to make it easily accessible.

The authors wish to express appreciation to Ellen Hatcher, Frankie Reynolds and Camille Cress for their valuable assistance in the preparation of this Guide, and to Sharon Wooten, Barbara Carter and Bill Puppione for their sketches.

Looking at the development of animal projects designed to help the small farmer in many parts of the world, we gratefully acknowledge a profound indebtedness to Dr. Thurl Metzger, who served Heifer Project International from its inception in 1944 as both Executive Director and Program Director. This debt is shared by thousands who have benefitted from his pioneer work and the deep personal commitment which has motivated his efforts over the years.

If you have questions or comments, please address them to: Program Department, Heifer Project International, P.O. Box 808, Little Rock, Arkansas, 72203, USA.

Gordon Hatcher, DVM
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The Case For Animal Agriculture

Animal proteins, as found in milk, eggs and meat, are needed to balance the plant proteins in the human diet. It is very difficult for young children in the developing countries to grow properly without animal protein. Breast feeding provides the best source of protein, of course, but after weaning millions of infants do not receive an adequate supply of protein. This deficiency may result in permanent brain damage. By balancing a diet which is customarily composed of starchy foods, cereals and lentils, animal protein can greatly improve the chances for normal development in children and good health in adults.

In some parts of the world people depend upon their animals for their very survival because of the scarcity of land which is suitable for crop production. Ruminants are uniquely suited to converting the forage on such land into human food.

In Southeast Asia one pair of oxen or water buffalo, cultivating the rice paddies, can feed 100 people. Animal transport of crops is often vital because of nearly impassable roads in many parts of the world. These are only two examples of the importance of animal power.

Animal manure for fuel, as well as for fertilizer, is just one of many valuable by-products of livestock raising. Wool, skins, hair, bone-meal and blood-meal have numerous uses and provide a livelihood for many people.

Preliminary Considerations In Planning A Project

The following is a do-it-yourself appraisal of the possibilities for a good livestock project. Ask yourself (selves) the following questions and rate your proposed undertaking accordingly:

A. Whose idea is this proposed livestock project?

1. Did the idea come from the people themselves?
2. Did it come from you?
3. How many people in the community are really serious about the project?
4. Are you the advisor? If you are not a member of the community, do you have a counterpart within the community?

B. Why do these people want an animal project?

1. Is it to increase food production?
2. Is it to improve diet and nutrition?
3. Is it intended to make money?
4. Is it to secure ownership of the land?
5. Is it to utilize idle land?

A "yes" answer to any of the above 5 questions would be a valid reason to consider a live-stock project.

C. Have you and/or knowledgeable persons carefully studied the proposed project to see whether it is feasible and practical? (A feasible project is one in which the livestock being considered can reasonably be expected to

produce results in the proposed setting; a practical project is one in which the people to be benefitted can handle the production tasks which are involved.)

1. Have the findings of your study been favorable?
2. What problem areas has your study revealed?
3. Is there opposition to the proposed project with the community?
..... from the neighbors?
4. Is there a spirit of cooperation within the community?
..... within your group?
5. Will the entire community eventually benefit from this project?
..... or only a few families?
6. Have you considered that acquisition of animals by a few people might cause resentment in the community?
..... how would you resolve such a problem?

D. Assuming that there is strong support from the community, and cooperation within your group, ask yourself (selves) as impartially as possible the following questions:

1. Are the people who hope to participate in the project thinking realistically about the costs in money, time, hard work and resources needed for a successful animal project?
2. Are they able and willing to take time from their regular activities to participate in the project over a long period--after the first enthusiasm has disappeared?
3. Are they sufficiently motivated and mentally prepared to carry through with the project in spite of possible bad luck or other discouragements?

4. Are they aware of how long it will take to get a "crop"?

E. If the answers to the above questions are positive, continue your consideration of these specific points:

1. What kind(s) of animals are being proposed for the project?
2. Have the people had experience with these species?
..... if so, were the results positive?
..... what problems did they have?
..... did they solve their problems?
3. Are there neighbors who are raising this kind of animal?
..... if so, what has been their experience?
4. What animals do you already have in your community?
..... are they healthy and reproducing well?
..... are their owners taking good care of them?
..... do the animals have enough to eat now?
5. Is the proposed project compatible with the planning of your country's Ministry of Agriculture?

F. Climatic conditions?

1. Is the climate in your area favorable for raising this kind of animal?
..... will it survive in the extremes of heat or cold of your climate?
..... altitude?
..... heavy rains?
2. Are there times during the year when there will be shortages of feed and/or water?
3. Have you seriously considered what you

could do for the animals in case of drought or flooding, or other conditions which would affect their feed and water supply?

G. Management:

1. Will there be a constant supply of feed?
This includes whatever feed you would need to purchase--is there a dependable source?
..... have you calculated the probable costs of feed?
2. Will the animals be stable-fed?
Tethered? Caged?
..... who will be responsible for feeding them?
Remember this is a daily task.
3. Is there an animal expert in your group, or easily available for consultation? You will need the dependable assistance of someone who is knowledgeable about the care of the animals.
4. Do the participants or the group own the land to be used for the project?
..... if not, what security does the project have?
5. Record-keeping is vital. Is there someone in your group who has a talent for this?
6. Is your project in an isolated area? What protection will you have against thieves?
7. Have you considered how your project might affect the environment? That is, your environment and your neighbors'.
..... water rights, drainage problems, flies odors, noises, dust, animals running loose--any of these could be a nuisance, or possibly a disaster.

H. Technical assistance: (This is a necessity!)

1. Is an agricultural extension service available?
..... is it reliable?
..... is it free?
2. Is there a veterinarian near the project site who is willing and able to come when called?
3. Is there a diagnostic laboratory service?
4. In the absence of the above assistance, what expert help will you be able to get?

I. Economic planning:

1. For a project to succeed, the project-holders themselves must invest something in it.
..... does the group have any money to put into the undertaking?
.....if there is no money, can they contribute land? building materials? feed? what resources can they furnish?
2. What financial benefits are expected from the project?
..... how long will it be before proceeds from the project will pay the costs of getting it started?
..... when do you estimate (conservatively) that there will begin to be a profit from the project?
..... how important is the above date to the continuation of the effort?
..... what plans do you have if your costs exceed income, such as during inflation?
3. Has a realistic, detailed budget been worked out by or for your group?
4. Have realistic start-up and production costs been calculated?

5. Will the project require financial assistance from the outside?
..... are you expecting a grant?
..... can you qualify for a loan? If so, how and when will you be able to repay the loan?
6. Where are the markets for your product?
..... will transporting animals or produce to market be difficult? costly?
7. Is your project going to be able to compete in the market against others who are selling the same product?
..... are competitors located nearer the market than you are?

Make your plans for 3-5 years in advance, because it requires time for animals to reproduce. Especially in the case of cattle, results won't show for several years.

Also, multi-year planning and funding are usually more attractive to donor agencies than one-time-only projects.

J. Planning ahead:

1. What do you envision that the results of this project would be 5 years from now?
2. Have you made an estimated time-table for the various steps in the project, as you work toward your expected accomplishments a year from now?
..... three years from now?
..... five years from now?
..... when will the pastures be ready?
..... when will fences and shelters be constructed?

3. When will the intended recipients of the animals be trained to care for them? (This should be done before the animals arrive.)
..... who will conduct the training courses?
4. Are you establishing a prospective market now?
5. How do you envision that your project will, in the long run, benefit a larger group of people who need this type of help?
..... will members of your group eventually become expert enough that they can assist other groups to get started with livestock projects?

ABOUT THE ENVIRONMENT...

In all your planning, look ahead to the effects your project may have on your environment and on the life of your neighbors.

Few activities are so isolated that they do not at some point affect the efforts of other people. Will your plans help to improve the situation for your neighbors and for future generations? -- or will your activities create new problems?

For example, diverting a stream for irrigation may dry up a neighbor's well. Cutting trees may cause soil erosion when heavy rains come. Livestock which are not well-managed can do serious damage to neighboring property; and too many animals grazing on a pasture can destroy it permanently.

Genetic Improvement In Livestock

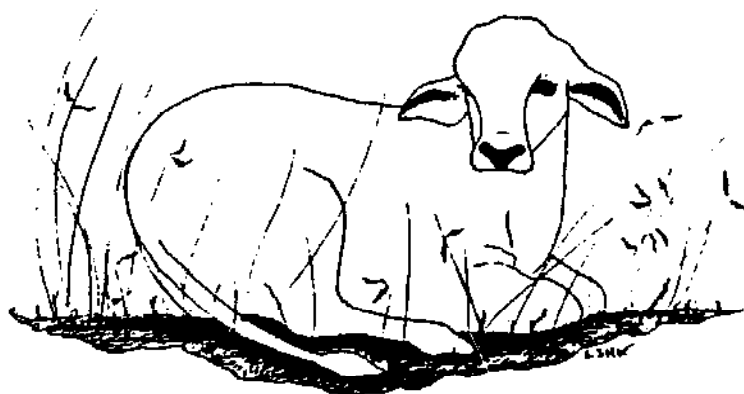
Local vs Imported Animals

It is a popular belief in many countries where livestock improvement is being promoted, that their local breeds are not good enough to be considered in such a program. People generally assume that the imported breeds are superior and will increase production rates rapidly when they are introduced into a livestock project.

Based upon this assumption, countless imported (exotic) animals have been introduced into tropical areas, with varying degrees of success. Experience has made the people involved in such efforts wiser and more cautious. It is important to face the fact that few of these imported animals are actually able to reach their genetic potential due to inadequate feed, difficulty in adapting to tropical climates, lack of resistance to tropical diseases and parasites, and poor management.

It is a commonly held belief that the exotic breeds will produce more, grow larger, and thus be more profitable. Actually, the imported animals require more daily attention, better quality feed, and skilled management--thus they cost more to maintain. In reality, the native animals have proven to greatly improve their productivity when they receive the same attention, management, and good nutrition that are required by the exotic breeds.

Of course there may be an advantage to importing animals from time to time to increase milk yield, body size, or to avoid in-breeding. Generally, these objectives can be accomplished by importing males only or by using artificial insemination. The reason for using imported males to cross with the indigenous females is that important traits needed for herd improvement (such as high milk production) are carried in the male genes.



The native breeds (or types) have desirable characteristics which are not always recognized. For example, they are likely to be well-adapted to tropical heat and humidity, and to be resistant to the diseases and parasites which are debilitating to imported animals. Also, some local breeds are by nature prolific and return early to estrus (heat cycle).

It is important to note that progressive cross-breeding of the local females with the imported males will mean that the advantageous traits of the native animals will disappear within a few generations. Serious consideration should be given to maintaining the local breeds (or types) as a separate entity in order to preserve their valuable characteristics. (In the Dominican Republic criollo - native - cattle which show no trace

of exotic breeding are being selected for a "gene pool" in order to preserve their good traits).

Do not be misled into thinking that imported genes are the key to the success of an animal improvement project. Genetic improvement means nothing if the animals are receiving inadequate rations or are not properly and regularly vaccinated and treated for parasites. Genetic improvement does not require the introduction of a foreign breed. Good results are achieved by selecting the best females to breed with the best males.

Thus, this is where an animal project should start: improve the local stock with better feed, better disease and parasite control, better breeding management (culling undesirable animals, castrating excess males, closely observing heat cycles, etc.), combined with careful day-to-day attention to the animals' needs.

Importing Animals

If you are thinking that it will be necessary to import animals from the U.S. or some other country: have you tried to locate the animals you need in your own country or area? Heifer Project International and other organizations have been shipping quality animals into tropical areas for many years. First, investigate the possibility that some offspring of these animals might be available. Of course commercial interests have been and still are shipping good livestock world-wide in increasing numbers.

After a few generations, the offspring of the animals which were imported in the past develop some degree of tolerance to tropical conditions (lacking in newly-arrived livestock), so there is a big advantage in securing acclimatized animals, if possible.

If you see no alternative to importation, consider the following points:

1. Importing animals is a long, complicated process which must be planned and arranged for months in advance of expected arrival.
2. Whoever is responsible for the importing should: secure a written copy of health requirements from the veterinary section of the Ministry of Agriculture. Insist that the requirements be adhered to, or have a written waiver if exceptions have been granted.
Secure an import permit, with a 6-month time limit, if possible.
Arrange for use of the official government quarantine.
Arrange for handling and transporting of animals from aircraft to quarantine, and following the quarantine, to the project site.
3. Health requirements and the original copy of the import permit should be sent to the exporting agency promptly. Permits are dated differently by each country, so allow sufficient time for preparations by the exporter, for vaccination and testing of animals. Export permits issued by the U.S. have a limit of 30 days; this may vary from country to country. It would be a good idea to discuss your plans with animal health authorities in your country and get

their advice regarding your plans to import.

Commercial importers/exporters who are in the business of shipping animals usually know the requirements and can do the necessary paper work for you. This service will cost, of course, but it will save considerable effort and perhaps some money. Remember: under the best of circumstances and pre-planning things can go wrong, so be prepared with a contingency plan!

Warning: if you decide to import, request young animals and don't order any animals in late pregnancy. To the degree that you can control the schedule, try to have the shipments arrive in the best time of the year for adaptation of the animals. For example, try to avoid shipping during winter from cold weather to the humid, hot climate of the tropics. It is not the intent of these warnings to destroy your enthusiasm for an animal project--only to present a realistic picture of problems you would be likely to encounter in importing new breeding stock.

Government agencies sometimes demand additional requirements following arrival. They have the right to hold your shipment in quarantine indefinitely while they make additional tests or observations of the animals. They will probably charge for the care of the animals in quarantine, and you may be charged a "fee" to get them released. You may be assessed an import duty and/or handling fee. Animal health authorities have the right to destroy your animals if they become sick during quarantine, or even after that if they decide that the livestock may be carrying a disease which could threaten national agriculture.

You cannot depend upon an off-loading ramp coming with the plane, so plan in advance how you will handle this problem if you have to produce a ramp in a hurry. Remember: the animals may have been in the aircraft and/or on the road for many hours. They are hungry, thirsty, frightened and irritable. They must be removed from the plane immediately as it is probably like an oven inside the aircraft.

Be certain that your truck is at the airport well before the expected arrival of the plane. (It may come early). The truck must have high sides and a tarpaulin to cover the top in case of rain. For goats the sides of the truck must be at least 5 feet high, plus a tarpaulin to keep them from jumping out of the truck. Have one person in charge of the unloading and of making all the necessary preparations. Several husky handlers will be needed to carry the small animals to the truck or to get the large ones up the ramp. Hopefully you can find someone with experience in handling livestock.

You may be obliged to provide feed while the animals are in quarantine for 30 days (or more). This means a person will be needed to buy or cut the feed and deliver it. Determine in advance who will care for and feed the animals during quarantine. You may or may not be allowed to visit the animals during this period. If you receive from quarantine fewer animals than went in, you are entitled to find out from the veterinarian's report the reason for the shortage. Beyond that, there isn't much you can do except to hope for the best.

You can avoid many difficulties by importing frozen semen. Health requirements apply to semen as well as to animals. Some airlines do not transport the liquid nitrogen tanks in which the frozen semen is stored, believing

them to be unsafe. However, the international transportation of semen is quite common today.

Artificial Insemination

There are several advantages to using AI in animal projects:

1. Genetic improvement can be rapid.
2. A wide selection of proven sires, or sires with good production records, is available, so that there are many excellent sires from which to choose.
3. AI saves the cost of feeding and caring for a male.
4. Cross-breeding is simplified.
5. Semen from outstanding sires is available to the small farmer at reasonable prices.
6. There is less chance of disease being transmitted from one animal to another.
7. The offspring of top quality sires will be more valuable.

Some problems with AI are:

1. Failure of the owner to detect the animal's heat (estrus) at the proper time.
2. Lack of a holding facility where the animals can remain quietly before and after being inseminated.
3. The logistics of getting semen to remote places and maintaining the thermos properly charged to preserve the semen.
4. Lack of a reliable source of liquid nitrogen.

5. Lack of a skilled inseminator.
6. The animals' state of health.
7. Insufficient volume of animals to justify the expense.
8. Not all females respond to AI; a male might be needed eventually, in spite of the best efforts.

Embryo Transfer

Embryo transfer is a highly technical procedure requiring much more equipment and skill than AI. High technology makes it expensive. Embryo transfer makes it possible to greatly increase the number of offspring of high quality cattle by implanting their developing embryos into ordinary cows. Thus, most of the 9 months required for the embryos to become calves can be assumed by receptor cows. The major use for ET is to increase the reproduction rate of valuable cows; that is, 50 embryonic calves in 12 months.

AI is commonly used to multiply the genetic benefits from a superior bull, while ET can be used to introduce a different breed. ET has its place in cattle improvement, but in most developing countries with small-holder projects, its time has not yet come.

Looking At Various Species

Each species of livestock has advantages and disadvantages for the small farmer with limited resources. This section touches upon management aspects which must be considered for various species. Some of the information applies to all species and will not necessarily be repeated for each one.

WHY RUMINANTS?.....WHY NOT?

Animals which ruminate (re-chew their cud) include cattle, buffalo, sheep, goats, camels, llamas and many other domestic and wild animals. There are some basic considerations which are common not only to cattle (for meat, milk, or traction), but to all ruminants.

It has been erroneously stated that ruminants compete with man for the limited resources of the land. This is true to some extent in the so-called "developed" countries where grain is often fed to livestock. However, ruminants actually utilize plants and agricultural by-products that humans cannot use directly. Through the animals' digestive process humans become the beneficiary of the plants--enjoying milk, meat, cheese, fibre, fertilizer, hides, and animal power.

Consider this: nearly one-third of the land on earth cannot be used for crop production, but when ruminants utilize it for grazing and browsing, people benefit.

Since in most cultures ruminants do not consume human food (grains), they are placed in direct

contrast to swine and poultry which receive only limited sustenance from plants. These two groups must have some grains, plant and animal by-products to be productive. (See sections on swine and poultry.)

CATTLE ONLY?.....WHY NOT SHEEP AND GOATS TOO?

Are you sure that cattle are more appropriate for your area than sheep or goats? Or buffalo? In reality, there are benefits in pasturing cattle, sheep and goats together. They are not in competition but complement each other because each species has its own plant preferences. Actually, such an arrangement can improve the pasture. In the past, cattlemen have held unfounded prejudices against having sheep grazing with cattle, and these old attitudes die slowly.

Cattle

Cattle can be found throughout much of the world, where they have adapted to climatic extremes. Over the centuries certain types have evolved, and extensive work to improve their performance has resulted in some well-known breeds and recognized native strains. The native cattle usually have the advantage of being more resistant to disease, but they seldom produce more than just enough milk for their calves.

In many developing countries cattle are considered multi-purpose animals. In Africa they are valued for their milk, traction, manure and value as stored wealth. The milk production of the Boran, an East Africa breed, is low, so the farmer keeps large number of them in order to have enough milk. Keeping

cows for milk is the primary reason many farmers raise cattle, so the animals which they sell for meat are likely to be the surplus bulls or steers or the milk cows which are too old to breed.

However, the advantages of the meat-type animal can be combined with the advantages of the milk-type breeds: that is, crossing beef animals, such as Brahman or Zebu (Cebu) with European dairy breeds, such as Brown Swiss or Holstein. Their offspring are generally hardier than the purebreds, and the beef animal's resistance to heat and ticks is retained while milk production is increased.

Cattle can live and reproduce on grasslands and native pastures, but your aim is to get good production from them, not just to maintain them. The greatest limiting factor in raising livestock in developing countries is poor quality feed and/or inadequate feed.

Temperate climates present fewer problems for cattle than do the humid tropics. Prevalent and troublesome conditions affecting all cattle in the tropics are the high temperatures and humidity, and parasites. (See section on parasites.) In addition to these problems, many serious cattle diseases are more common in the tropics than in temperate zones: foot and mouth disease, rinderpest, tick fever, hemorrhagic septicemia, and East Coast fever, among others. Of course, imported animals are more susceptible to all these problems and diseases.

Dairy Cattle

Many attempts have been and are being made to introduce and acclimatize exotic (foreign) breeds such as Holstein Friesian, Brown Swiss,

and Jersey into the humid tropics. There have been some successes and many failures. Dramatic improvements in body size and milk production have been made by crossbreeding native cows with Holstein, Brown Swiss or Jersey bulls. This has been done on a large scale in India where milk production has commonly increased from 2 liters to 8 liters per cow per day in the first generation. The next crosses did not greatly increase production as long as the animals were fed grass only. With the addition of a dairy supplement, however, the second and third generations were able to produce as much as 12 liters.

For good milk production you will need to provide, in addition to the pasture, a dietary supplement which is a mixture of ground grains and agricultural by-products. You can prepare this balanced formula yourself, following instructions from your extension service or some reliable source-book. However, you will have to determine whether the additional cost of this supplement will be paid for by the increase in milk production. If costs are high in your area, the supplementary feeding might not be profitable in the long run. It is well documented that cattle under good management can be very productive on an improved pasture; that is, legumes planted with grasses.

Analyze your plans and situation carefully: do you realize how long it takes for a dairy cattle project to provide milk? Do you plan on milk only for home consumption? Will there be a surplus? If so, how will it be used. Are there adequate roads and transport to deliver the milk promptly before it spoils? Have you considered goats or buffalo instead of cows?

Lactose Tolerance

Important as milk is in the human diet, it must be noted that many adults in parts of Asia and Africa have an allergic reaction to milk because their bodies lack an enzyme called lactase, which is needed to digest the sugar (lactose) in milk.

This enzyme permits infants and young children to digest milk without difficulty, but the lactase level gradually diminishes in young adults so that they lose their tolerance for milk, unless they continue to drink it. Apparently adults who have not stopped drinking milk during the years since their childhood still have the enzyme in their systems.

Beef Cattle

Beef animals are usually pastured and grass-fed. In some areas they must be tethered because the high cost of fencing makes it necessary for the small-holder to manage his animals in this way. Generally, raising beef cattle is not as time-consuming, intensive, or exacting as dairying.

The reasons for keeping beef cattle vary from area to area. In some Latin American countries it is necessary for the owner to show that he is using the land in order to be able to establish his title to it. Raising cattle is a good solution to the problem, and in this case the quantity is likely to be more important than the quality of the animals. This is also true in some African countries where herd size determines the owner's prestige.

Because of their large size and their value, cattle are generally sold at market, being too valuable for home consumption. (Mutton, goat or chicken are more likely to be consumed by the family.) In some countries where there are no roads, cattle offer the advantage of being able to walk to market. Where air strips are available, the animals are sometimes slaughtered and the meat flown to a market town in a small plane.

In both beef and dairy farming the strongest males are often selected for use as traction animals to cultivate fields or haul produce.

Pastures

If you are going to depend upon pastures, recognize their limitations. There is a temptation to over-estimate the value of natural grasslands. Although they are abundant at times, native grasses often have a low nutritional value. Lush green grasses and wild plants have a high water content; so, even though the pasture may look adequate, the cattle actually have to eat large quantities just to maintain their body weight. (As you would expect, the native cattle do better on this type of pasture than do the high-bred imported animals.) Consider carefully whether it would be profitable to improve the natural grasslands.

Consult with local experts about the realistic carrying capacity of the pasture land you are considering; find out about improving the pastures by seeding better varieties of grasses and legumes. Does the land need fertilizers? Be sure to have the soil checked for problems or deficiencies, such as excessive salts or alkalinity.

Diseases

You should become acquainted with an animal health expert where you are planning your livestock project. Profit from his experience and avoid repeating mistakes which have already been made by others in your area.

Do you know what the prevalent diseases are for the animals you are considering? Are these being controlled satisfactorily at the present time in your area? Are your neighbors successful with their animal health programs? How costly would an animal health plan be for the number of livestock you are considering?

Your project should include a preventative health plan, including the vaccinations and tests to be done and when.

Parasites

One of the most limiting factors to a successful livestock project is parasites--internal and external. They affect all classes of animals--including fish and bees--to some degree, whether the effects are noticeable or not. Animals can and do develop some resistance to many parasites; however, neither ruminants or other species can remain in healthy condition if they are infested with parasites to any extent.

This information is generally applicable to other classes of livestock: The external parasites (lice, mites, ticks, flies), in addition to transmitting disease, sap the strength of animals. Generally these pests can be controlled by regular and systematic dipping and spraying of the animals with various

preparations manufactured for this purpose. (Some breeds of cattle are more tick-resistant than others.)

The internal parasites (round worms, tape worms, flukes, several types of blood parasites) can severely affect the health of the animals and if not controlled, can eventually kill. There are products available for controlling most of these parasites, but it is impossible to eradicate them completely.

Do you know whether there is a reliable supply of such preparations in your area? Will it be possible for the people to pay for them? These factors must be considered from the start because failure to maintain a parasite control schedule can result in serious loss of milk production, loss of body weight, and lead to disease. We have seen the results of shortages of veterinary supplies in some African countries where foreign exchange makes purchase impossible. This is beyond the control of the livestock owners, of course.

Be very cautious in the selection of parasiticides to be sure that the product has been recommended for use on that particular species, and that the instructions are clear and well understood. Do not guess or take chances--the safety of the people using the product must always be considered. Some of the preparations can be deadly if misused.

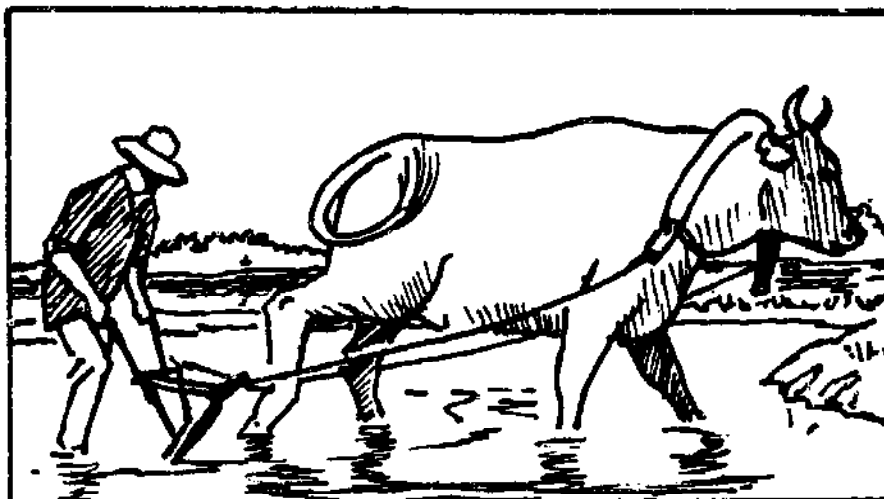
Buffalo

If your objective is to produce milk and/or meat, where conditions are not favorable for day cattle, don't overlook the water buffalo (Bubalus bubalis), if it is available in your area. It should not be confused with the North

American bison, commonly called a buffalo, nor with the African Cape buffalo. The origin of this docile domesticated animal is thought to be India. Its history goes back over 5000 years, and it has spread throughout Asia and to the Mid-East, adjusting well to colder climates such as are found in China and Southern Europe. The buffalo is the main source of milk in Egypt and India and a major source in several Asian countries.

The species isn't well-known in many less-developed countries, and until recently its importance has not been widely appreciated. Buffalo are being introduced into Brazil and countries around the Caribbean Basin.

There are two general types: the swamp buffalo and the river buffalo. Both are used for transport and for cultivation, and in addition, the river type is used for milk production. A common misconception is that the buffalo has a bad disposition and is hard to handle; but everyone who has actually had experience with them knows they are very manageable. In Asian countries it is usually the young children who are in charge of caring for the buffalo, which are treated almost like members of the family. The young animal is easily trained to work.



Buffalo lack the sweat glands which help to keep other tropical cattle (such as the Zebu) comfortable, and they are therefore very sensitive to heat. They must have shade during the hottest part of the day as well as cooling-off periods during the day. They enjoy wallowing in a mud hole or a stream, but these are not necessary if other ways of keeping them cool are used regularly.

The flavor and quality of buffalo meat compares favorably to that of cattle, and is in great demand in Singapore and Hong Kong.

Some advantages of using buffalo are:

1. They are able to utilize low quality roughage and aquatic plants, feeds which cattle cannot digest.
2. Buffalo are raised on the feed along the canals and roadsides. They do not require pasture or supplementary feeds.
3. They are ideally suited, and preferred, for working in wet and muddy terrain, such as rice paddies.
4. They tend to be more disease-resistant than cattle and have a higher tolerance to ticks.
5. The butter fat content of buffalo milk is 6-8%, as compared with 3-5% for cows. It is widely used for making cheese and other dairy products.

Some disadvantages of using buffalo are:

1. They are slow and have to rest during the day. In hot weather frequent cooling by means of shade, showerbath, stream or wallow is a necessity.
2. Very little has been done toward breed improvement.

3. Infertility has been reported as a problem; however, this may be due to the failure of the handlers to detect the signs of estrus. Buffalo tend to be shy breeders.
4. In extremely cold conditions they need special attention.

Small Ruminants — Sheep and Goats

These two species are often raised together because they are very compatible, each specie having a preference in the plants it eats. We will consider first the characteristics they have in common.

Both sheep and goats are found in many parts of the world where they are valued for their meat. Their small size makes it practical for a family to consume the meat in a short time without need for refrigeration. Their small size also makes them easy for women and children to manage.

These small ruminants do well eating plants not liked by cattle, but they must be carefully watched while they are foraging to prevent them from eating the neighbors' gardens or valuable plants. They must also be carefully guarded from attack by dogs or other predators (two-legged or four-legged).

Sheep and goats have been accused of over-grazing and thus causing soil erosion which has turned vast areas into deserts. Environmentalists and some international livestock development organizations have been slow to realize that the animals are not the culprits, but that man's mismanagement of them has caused the damage. In recent years, fortunately, there has been a clearer

understanding of causes and effects, and a growing realization of the great potential sheep and goats have for contributing to human welfare. Of course, wherever soil is exposed, with evidence of erosion, grazing by all animals should be prohibited.

Because sheep and goats have a short gestation period of five months, a flock or herd can be built up quite rapidly, as compared to the larger ruminants.

ANIMAL WELFARE

Never forget that you have an obligation to the animals whose lives depend upon your continuing care.

Animals, like people, suffer when they are deprived of food, water, shelter or attention when they are sick or injured.

Well-cared-for animals are usually able to repay their owners well with their productivity. Other people will be observing the way you handle the animals entrusted to you -- they will use your methods as a model.

Naturally, our concern for bettering human living conditions is the basis for this manual, but human welfare and animal welfare are inseparable.

There are differences to be noted between the two species: sheep are more easily fenced in or out because they are not jumpers like goats, and they are not harmful to trees as goats are. Goats love to eat the bark of trees. Actually, the "personality" traits of the two are quite different: goats are more

intelligent, curious and lively than the generally apathetic sheep. Of course the great advantage of sheep-raising is the renewable wool crop. The great advantage of goat-raising is their high milk production. (Milking sheep are prized in some places, but are not common and they can be milked for only a short period.)

Goats

This multi-purpose ruminant is considered the most important domestic animal in the tropics. Over 90% of the world goat population is found in the less-developed countries. Their primary value is usually meat (in some places it is preferred to mutton); however, there are areas where the goat's milk is considered its greatest value. In the Philippines, for example, there is a national plan to develop dairy goats as the chief source of milk.

Called the "poor man's cow," the goat provides nourishment to millions of peasant families and urban dwellers who would otherwise go without milk. Unfortunately, the goat's potential production has not been realized, due mainly to poor management and lack of proper feed.

With the dissemination of practical information about the goat, the unfair public image as a destructive animal is gradually being corrected; however, there remain some areas where goat-raising is prohibited. On the positive side: the goat is perhaps adapted to living with a wider range of environmental conditions than other domestic ruminants. Of all the diverse locations where they can survive, they seem to perform best in dry areas. An outstanding example of this is on the deserts of northern Mexico. (Cheese from these goats is in demand throughout the area.) Even so, goats are a very important part of the small-holders' resources in the humid tropics.

In Indonesia there are over 7 million meat-type goats.

There is no greater justification for raising goats than the improvement which their milk makes in the nutrition of the children of poor families. Goat milk has made a dramatic difference in the health of children in the villages of rural Honduras. Enthusiasm for goat projects there has spread from town to town by word-of-mouth advertising as parents tell how formerly sickly children are now strong because of milk from the family's goat. And in a country where hundreds of thousands of families' income is \$200 a year, having an occasional goat to sell for \$25 raises the standard of living substantially.

When you are considering a milk project, compare the native or unimproved cow, producing 3-4 liters per day (an optimistic estimate in some areas) to the 1/2-1 liter production of the unimproved goat.* Improved and purebred goats will provide 1-4 liters daily, depending upon management. As a rule, with several goats there can be milk the year around, while a single cow will be dry at least two months a year.

When milk production is not the object, note that in the tropics (unlike the temperate zones) goats will breed the year around. Three kiddings in two years is quite common, with the first at 12-15 months. Kidding intervals of 280-300 days can be expected with meat-type goats in the tropics, and twins are common.

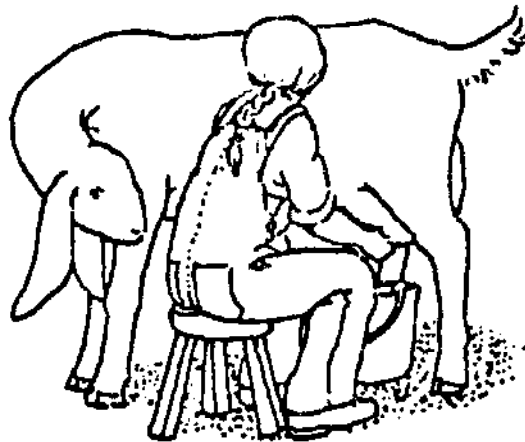
* Based on observations of milk goats in India and Central America. In parts of Africa 1/4 - 1/2 liters per day is more common.

Theoretically, a doe (female) should produce 2.1 to 3.3 kids per year; and half of this increase, the male kids, should be castrated at an early age, fattened and used for meat.

The females are kept to increase the herd, but the potential for increase is seldom realized due to high death losses in young kids. This is almost always due to poor management. Pneumonia and internal parasites are the most common causes of death in kids. Both of these can be minimized by: providing a shelter from winds and rain; a raised, slatted floor which helps to keep the kids dry and prevents their standing in their own manure and thus becoming re-infested with parasites.

It is generally assumed that there isn't much to raising goats, but experience has shown that there are certain management practices which are necessary for a successful project. You should start with a practical hands-on training program for all who will work with the farmers as well as for the farmers themselves. Lack of adequate advance training invites failure, and there are already too many failed projects.

Even after the goat's milk has made the difference between a healthy child and a weak one, the owner often feels that he has no social status until he has acquired a cow.



Sheep

Two general types of sheep are to be considered: wool sheep and hair (wool-less) sheep. Both are used for meat. Like goats, sheep are to be found in a wide variety of geographical areas and have served humans since early history. They are found from the highest mountains to the humid, sea-level tropics. Considerable adaptation by the different breeds found in each zone has made this possible.

Sheep are kept for their meat, wool, skins and manure, and are sometimes used as a "savings account" which can be easily converted into cash when needed.

The absence of wool makes it possible for the hair sheep to withstand tropical conditions. As the coarse hair is of little value, this is strictly a meat-type animal. In Indonesia a small, prolific hair sheep has evolved after many generations into a hardy, fairly parasite-resistant animal. These animals number over 3 million--96% of all the sheep in Southeast Asia. In this predominantly Muslim country sheep are the most important source of meat protein.

There are many recognized breeds of hair sheep, almost all of which are found in the tropics. They will generally breed the year around, and are more prolific than the wool breeds. Some hair sheep lamb twice a year and multiple births are common. In the Caribbean region there are several breeds or types of hair sheep, among which the Barbados Black Belly is the most colorful. These breeds originated in the Caribbean, resulting from crosses of European and African breeds.

The wool-type sheep, commonly found in the temperate tropics of Latin America, was introduced by the Spanish conquistadores. They are generally greatly in-bred, small, and with fleece which has degenerated to a poor quality. However, improved breeds have been imported to assist the local economy of the Andean regions, which is heavily based upon sheep. Wool from both sheep and Alpaca makes possible the cottage industries of the area and the homespun materials are often the family's primary source of income. Collectively, the sale of these woollen products accounts for a considerable part of the countries' export market. Much of the Andean region is too high and too cold for crop production or cattle.

If you plan a wool sheep project, you should bear in mind some special precautions:

1. Shearing the wool at the right time is something to consider and is a technique to be learned. Some groups have a strong tradition against a complete shearing, believing that the shorn sheep will die of pneumonia. In fact, this is a possibility if the shearing is done in very cold, rainy weather.

Some people are content to pluck what wool they need at the moment, but as a matter of good practice an over-all shearing and dipping for external parasites is necessary. It is difficult for the dip to penetrate thick wool.

2. Cleanliness is very important because dirty wool attracts flies as a place to lay their eggs. Prior to lambing a shearing around the ewe's hind parts (called tagging) will make both the birth and the clean-up after the birth easier.

Be especially careful to clean the wool if an animal has had diarrhea. In hot weather fly eggs hatch into maggots within a few hours. The maggots burrow into the skin at first,

concealed by the wool, but soon there is an obnoxious odor of decaying flesh. The sheep must be sheared immediately and treated with a spray or ointment, after thorough washing.

3. Sheep get a parasite in the nasal sinus called a "bot," which causes nasal discharge, sneezing and coughing. This needs prompt treatment. They also cough often from the affects of dust. This is not serious--but you have to be able to recognize the difference. (Goats can exhibit these same symptoms.) This would require spending some time with an experienced sheep-raiser.

Sheep are very different from cattle--not just smaller--and, as has been mentioned, they are quite unlike goats in some ways. They do offer the small-holder a valuable resource at a reasonable cost.

Swine

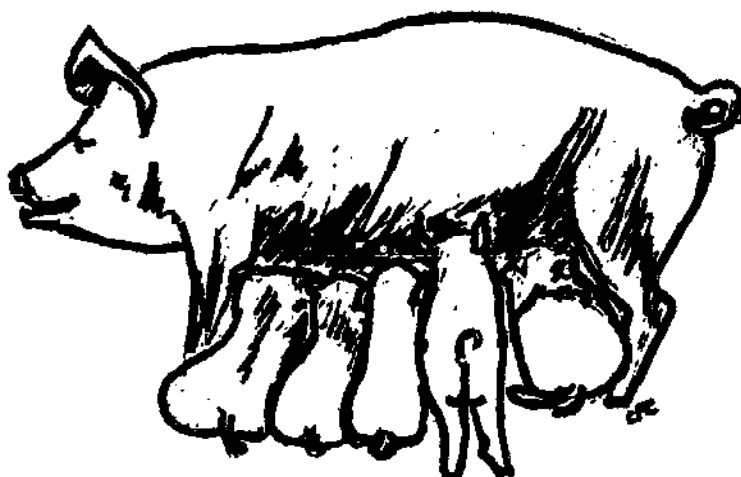
Swine are raised in most of the developing countries, but not always for the same reasons. In many countries they roam freely, scavenging in the villages, receiving little or no feed. Actually, such a pig is the family's "bank account"--to be sold when cash is needed. The initial investment to start a family project is not great, and even people who have little space can undertake this.

It is common in Asia for a family to keep a pig or two for fattening. These are confined to small rustic pens and fed table scraps in addition to prepared feed. The owner's small profit often makes possible some home improvement or educational opportunity for the children. In Cameroon wage earners often put part of each paycheck into buying feed for pigs, as a means of forced saving. This means the cash will not be available for relatives

who would like to borrow it. The owner may actually put more feed into his pigs than he will get back in the form of cash, but he will have money which would otherwise have gotten away from him.

On the other hand, cooperatives and/or commercial hog farms must operate on a business-like basis. Medium-sized commercial enterprises with up to 50 breeding sows require a substantial investment in housing, and must feed a balanced ration. Large-scale hog farms are common in some Southeast Asian countries, such as the Philippines, Singapore, and Thailand. The meat is extremely popular in China, which raises over 35% of the world's total pork production. (In Muslim countries, however, eating pork is a religious taboo.)

If you are thinking about a pig project: is your aim to help individuals with backyard projects?...Or are you thinking of a cooperative with perhaps 10 to 15 sows? Whichever you have in mind, a reliable source of scientifically balanced rations is essential. Even a backyard project cannot raise pigs entirely on table scraps. The digestive system of the swine is entirely different from the ruminants'. The pig cannot get enough of its required nourishment from grazing or foraging, so it must have a more concentrated feed to be productive.



Consider the advantages of raising pigs:

1. They are efficient in converting feed to meat. On good quality feed they are four times as efficient as cattle, and exceed sheep and goats*. Carcass dressed-weight can yield 70-75% of live weight, compared to 50-60% for cattle and 45-50% for sheep and goats.
2. Pigs are prolific. Litter sizes of 8-12 are common, and if the piglets are weaned at one month, a good manager can get 5 litters from a sow in 2 years. (Two litters per year is more common.)
Of course this kind of production depends upon a good ration.
3. As swine are fast-growing, the farmer can raise a piglet and receive a return on his investment in 6-7 months. Under good management a piglet will reach market weight of 90 kilos (200 lbs.) in this period of time.
4. Unlike ruminants, pigs do not require much space, but they do need room for exercise. Four to five square meters (16 sq. ft.) is often recommended per adult animal, but unfortunately they are sometimes enclosed in an area scarcely large enough for turning around, and this is a cruel way to treat any animal.
Don't forget an additional pen is needed in which to rear the piglets after weaning.

* Broiler chickens have the highest feed conversion rate: 2-3 lbs. of feed to 1 lb. of meat.

Consider the possible disadvantages of raising pigs:

1. In a backyard project disposal of pig manure can be a problem, and flies and odors will result from poor management. (If there is a garden plot nearby, the manure will be an asset, of course.) Even with good management, however, there always seems to be some fly and odor problem.
2. Pigs are subject to parasites and diseases, as are all other animals, and a systematic vaccination program is essential. If pigs are raised in pens that can be easily cleaned, serious problems can usually be avoided.
3. Hog (and poultry) projects are often criticized because these animals compete directly with humans for the available supply of grain. That is, man can utilize these foods directly. However, agricultural by-products such as rice bran, wheat bran, citrus pulp, blood meal and brewery wastes, which have no other use, can form an important part of hog rations. They do eat green feed, so pasturing and feeding a variety of tubers are good ways to reduce feed costs.

Caution: Before undertaking a pig project, study the market carefully. In some places the marketing of pork products is controlled by those who do the butchering and processing. In Eastern Bolivia, for example, the butchers control the price paid for living hogs, paying the same price for scavenger pigs as for good quality 6-month old pigs. Under such a system

the individual hog-raiser can not make a profit. A project near Cusco, Peru, successfully gets around this problem by processing all its own pork into hams, bacon, sausage and fresh meat.

Small-holder Poultry Raising

Poultry, in various forms, is raised throughout the world. Preference for a particular species is influenced by climate, available feed, or custom. Before deciding on a poultry project, consider community preferences and review the section on "Preliminary Considerations" as it applies to poultry.

Poultry is almost universally an integral part of subsistence farming and of the life of the landless peasant or villager. Most of their farmyards have chickens or ducks or turkeys together--sometimes geese, guinea fowl or pigeons too. Generally such birds find their own food, receiving a small amount of grain in the evening to coax them into their house, or to fatten them for a special occasion. The small-holder has little actual investment in the birds, but even so, if disease or predators strike the flock, his loss will be felt. In the case of an outbreak of disease, this loss will be multiplied by the number of families in the neighborhood, and the result can be disastrous.

Chickens

Keep in mind that chickens, especially, are affected by many diseases. There are many

countries where the chicken population is decimated by disease nearly every year. Few such outbreaks are investigated by the animal health officials due to lack of concern for small flocks.

Probably most of these occurrences of rapidly-spreading disease are fowl cholera or Newcastle disease, and these can be checked with diligence and community cooperation. For example, several villages in Honduras organized and coordinated a campaign to vaccinate all of the chickens every 3 months to control Newcastle disease. The cost to farmers was a few cents for each bird. High school students did the vaccinating, with the proceeds benefitting their school projects.

Turkeys

Are generally raised for market as a feast bird, due to their size and the cost of raising them. The occasional turkey farm caters to the "foreign" community and the wealthy. Commercial farms have a large investment in each bird if it is raised and fattened to sell at 6 months--and to the costs one has to add 10-20% for losses. In addition to requiring a larger initial investment than chickens, turkey farming demands skillful management because turkeys are delicate. Their temperament is different from the chicken's--it is difficult to prevent a turkey from being destroyed by its own stupidity.

Ducks

In large areas of Asia ducks are the preferred bird for meat and eggs. They generally suffer fewer diseases than chickens or turkeys. Ducks are "herded" through rice paddies where they

feed on insects, slugs and seeds while fertilizing the rice. They are efficient foragers, finding up to 100% of their feed, although they do not graze as efficiently as geese.

Ducks are valuable in controlling certain pests, such as grasshoppers, and they eat the snail which carries liver flukes which, in turn, cause extensive damage to cattle, sheep and goats. Certain water plants which tend to over-grow streams and ponds can be controlled by ducks. Commercial fishponds and ducks are a good combination as the ducks eat mosquito larvae and fertilize the water plants needed by the fish.

One of the most popular and prolific egg-layers is the Khaki Campbell duck. Reportedly it can produce 360 eggs a year, although 300 is more typical. Their eggs are larger than hens' eggs, with a flavor which is similar but stronger. These ducks are not good at setting and hatching their eggs, so it would be a good idea to keep some Muscovy ducks for this purpose.

Before planning a duck project, survey your potential market. In some communities there will be little interest in duck meat because it is dark, even though it is flavorful. In some places duck eggs are prized for their large size while in other areas they sell for less than hens' eggs.

Geese

Are largely grass-eaters and thus are easy to feed. They are a bit more "precocious" than other fowl and can start eating grass (along with their starter rations) at 4 weeks, and can be put out into the fields as "weeders" at 6

weeks. Weeder geese are useful to keep certain crops free of weeds--for example, onions, cotton, strawberries. They are selective in what they eat and will not eat the crops if placed in the field and then taken out again at the proper time. Another interesting and useful aspect of geese is that they are "watch-dogs"; that is, they are very noisy and aggressive when strangers appear on "their" territory.

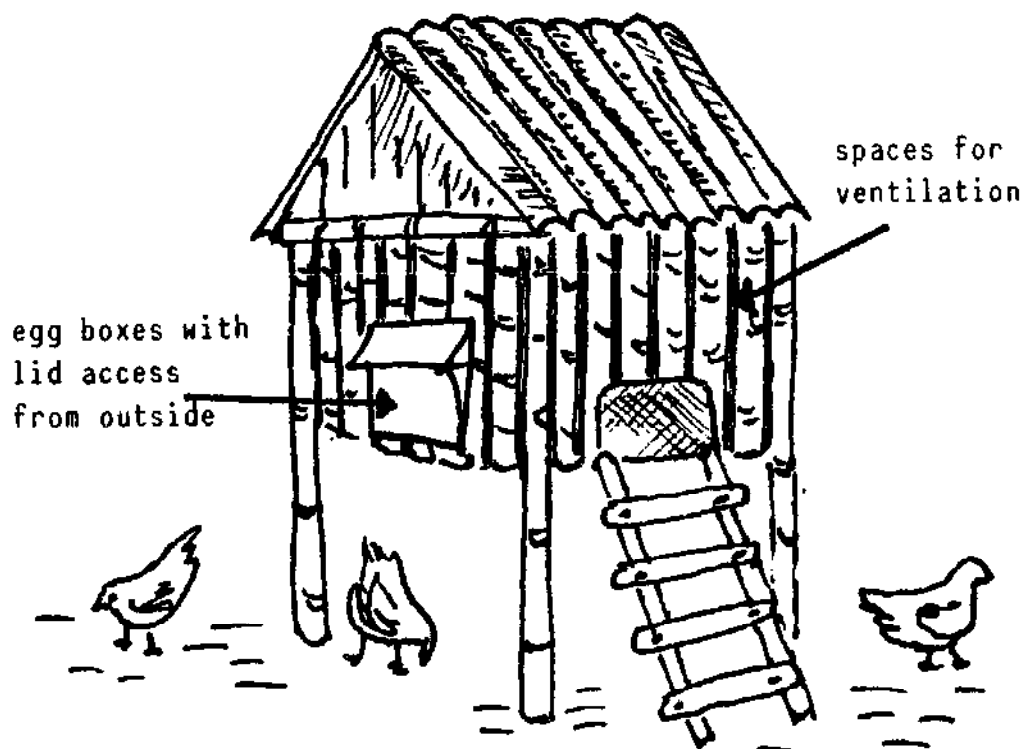
Weeder geese are a meat-type bird. Compared with chickens and ducks they are poor layers, with 50 eggs a year, at most. Goslings may be purchased from commercial breeders. Compared to chicks and ducklings they are more expensive, but they live much longer. (If not eaten!)

Quail

The coturnix, or Japanese quail, has appeal for its egg-producing ability and its small size. Up to 10 quail hens can be housed in the space of one chicken, or 25 in a cage 2' X 2' X 1' (0.6 m X 0.6 m X 0.3 m). With good nutrition they will come into full production at 50 days, as compared to 6 months for a hen. Annual egg production of 250 is common. In some places commercial farms are finding it profitable to raise quail for egg production, even though the eggs are small and fragile. Average egg weights per dozen: 5.5 ounces for quail; 24 for chicken; 31 for Khaki Campbell ducks.

The quail's productive life is one year, as compared to 1-2 years for a chicken, 2-3 for a Khaki Campbell duck, and up to 8 years for some geese. Quail are subject to the same diseases as chickens, and require the same scientifically balanced rations to get good production. They have the advantage of being

inexpensive to keep; a quail hen will consume 23 lbs. of balanced ration annually, compared to 97 lbs. for a white Leghorn chicken.



Guinea Fowl

Are popular in some areas, as they are more disease-resistant than chickens and can, to a large extent, forage for their feed. Although they don't lay as many eggs as commercial layers, their egg production is better than the average backyard chicken. Their meat is very dark in color which is not appealing to some people. They are very noisy when aroused--some people think they are better than watch-dogs.

Pigeons

Are a favorite with some people, although not as popular as most other poultry. They don't require much space and reproduce rapidly. The meat of squabs (young pigeons) is very tender.

All baby fowl--chicks, turkey poults, goslings, or ducklings --need special care: that is, a warm place which is protected from drafts and from predators. They must have a chick-starter ration for their first several weeks.

Commercial Poultry Raising

Commercial poultry raising is, of course, an entirely different type of enterprise. Near cities where there is a market for eggs and poultry meat, there are often large farms with birds numbering into the hundreds and thousands.

In a commercial operation:

1. There must be a sure market for the product, at the proper time, and reliable transport to get it to the market.
2. Poultry are confined, and a sizeable investment in housing is necessary.
3. Hybrid* egg or meat-bird chicks must be purchased from a dependable supplier.
4. Feed must be purchased from a reliable source of scientifically balanced rations. Without such feed the birds cannot develop or lay properly.
5. There must be a dependable source of electricity.

* Hybrids are high performance birds which are used on commercial farms; however, do not try to use them for reproduction because their chicks will be poor producers.

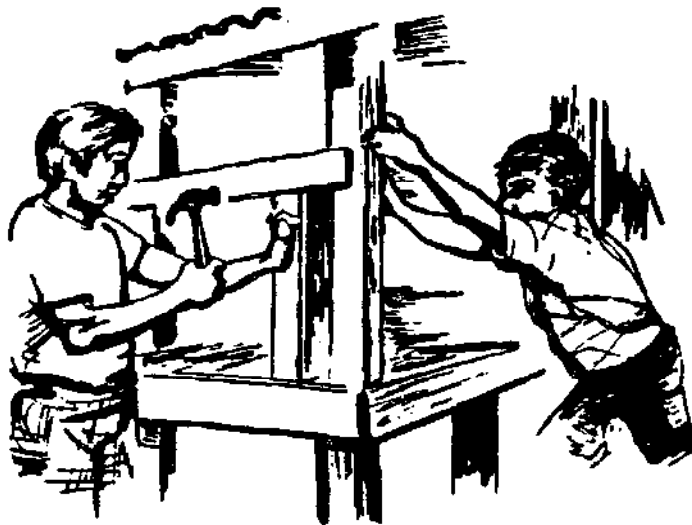
6. Technical assistance must be available, including vaccines and diagnostic laboratory service.
7. There must be a dependable source of vaccines and medicines.
8. A source of commercial credit may be necessary.
9. Secure storage facilities for large quantities of feed are necessary.

An outbreak of disease spreads rapidly among birds in close confinement, so daily observation and prompt action by a knowledgeable manager are essential. Be careful of interruptions in the feed or water supply, or substitutions in the regular ration; these can cause a drop in egg production or put the birds into a moult, delaying marketing. There is very little room for error in the management of a commercial poultry enterprise.

Rabbits

Of all the small-holder animal projects, rabbit-raising should be one of the most rewarding. Rabbits can be raised in urban as well as rural areas. They are quiet and cause little odor. They are easily cared for by anyone in the family, and can be fed table scraps and home-grown root and leafy plants. Their cages can be home-made and require very little space. The does (females) are prolific. They reach sexual maturity in 6 months, and a good doe should produce 4 litters per year with 7-10 per litter in her productive lifetime of 2-3 years. An exceptionally good doe can produce 175 lbs. of meat in a year. Rabbit manure is very beneficial to crops.

You would suppose that these qualities and advantages would make rabbit-raising an ideal project to increase the family's income as well as its protein supply; but generally speaking, rabbit projects have been very disappointing. Under ideal conditions, in the hands of people who work hard and manage well, a successful project is possible. However, compared to the number of rabbit projects started, there are very few successes to point to.



Here are some of the difficulties encountered in projects which fail, not necessarily in the order of their importance:

1. Bunnies are attractive, cute, and make good pets, and that is the end of many projects.
2. The quality and amount of home-grown feed is likely to be inadequate. The owner often underestimates the needs, which then means the doe does not have enough milk for the babies. Balanced rabbit rations will eliminate nutritional problems, but they are expensive and may not be available.
3. Faulty cage design and construction contribute to disease problems, as well as injuries and death when cage doors come open, or when dogs can

- reach the rabbits' feet through holes in the cage floors.
4. Not everyone likes rabbit meat or is willing to try it. It is more expensive than chicken in the market. In some areas the sale of wild rabbit meat affects the market.
 5. Rabbits are sensitive to green feeds which are not fresh and/or have mould on them (which is not apparent to the eye). The toxins in this feed quickly kill the rabbits.
 6. Mosquitos carry myxomatosis, a disease which devastates rabbits and makes raising them impossible in certain areas. Rabbits are subject to parasitic and bacterial diseases, and these conditions can spread rapidly from cage to cage. Constant watchfulness is important.
 7. While rabbit fur can be attractive, it is not durable when compared with other furs, so the prices paid for pelts are not a great inducement to raise rabbits. Furs produced in hot climates are generally of poor quality, and a market is often not available.

Note that there are three main types of rabbits: meat, wool, and fur, with many breeds of each type. The meat types are bred for large body size and fast weight gains. Angora rabbits are raised for their wool, which is plucked or sheared and made into a yarn. The fur types come in attractive colors and textures and pelts, when tanned, are used for garments and novelties.

Fish Farming

Raising fish as a source of food may be an idea which is new to you; however, it has been a practice for over 3000 years in Asia, supplying important protein for millions of people. Not only are fish "farmed" (raised artificially), but shellfish, shrimp and other species are cultivated in ponds, lakes, tanks, and cages which are suspended in the water. The term "aquaculture" is used to refer to raising the various aquatic species.

Before getting too involved in such a project, review the Preliminary Considerations, especially those regarding cooperative efforts, marketing, competition and security. Contact government agencies or local fish farmers for the technical information you will need. Environmental aspects of constructing a fishpond are very important, especially if it involves diverting water from a stream. Such an undertaking could have an adverse affect on neighbors as well as people who live a long way down-stream.

Some species of fish require salt water, others tidal or brackish water, while still others are fresh water fish. The type of fish to be raised will depend upon the water available. For instance, trout must have fresh, cool, flowing water, while tilapia do well in warm water ponds. Small lakes may be "stocked" or "planted" with fingerlings (baby fish), but where there are no natural ponds, artificial ones can be made near a stream or reliable source of water.

Digging a pond or making a dam requires a great deal of physical work, difficult for an individual to undertake; however, a group

working in cooperation can make it possible. Machine excavation is very expensive, but may be necessary in some cases. Will your group be able to work together over the necessary period of time? The fish must be fed--who will grow the feed? Fish farmers can produce most of the feed necessary because fish eat greens and agricultural by-products, with a diet similar to that of swine and poultry. When the fish are eating-size, poachers may come to the pond--who will guard it?

The location of the pond is important, because the pond will leak if the soil is too porous. The water quality must be checked because too much salt or mineral content or toxic substance will make fish culture impossible.

Fish farming can be conducted on a large, medium, or small scale. Large-scale aquaculture is a sophisticated business, somewhat like poultry-raising--that is, large numbers, large investment and diseases which spread rapidly. Good management is essential.

A small-scale fish project offers the opportunity for a family or group to produce food for year-round home consumption and for sale. The fish can be taken as needed, or the whole pond can be harvested at one time. Excess production can be preserved by smoking or salting. Harvesting can be done with nets or by draining the pond. The emptied pond site can be planted to a crop to take advantage of the richly fertilized soil, and then it can be refilled and restocked. Draining the pond has another advantage: drying out the soil at the bottom destroys many of the disease organisms which attack fish.

Duck-raising and fish-farming are complementary projects. Duck manure fertilizes plant growth in the pond to benefit the fish, and the ducks

keep the grass on the banks trimmed. (Be sure to keep the ducks confined in the morning until they have laid their eggs; otherwise, some eggs may be laid in the water.)

It would be misleading to suggest that a certain yield per hectare per year can be expected. So much depends upon the soil, water, temperatures, climate, and the fish-farmers' expertise. However, it is safe to say that up to 18 tons of fish per hectare per year are possible; one half of that would be more common. Large commercial operators get much higher yields. When balanced rations are fed, feed conversion rates of 5:1 are realistic; that is 5 lbs. of feed will produce 1 lb. of fish. Conversion rates using banana or manioc leaves vary from 25 and 18 to 1.

Bees

Beekeeping is a project which doesn't require much space and can be practiced even by people who have no land. Honey is always in demand as a sweet treat, and the sale of it can add to family income. Many people are afraid of being stung by bees, but there are ways to work with them safely.

Bees are essential to the pollenization of pasture plants, field crops and fruit trees, as well as wild flowers and garden flowers. An area where there are varieties of flowering plants assures a continuous source of nourishment for the bees. They do well near alfalfa fields or citrus trees, but must have other sources when those plants are not blooming.

Some farmers will actually pay to have bee hives located in their fields; but whether or

not this is the case, there are benefits from a successful bee project because there is almost always a market for the honey and the wax. In several developing countries there is an export market.

Bees make their homes in logs or tree trunks, and many people leave them there and gather as much of the honey as they can. However, much of it will be lost using this practice. You should plan to use modern hives in order to protect the bees and to harvest as much honey as possible. There are several variations of design for hives which can be considered by talking to producers or studying manuals.



Like any other project, beekeeping must first be studied and planned with care. Bees, too, are subject to diseases, parasites and predators. Ants especially enjoy raiding a bee-hive, so you will have to watch for them. Agricultural sprays may be lethal to bees, so they must be used with care.

It may be impossible to initiate bee projects near fields where continuous spraying of pesticides and insecticides occurs.

BIO-GAS

New techniques for collecting methane gas from manure and rotting plant materials make a bio-gas system worth considering. In any animal project where a large amount of manure is collected, and where gas could compete favorably with wood as a fuel, consider a bio-gas collector.

For example, a medium-sized hog project in the Philippines, a 3-cow dairy in India, a 50-goat dairy in India have functioning bio-gas systems. An additional source is toilet waste from the home.

There are variations in design of such units, of course. The "modified Chinese" bio-gas unit is a bee-hive shaped receptacle, about 6 feet in diameter, below ground-level, constructed of bricks. It has no metal tanks or moving parts. The gas collects in the top of this chamber, from which it is piped into the house for cooking, for heating water, for sterilizing milking equipment, etc. Gas generated in the chamber can't escape except through the outlet pipe, so that the system is odorless. The gas can also provide lights for the house and operate an engine for pumping water.

Remember that only methane gas is removed from the manure. The organic solids in the form of a "slurry" are eventually discharged from the chamber and go back on the land as fertilizer. Study installation costs first, of course. Where neighbors have stables nearby, a single bio-gas unit could serve more than one family, thus reducing costs to the individual.

Though much experimentation has been done with bio-gas digesters in developing areas, these systems are not widely found in the homes of the poor yet, probably because of relatively high installation costs.

Project Monitoring

Record Keeping

It isn't as easy to count cows as you might think.

Simple record keeping is one of the keys to a sound livestock project. Without regular recording of information you may lose track of what has been invested in the project and it will be impossible to know if the animals are providing the owners with a reasonable return for their efforts. Obviously this return can be calculated in several ways. Aside from income, we should also look at the nutritional and other benefits which come from livestock projects. Record keeping must be a part of your planning from the start.

Information on the acquisition of animals, breeding, reproduction, and current inventory should be recorded and kept up-to-date in a simple but adequate fashion. If this information is not recorded at the time of occurrence, it is very difficult to reconstruct the numbers and dates later.

When a simple record is kept concerning normal project costs such as feeds, medicines and labor, it will be fairly easy to determine if the project is making or losing money.

Records should be kept on the following:

Herd or Flock Inventory: Overall growth or decrease in herd numbers from death, birth, sales, and other additions or subtractions;

should be recorded for the animals in each category such as boars, sows, piglets, etc. Ideally you should also record weights at birth, weaning, and slaughter.

Breeding Records: Records on each breeding animal should include such information as heat cycles, date bred, sire, number born, sexes of offspring, number weaned, etc.

Income and Expenses: This should include costs for starting up a project as well as operating expenses such as feed, health care, equipment, etc. Obviously, the record of income from the sale of milk, meat, wool, or other products is important in relation to what the investment has been.

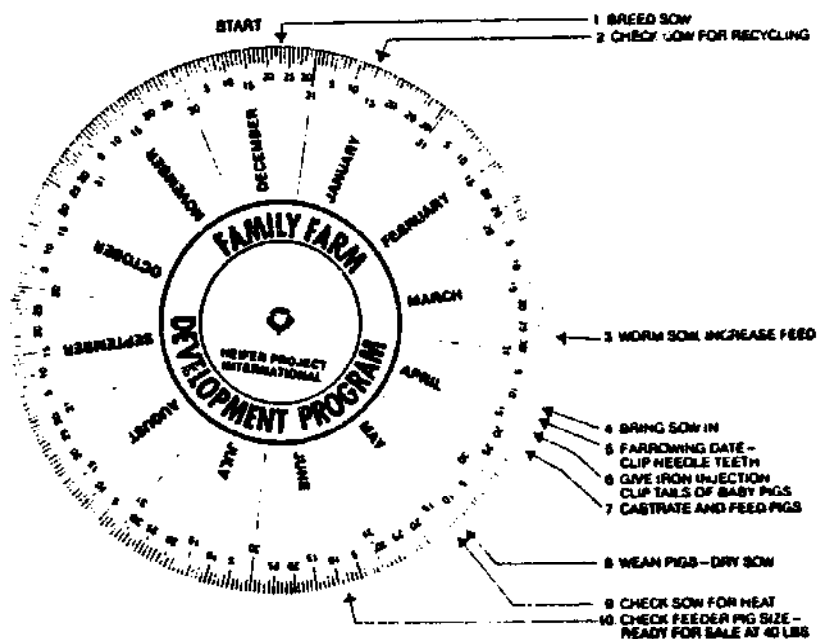
Most practical manuals on livestock production include a section on record keeping together with sample forms. Several of these manuals are listed in the section on reference materials in this guide.

HPI has also developed some easy-to-use forms for keeping track of herd or flock inventory on an annual basis. A "Production Summary Sheet" for each species is available from HPI and can be a helpful evaluation tool. With such records, herd growth rate, female growth rate, death and sales rates, etc. can easily be calculated.

Perhaps one of the most practical tools for helping the small producer improve management through record keeping, are the Management Calendars and Herd Management Wheels for cattle, swine and sheep which have been developed by the Family Farm Development Network and others. The Wheel reminds you of what needs to be done on a particular day with reference to raising and managing the herd, and

the Calendar provides a place to file receipts each month and a record of income, expenses and other herd or flock activities.

SOW HERD MANAGEMENT WHEEL



Evaluation

Approaching Evaluation

There are a number of basic questions which always arise when a project is being considered for financing or when a project is being evaluated. Besides questions concerning the particulars relating to the practicality of production for each species dealt with in this guide, there are questions relating to the human factor: How are the people organized?; Who is in charge?; Are the people trained and ready to handle the livestock?; What do they feel are their needs?; Their problems?; What do they want to achieve?; Are they making a real commitment to the project?.

All of the planning questions listed at the beginning of this guide can be used to review the project when you get to the evaluation phase especially those referring to the goals of the project.

Terms Used In Planning And Evaluation

The literature on planning and evaluation does not provide any absolute definitions of terms. However, for effective communication it is important that people who work together in projects all have approximately the same idea as to the meaning of the terms they use.

The following definitions of terms might be helpful:

<u>TERMS</u>	<u>DEFINITIONS</u>
Needs	Clearly described, this is a lack of something desired by the community and should be defined by the people involved in a given situation.
Purpose	The organization or project exists to fulfill the defined need. This is a broad statement of <u>why</u> the project or organization exists.
Policy	Gives the basis for "the way we operate."
Goals	"End results" statements of what will be accomplished.

project. This is what is called baseline data. This baseline data is lacking in many projects. However, at the very least projects should become more conscious of documenting, by observation if not by survey and statistics, the conditions before a project begins (i.e. the need which we are hoping to affect by way of our project work).

EXPECTATIONS

Production figures given in various books and reports and in this guide may seem unrealistically high compared with results which you have seen or experienced. Such figures should be interpreted as what is being done somewhere, and what is known to be possible under ideal conditions.

These figures should not be used to measure the results of your own project without considering all the factors that make animal projects possible. It would be far better for you to try to exceed your own rate of production each year than to try to compete with the records of top producers in some other country.

The greatest gains to be made with livestock in the developing countries will not come from more animals, but from better performance by the existing animals.

Objectives:

In the way we are using planning terms here, objectives are more specific and it may require several of them to accomplish the goal. Objectives should be:

- Specific (often includes numbers and \$).
- Time-related.
- Measurable or observable.
- Related to the primary goal.

Several examples of objectives related to the above goals are:

- To assist in the formation of a mothers club in each of the three communities, to include all the women of the 100 participating families in the project.
- To carry out a course on the production and use of goat milk with each club so that all participants have these basic skills.
- To bring at least two milking goats into production for each family within two years.
- To have each family which receives a donated goat "pass on the gift," i.e. a female offspring for re-distribution.

A Final Note:

Simple but continuous reporting and follow-up, especially by the "owners of the project," can tremendously improve projects by helping those involved make good choices and decisions. HPI has written a manual for the evaluation of small-scale livestock projects which contains practical ideas for planning and carrying out an evaluation and putting the results to good use.

Farmer Education

One of the things you need to think about and plan from the beginning is the education (training) of the project participants. This includes both teaching them before they receive the animals and follow-up or extension support after the animals have been distributed. What do the farmers need to know or be able to do to insure that the animals will be healthy and productive? What attitudes do they need to have toward the animals and their care? How will you help the farmers learn these necessary skills and attitudes? What resources do you have available for education? Where and how can you get additional resources you may need, including skilled people?

Continuing Education

Planning for continuing education (or perhaps more appropriately continuing learning) of the participants is crucial to the long term success of any project. In many cases the farmers will have had no previous experience in caring for livestock. Even when they have, the project should aim at helping them do a better job of managing the animals.

In any case, the participants will need to learn new skills and attitudes. Many of these innovations will need to be taught before the animals are distributed. For example, in a dairy cattle project in Tanzania farmers have to be taught how to plant good fodder crops and the construction of a simple milking shed before receiving a heifer. Learning such skills and implementing them should be a

condition for the receipt of an animal. But learning does not stop there. Many skills are best learned when the farmer has the animal and can see the results of his or her efforts.

Since agriculture is dynamic, problems and opportunities will continue to emerge. For example, there may be an outbreak of a disease, or a new type of by-product may become available for feed. The farmer who does not continue to learn may fail to solve new problems or take advantage of new opportunities.

Is there a system to help teachers or extension workers keep up-to-date, or to help them find solutions to new problems? Remember, the extension workers cannot teach something they do not know. It is important to provide them technical backstopping and continuing opportunities to learn. It is also important to keep them motivated. In many instances extension workers and veterinarians are employed by the government and resent working outside office hours and walking long distances to farms. They may wait for farmers to come to them.



Motivation To Learn

We have often heard people say that small-scale farmers in developing countries resist change. It is said they don't want to learn and implement new practices. Our experience is to the contrary: most are eager to learn, but are reluctant to take the risks involved in trying a new practice. Since they have very little material surplus, it is difficult for them to take risks. It should be recognized that existing practices are the result of long experience - though they may not seem logical to the outsider, these practices have stood the test of time. Foreigners and nationals with formal education often assume they know much more than the local farmers. Often farmers fail to adopt innovations recommended by experts because practices recommended by researchers, on close examination, prove undesirable. Farmers not only know the local environment much better than outsiders, they also know their own interests and resources. It is therefore important to use a questioning, participatory teaching approach in order to gain understanding, build on and benefit from this knowledge. This is sometimes referred to as the dialogical approach to education, as contrasted to the more traditional methods of teaching by "depositing" knowledge in the student.

In learning a new practice it is often necessary for the participant to first "unlearn" an old practice. The teacher cannot help the learner unlearn unless it is understood why the learners do what they do. Before trying to teach a new practice or encourage farmers to raise a different animal, be sure it is desirable from the farmer's point of view under his or her circumstances. What

works at a research center will not necessarily work on a small farm. Often it is impossible to be sure before trying it. This is one reason why it is good to start small and be ready to learn and change as you go.

Educational Methods

Usually it is best to use a variety of methods. In working with farmers who are illiterate or have little formal education, it is good to be as practical and "visual" as possible. World Neighbors' experience shows that what people hear they forget; what they see they remember; but what they perform they can do. Research in India shows that when a message is repeated in different ways, it is more likely to be understood. Thus, a good education program should involve more than a plan for occasional farm visits. It should combine demonstrations and "hands on" practice with discussion, written materials, the use of visual aids and perhaps other techniques such as drama, singing and radio. Talking about the experience with fellow learners after having "done it" is often the best reinforcer of learning.

Choosing The Right Methods

Which methods should you use to help the farmer learn the needed livestock production skills? You and the farmer are the only ones who can answer this question. Educational or extension methods are often divided into three broad categories depending on the size of the audience with which they are used:

TYPE OF METHOD

EXAMPLES

Individual

Practical experience

	Farm or home visits
	Personal letters
	Telephone
	Office visits
Group	Lectures
	Demonstrations
	Audio-visuals
	Discussions
	Simulations
	Role play
	Case study
Mass	Radio
	Newspaper
	Written material

Each method has a particular use and certain advantages and limitations. Some methods, such as demonstrations and visits allow more interaction and experience. Others, such as radio, are primarily for giving information. Descriptions of these methods and their use can be found in some of the extension handbooks listed among the references.

In planning which educational method to use, three major factors need to be considered: (A) the learners; (B) the content; (C) your resources.

A. The Learners. "Know your audience" is one of the most basic communication principles. Your message and method must be tailored to your audience. One important part of this is knowing where they are in the learning process. For most livestock projects, learners need a chance to learn and practice skills followed by encouragement in the application of these skills on their own farm. At these stages, group and individual

approaches are recommended. Other important characteristics of learners are:

1. Confidence in extension advice.
People are often rightly skeptical and must be shown before they believe.
2. Literacy level.
3. Ability to take risk.
4. Sources of information.
5. Ability to attend meetings or short courses.
6. Division of labor and control over livestock management.

B. Content. The method(s) you choose to teach the farmers should also take into account the type of innovation or idea you hope they will adopt or learn. Most livestock management skills are best learned through practical experience. It may be possible to provide such experience through a demonstration; having learners work with an experienced farmer or in practice sessions as part of a training course. Often visual aids such as pictures or slides can help to show those things which are not easily demonstrated because of timing, rareness, etc. For example, a difficult birth is not easily staged. Symptoms of disease are hopefully rare.

Changes, or what is being taught, can be classified by how they rate in terms of the following:

1. Individual or group change or action.
2. Complexity.
3. Visibility.
4. Urgency.
5. Newness.

6. Cost and risk.
7. Impact on existing values.
8. Ability to be tried on a small scale.

Again, it is not possible to elaborate, but the method(s) used should suit the message. Too often the standard answer to, "how will the farmers be trained?" is, "the government will provide extension services."

C. Your Resources. Having thought about your participants and the types of change you hope they will make, you need to think about your educational resources. People are, of course, the most important resource. Who is available to teach the farmers? What skills do they have, both in terms of knowledge of livestock and communication with people? How much time do they have available and how much time are they motivated to give to this task? Are there others in the area who might help? Are there experienced farmers and village leaders who could be used as village level extension workers (promoters, animateurs)? Is it possible to teach these workers the skills and attitudes they need?

Try to be as realistic in assessing your people resources as possible. As noted earlier, government extension workers are often not very motivated and may lack practical knowledge, even after several years of training. Unless the extension workers are accountable to you and/or the participants, it is difficult to be sure of their services.

Other educational resources are:

1. Transport to allow farm visits.

2. Farms where good animal husbandry can be observed/practiced.
3. Places to meet in the villages.
4. Materials and a budget for demonstrations.
5. Demonstration/practice animals.
6. Printed material.
7. Audio-visual aids.
8. Local newspapers or radio.

Training Centers and Demonstration Farms

Too often the first thing that people think of when they consider how they will educate the participants is a training center or demonstration farm. Perhaps this is because most of us have been taught in school buildings and tend to think of courses and institutions. While training centers can play a useful role, their limitations should be recognized. First, they are very expensive to construct and operate. Arranging a variety of courses also takes a lot of staff time and skill. The need for this type of training and interest in it are also limited. Second, many farmers are limited in the time they can be absent from their homes and farms and are therefore unable to attend courses longer than a few days. Courses lasting from several months to several years tend to be academically oriented and to cut a person's ties with his or her village and to raise expectations of wage employment. Batchelor reports that out of 122 graduates of one farm training center, only two went back to farming.

Even when a course is short and practical, training centers and demonstration farms are

often poor teaching tools. The animals at the training centers and demonstration farms are often not as well managed as those belonging to individual farmers. They are looked after by staff who have little incentive to see that the animals are properly cared for day and night. Instead of being a source of income, such farms often lose money. Farmers also tend to discount what they see at such centers and farms because they are aware that they have more and better resources (tractors, vehicles, staff, contacts, budgets) than the small farmer. A demonstration on a farm with conditions similar to that of the target group is therefore much more effective.

On the other hand, demonstration farms and training centers have certain strong points. For example, they allow for some experimentation and testing of new ideas. A variety of animals, feedstuffs, grasses, educational materials, etc. can be kept in one place and reused in teaching different audiences. Farmers may enjoy the chance of "going to school" and meeting people from outside their own village and this can stimulate learning.

In conclusion, it is best to look at residential courses as supplementing the extension program instead of extension being the follow-up courses. There is no substitute for ongoing contact with the participants to help them continue to learn while providing necessary support services.

What Is Heifer Project?

A Leader is best
When people hardly know he exists,
Not as good when people proclaim him,
Worse when they despise him.
But of a good leader, who talks little,
When his work is done - his aim fulfilled -
They will say, 'We have done it ourselves.'
By Chinese sage Lao Tse,
as quoted in The Story of Dan West

The above words well express the philosophy of Heifer Project International, an organization whose origins go back to the fulfillment of the dream of one man, Mr. Dan West, its founder. As a relief worker in the Spanish Civil War, Dan West discovered that enhancing human dignity is more important than merely insuring physical welfare, and that only lasting help gives lasting benefits. Dan found that when people accepted his handouts of powdered milk, they felt their dignity had been somehow compromised; and when the supplies of milk ran out, the people were no better off than before he had helped them. The solution, Dan decided, was not handouts of milk but gift/loans of dairy heifers that would produce an ongoing supply of milk and a calf every year. Everyone would pay for his or her heifer by giving its first offspring to a needy neighbor, thus passing on the gift.

As recorded in the Articles of Incorporation, the purposes for which Heifer Project International, Inc. is formed are as follows: To provide, under Christian direction, livestock to needy persons and other related services toward helping people feed themselves.

Heifer Project International (HPI) today is a world-wide, non-sectarian, non-profit, self-help organization, financed by voluntary contributions that provides livestock, poultry, and related services and materials to people in developing areas of the world (worldwide and U.S.).

Since HPI made its first shipment of livestock in July 1944, it has grown in ways not even imagined by the visionary Mr. West. Over the past 40 years approximately 70 thousand animals and 2 million units of poultry have been distributed by HPI to people around the world and more than 30 states within the U.S. No one knows the number of their descendents; nor can anyone measure the impact on the lives of all the beneficiaries. These livestock have not gone to HPI projects per se; rather, they have been placed with local project holders such as extension groups, cooperatives, government agencies or church-related development programs. Each project is based on local initiative and needs defined by a local group. Projects aim at self-sustaining development of people through genetic improvement of farmstock and demonstrating and teaching proper livestock management. HPI's diverse experience in livestock development has made it increasingly aware of the need to place animals that are environmentally appropriate. Another serious consideration is to assure that livestock are not placed where they compete with people for scarce grain which can be more effectively directly consumed.

From its beginning HPI has worked through a committee structure. The current committees include representatives of various supporting church boards and a designated number of at-large members from HPI's grassroots constituency. All project requests to receive

consideration by HPI must be consistent with established program criteria. Three major factors are considered: the economic, technical and social feasibility of the project; the objectives and goals of the project as expressed in the project proposal; and the provision for "passing on the gift." A simple summary of criteria includes: How many people will benefit from the proposed project and at what cost?; Are those who are to benefit from the project involved in its planning and design?; Is there veterinary care, adequate shelter, and sufficient feed available for the animals requested?; Is a training component built into the project so that it will have long range benefit?; What plan does the group have for passing on the gift to others in need who can care for the animals?; Will benefits continue after the end of the project?.



"Passing on the gift" has been mentioned several times. It is the principle which has made HPI unique as a self-help organization, and one that has been used as a model by numerous other programs throughout the world. For HPI-related projects there are a number of ways in which recipients can arrange to become providers of animals to others, including - but not limited to - the following:

- Pass on the first offspring. (For example: recipients in the first "heifer project" agreed to return the first-born female.)
- Pass on the original animal and keep the offspring. (For example: a pair of top-quality rabbits may be used to breed a large litter, and then returned for another recipient to use as a "starter.")
- Pass on multiple offspring. (For example: the recipient of a goat that has kids twice a year might return on offspring from the first and third kiddings; or, the recipient of a sow producing two litters a year of eight pigs each might agree to return four pigs by the end of the first year.)

Usually a local project committee is responsible for enabling those who receive livestock to provide livestock for others. This committee also selects new recipients and prepares them to care for the animals and to see that they also agree to "pass on the gift" by providing offspring, or - where appropriate - by teaching others as they have been taught. Requests for support from HPI must state how the project sponsors and individual recipients agree to "pass on the gift."

As HPI works to assist local organizations in designing projects so as to be self-supporting and self-perpetuating, its major reason for being is always kept in the forefront: that of assisting small farmers around the world to achieve a better living through more efficient use of human and natural resources.

LIVESTOCK IN DEVELOPMENT
Bibliography/Resource List of
Practical Materials

GENERAL

- Aaker, J.; Schmidt, A., Evaluation Manual for Livestock Projects, Heifer Project International. 1981.
- Arthur Yates & Co., Better Pastures for the Tropics, Yates. 1975.
- Cox, M.; Rice, D., Environmentally Sound Small-Scale Livestock Projects, CODEL-HPI-Winrock, available from VITA. (in print)
- Hall, H.T.B., Diseases and Parasites of Livestock in the Tropics, Longman, New York. 1977. (\$7.95)
- Humphreys, L.R., A Guide to Better Pastures for the Tropics and Sub-Tropics, Wright Stephenson, Australia, 1980.
- Humphreys, L.R., Tropical Pastures and Fodder Crops, Longman, New York. 1978. (\$5.50)
(Intermediate Tropical Agricultural Series)
- Ministry of Livestock Development, Zero Grazing, A Guide to Extension Workers, P.O. Box 68228, Nairobi, Kenya. 1983.
- Williamson, G.; Payne, W., An Introduction to Animal Husbandry in the Tropics, Longman, Inc. (\$31.00)

BEES

- Clauss, B., Bee Keeping Handbook, Agricultural Information Service, Private Bag 003, Gaborone, Botswana. (\$7.50)
- Gentry, Curtis, Small Scale Beekeeping, Manual M-17, Peace Corps. (\$7.50)
- Spense, Joaquin Douglas, La Apicultura: Guia Practica, (Developed in Guatemala), Information available from Heifer Project.

CATTLE

- Aagaard, S.E., Utunzaji wa Ngombe wa Maziwa
(Raising Dairy Cattle), Heifer Project.
1978.
- Animal Production Research Unit, Beef
Production & Range Management in Botswana,
Ministry of Agriculture, Agricultural
Information Service, Private Bag 003,
Gaborone, Botswana.
- Gingerich, Ken, Manual Practico de Ganaderia
Tropical, MCC and HPI-Bolivia.
- Needham, Tom, Dairy Farmer Training Manual,
Heifer Project. 1983. (draft only)
- National Dairy Research Institute, Dairy
Handbook, Vol. 1 - Production, Vol. 2 -
Processing, ICAR, National Dairy Research
Institute, KARNAL-132001 (Haryana).

GOATS

- Devendra, C.; Burns, M., Goat Production in the
Tropics, Commonwealth Agricultural Bureau,
Bucks, England. 1983. (\$25.00)
- FAO, Self-Learning Manual in Dairy Goat
Production, FAO Regional Dairy Development
and Training Team for Latin America,
Santiago. 1983.
- Guss, Sam, Management and Diseases of Dairy
Goats, Dairy Goat Journal Publishing Co.,
Scottsdale, AZ. 1977.
- Sands, M.; McDonald, R., The Potential of the
Goat for Milk Production in the Tropics,
Department of Animal Science, New York
State College of Agriculture, Cornell
University, Ithaca, New York. 1978.
- Sinn, Rosalee, Raising Goats for Milk and Meat,
A Heifer Project International Training
course. 1984. (\$10.00)
- Thedford, Thomas R., Goat Health Handbook, A
Winrock International publication. (\$4.25 +
postage)

POULTRY

- French, Kenneth, Practical Poultry Raising,
Manual M-11, Peace Corps.
- Holderread, Dave, The Home Duck Flock, The Hen
House, P.O. Box 492, Corvallis, OR 97330.
- Mercia, Leonard, Raising Poultry the Modern Way,
Garden Way. (\$7.95)
- Poultry Production Task Sheets, Penn State.

RABBITS

- Attfield, Harlan D., Raising Rabbits, A VITA
publication.
- Cecil, Robert, Raising Rabbits for Nutrition and
Profit, Catholic Relief Service, Tunisia.
1982.
- Cheeke, Patton; Templeton, Rabbit Production,
OSU Rabbit Research Center, Oregon State
U., Corvallis, OR 97331. (\$12.50)
- Sicwaten, Juan; Stahl, D., A Complete Handbook
on Backyard and Commercial Rabbit
Production, CARE-Philippines. Available
from Peace Corps.

SHEEP

- Bishop, John, Prolific Hair Sheep, (a paper
available from Heifer Project)
- Devendra, C.; McLeroy, G.B., Goat and Sheep Pro-
duction in the Tropics, Longman, New York.
1982.
- Diamond, James E., Sheep Production Task
Instruction Sheets, Penn State. 1980.
- Family Farm Development Network, Sheep
Management Calendar, Heifer Project.

SWINE

Alabama Cooperative Extension Service, Various manuals on swine production, Tuskegee Institute.

Eusebio, J.A., Pig Production in the Tropics, Longman, New York. 1980. (Intermediate Tropical Agricultural Series). (\$5.95)

Family Farm Development Network, Swine Management Calendar, Heifer Project.

Loon, Dirk Van, Small-Scale Pig Raising, Garden Way.

ANIMAL TRACTION

Davis, Richard; Chakroff, Marilyn, Animal Traction, Manual M-12, Peace Corps. 1981.
The Water Buffalo: New Prospects for an Underutilized Animal, Commission on International Relations (JH-217) NRC, 2101, Constitution Avenue, Washington, D.C. 20418. (Free)

FARMER EDUCATION

Batchelor, P., People in Rural Develop, Exeter, Paternoster Press. 1981.

Botham, C.N., Audio-Visual Aids for Cooperative Education and Training, Rome, FAO. 1967.

Bradfield, D.J., Guide to Extension Training, Rome, FAO. 1966.

Bunch, R., Two Ears of Corn, World Neighbors. 1982.

Pett, D.W., Audiovisual Communication Handbook, World Neighbors.

Saville, A.H., Extension in Rural Communities, London, Oxford University Press. 1965.

LIVESTOCK RESOURCE ADDRESSES

Garden Way Publishing, Pownal, Vermont, 05261

Peace Corps, Information Collection and Exchange, 806 Connecticut Ave. N.W., Washington, D.C.

Winrock International, Information Services, Rt. 3, Morrilton AR 72110

Heifer Project International, Program Department, P.O. Box 808, Little Rock, AR 72203

VITA, (Volunteers in Technical Assistance), 1815 Lynn Street, Suite 200, Arlington, VA 22209-8438

Department of Agricultural Education, Pennsylvania State University, University Park, PA 16802

Wright Stephenson & Co. (Australia), 117 Silverwater Road, Silverwater, New South Walse, 2141, Australia

Longman, Inc., 19 West 44th St., New York, NY 10036

World Neighbors, Development Communication, 5116 N. Portland Ave., Oklahoma City, OK 73112

Yates Seeds, P.O. Box 117, Rockhampton 4700, Queensland, Australia

FAO, Distribution and Sales Section, Via delle Terme di Caracalla, 00100, Rome, Italy (FAO has local distributors in many countries)

Below is an example of the H.P.I. Project Rating Form which is used by staff in reviewing projects in light of H.P.I. priorities and criteria.

I. FEASIBILITY

Feed and Nutrition
Facilities
Training and Extension
Disease control/veterinary
Marketing
Management
Local contribution to project

II. PRIORITIES

A. Need: (Socio-economic level of participants)

- Commercial producers
- Small producers but not poor
- Small producers, poor
- Subsistence or very poor

B. Appropriateness:

- Livestock requested may not be ecologically appropriate
- Animals may be in competition with people for feed grains or other resources
- Livestock requested is traditional and ecologically sound
- Livestock requested will be beneficial to the ecology of the area

C. On-going Commitment:

- No prior H.P.I. relationship or support
- Previous satisfactory relationship to the project group

-- Multi-year commitment previously made
(or implied)

D. Relationships: (Type of organization
making request)

- External third party cooperating
organization
- Government structure
- Non-nationalized church mission or
religious organization
- Community based group
- National P.V.O.
- National denomination or church
- National or regional ecumenical
organization

E. Integrated Development:

- Livestock is the only component, not
integrated
- Livestock is the only component, but
will catalize other actions
- Various project components are
integrated/coordinated, i.e.,
livestock is one of several aspects
of the project

F. Availability:

- H.P.I. does not possess this breed or
species and/or it is difficult to
acquire
- This particular breed or species is on
hand or is easily obtainable

III. PROJECT SELECTION CRITERIA:

A. Initiation:

Project demonstrates community
initiative (definition of need,
commitment, control).
Is socially and culturally
appropriate.

B. Integration:

Project is a part of, and is compatible with broader development efforts.

C. Spread:

A just and workable "passing on the gift" system is planned.

D. Results:

Project should become economically self-sufficient within an appropriate period of time.

Should contribute to self-reliance of participants.

E. Impact:

Will achieve nutritional betterment.

Will achieve socio-economic betterment.

Will facilitate movement of resources into the hands (control) of the poor.

Project is ecologically and technologically sound.

F. Process:

Well planned with defined objectives.

Includes evaluation.

Will increase knowledge, skills, and problem solving capacity of participants.

Benefits will continue after initial goals are achieved.

IV. OBJECTIVES: Degree to which objectives are:

Clear and measurable

Attainable and realistic

GOALS:

Specific/measurable
Time related

COMMENTS: (Will it be possible to evaluate the results of the project using the stated goals and objectives?)

SUMMARY: (Combined ratings of areas I, II, III, IV)