

10. ANIMAL PRODUCTION AND RESEARCH IN THE REPUBLIC OF VIET NAM

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Introduction

The Republic of Viet Nam lies between an area 104 to 109 degrees east longitude and 8 degrees 31 minutes to 17 degrees north latitude. Total land area is about 171,655 square km (about 66,200 square miles); with about 18.5 million people living in 44 provinces. The country can be divided into three geographic and agricultural regions termed the Mekong Delta, Central Lowlands and Central Highlands. Over 12 million people are farmers operating some 42 million acres; most of those are in the Mekong Delta.

The terrain of Viet Nam is very diverse. Soils range from alluvial soils in the Mekong Delta to silts and light red laterites in the plains and Central Highlands. The silt load of the Mekong River is spread over the Mekong Delta area yearly during flood season, thus replenishing soil fertility and making huge rice crops possible. Cropping is carried on according to the "flood rhythm." Recently, the Government has been helping farmers in this area to intercrop sorghum with flood rice before the dry season begins to increase local feed grain production, thus improving incomes of rice farmers.

The Central Highlands, an area of some 25,000 square kilometers, are geographically the highest areas in South Viet Nam. They constitute the Southern Chaine Annamitique which begins 80 kilometers North of Saigon and extends into North Viet Nam, Laos and Tibet. Central Highland Plateau, an area 320 kilometers long by 160 kilometers wide, is a major geographic feature. It is very sparsely populated in normal times by montagnard people who use slash and burn practices to grow rice and corn and graze few cattle on the native pastures, which are seasonally burned over. The Western and Southern slopes of these regions contain about two million hectares of good fertile uncultivated land which would be perfect for extensive beef cattle production, provided socio-political security insurgency groups could be assured. Savannah grasses are naturally maintained on many of the more favorable site through much of the year because rivers provide a high water table.

Viet Nam has a warm moist tropical climate (monsoon) with a wet and dry season about six months each. In the highlands the high elevation tempers and shortens the hot dry season somewhat. Total rainfall varies with location but ranges from 1800 to 2500 mm or more annually throughout the area.

Viet Nam livestock production went through different states of development along with the general political and war situation. By and large, livestock industry contributes significantly to the National Economy.

During the early days under the French domination, Viet Nam had imported a number of breeding stock but the livestock industry could not make good progress due to lack of techniques.

Since 1945, the war broke off. National Defense took up majority of the National

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Budget and consequently no much fund was left for technical development program. Lack of security in the rural areas also hurted the total livestock production. However, beginning 1966, the Government of South Viet Nam, with the support of the United States Government launched an intensive livestock development program to increase animal protein supply for the South Vietnamese people thus improving their living conditions throughout the country. Swine and poultry were judged to



Fig. 1. Administrative map of the republic of Viet Nam

possess higher development potential than other domestic animals. Since then, technology of livestock production has been significantly increased among producers, more breeding animals have been imported into Viet Nam and adequate means of protecting animal health have been provided by the Government. Up to present time, Viet Nam can follow other leading countries in the area of livestock production and is in position to export breeding hogs, commercial chicks, ducks, and animal products.

However, a number of problems is still to be solved including local production of feed ingredients, processing and marketing of animal products and cattle development in the Central Highlands once security is truly obtained.

Animal Production

A. Swine

1. Swine Production

The Vietnam swine industry has programs underway to increase hog production and production efficiency. These programs include importation of breeding stocks, better feed efficiency through improved management practices and use of imported feeds and protein supplements, and larger litter size through better management accompanied by use of vaccines to control swine diseases.

Official reports from 1968 through 1971 indicated a net inventory gain of 14.6% during this four year period or an annual population gain of 3.65%. This is a reasonable assumption in view of increased yields resulting from better management, breeding, nutrition and health practices now associated with the commercial swine production centered near the major urban areas. This category of producer, although relatively new, exists because the traditional swine industry has not been able to meet the demand generated by the increasing human population. Commercial swine group plays important role in supplying quality breeding stocks and technology to the industry as whole.

In 1969 and 1971 over 1,000 pure bred hogs, male and females, of Yorkshire, Duroc and Poland China breeds were imported from the U.S. for the purpose of (a) providing a source of improved blood lines, and (b) to demonstrate modern swine management in Vietnam. The swine were distributed in units of sufficient size to establish nucleus breeding herds throughout Vietnam. There is ample evidence to demonstrate that purebred progeny from the swine imports are breeding used in crossbreeding program, especially in the rural areas.

In 1970, 71 percent of the reported swine population was in the Southern Region, with 54 percent of this concentrated in the western part of the Region. This lowland area supplies 75 percent of the total rice production as well as a large quantity of rice by-products available for hog feeding. The Central Lowlands accounted for 26 percent of the swine population, and the Central Highlands accounted for only 3 percent.

Many of the larger producers sell 70-80 percent of their pigs to small producers in one to five pig lots. The other 20-30 percent they raise to market weight. Most of these larger producers are raising purebred or crossbred pigs (Landrace, Yorkshire, Duroc) for breeding stock. Around Saigon, several swine producers with 500 or more improved sows are feeding out their own pigs. However, at present time, imported breeds only accounts for 10 percent and most hogs are local breeds being produced in rural areas of the Mekong Delta. Imported hogs are being used as breeding stock, so the proportion of crossbred and purebred hogs relative to the local breeds will continue to raise. In most parts of Vietnam premiums are paid for

purebred crosses.

Pigs are slaughtered at City or Provincial slaughterhouses with official inspection and taxes, however most slaughtering facilities are outmoded. The Government of South Vietnam is well aware of these problems and a new slaughterhouse has been constructed near Saigon to replace old ones and will soon be put into operation. The area under construction covers some 20,000 square meters. Of this, 16,000 square meters are to be used for holding pens. The other 4,000 square meters are equally divided among the slaughtering room, cold storage room, water and electric plant, and an area for various miscellaneous functions. Construction cost of the building has been projected at 980 million VN\$. West Germany is financing the purchase of the equipment, including 9.5 million marks for slaughtering and processing equipment and 4 million marks for refrigeration equipment. The capacity of the new slaughterhouse will be 2,400 hogs and 300 cattle or buffaloes per day. The cold storage area will hold 900 metric tons of meat frozen at -20°C . A chill room to handle 104 metric tons of carcasses at 1°C also is included in the plans. Facilities to process by-products into blood-meal and bonemeal and to render fat into lard are likewise part of the new slaughterhouse. Although the slaughterhouse is owned by the GVN, management by the GVN, the private sector, or a combination of the two will be an important decision which will affect the future of the swine industry around Saigon.

2. Problem Areas

Producers have been understandably concerned about the cost squeeze. Hog prices are falling while the price of feed becomes higher and higher. The prices of imported U.S. feed ingredients are too high thus increasing production costs.

Another problem is an adequate measure or description of quality. The price information is based on per 100 Kg basis but the weighting procedure with proper scales is rarely practiced especially in the rural areas.

There appeared to be no cold storage facilities at the slaughterhouses, currently. Butcher shops usually starts selling meat early and closes about noon and most consumers lack refrigerators to store meat.

B. Poultry

In 1967, the Government of South Vietnam in cooperation with the U.S. Agency for International Development (USAID) initiated a program to increase commercial poultry production in the private sector of the Vietnamese economy. By 1970, the farm value of poultry and poultry products was estimated at VN\$ 4.48 billion or 10.7 percent of the total value of all agricultural production.

1. Egg Production

Egg production is concentrated in the southern region of Vietnam. Many small producers are located in the Delta or western part of the southern region. In this area, backyard flocks will average 5-20 birds while commercial laying flocks average 200 to 500 birds. Large scale commercial operations are concentrated in provinces surrounding Saigon with flock sizes varying from 5,000 to 40,000 birds. The annual rate of lay is estimated at 60 to 65 eggs per bird for local breeds and 200 eggs per bird for imported laying breeds. Local breeds still account for some 80 percent of the laying flock. Data on egg production and the Vietnam poultry industry is inadequate but estimated production for 1970 was 265.8 to 277.3 million eggs.

Facilities for handling eggs in markets are generally poor. Eggs are handled loose or on flats and, due to a lack of refrigeration, are not stored properly either

by farmers or dealers. Currently fresh market eggs are visually graded by size only. However, one plant for washing, candling and grading shell eggs is in operation in Saigon but the extra costs are of concern to consumers, producers and egg handlers.

The per capita consumption of table eggs appears to be low for two reasons. First, the price of market eggs is relatively high by Vietnamese standards and, secondly, duck eggs are relatively less expensive and readily available in the southern region. It has been estimated that annual consumption is 10 chicken eggs and 24 duck eggs per person.

2. Hatching Operations

In 1971, approximately 55 commercial hatcheries operated in Vietnam with a capacity to produce between 1.2 and 1.5 million chicks per month. The typical commercial hatchery maintains imported parent stock, uses modern hatching techniques, and generally markets day-old chicks directly to commercial producers. In many cases hatchery operators also maintain broiler and market egg laying flocks.

Table 1. Imported chicks, 1965—1970

Kind of chicks	1965	1966	1967	1968	1969	1970	1971
Broiler	—	—	—	3,676,508	3,345,991	4,056,902	0
Layer	—	—	—	206,244	984,170	477,960	0
Parent stock	13,700	73,854	45,106	20,200	93,353	192,970	cont

Source: Ministry of Agriculture

A large number of traditional or rice hull hatcheries also exist in Vietnam. These hatcheries do not require capital investment for mechanical equipment since eggs are placed in barrels insulated with rice hulls; the heat of the developing embryo is sufficient to incubate the fertile eggs. Each hatchery normally hatches both checks and ducklings of local breeds, the proportion of each depending on the season. Hatchability is reported to be as high as 75–80 percent.

3. Chicken Production

Total numbers of chickens have been relatively stable from 1966 to 1970 (averaging 19.8 million head), and the southern region accounted for approximately 75 percent of the birds reported.

Table 2. Chicken marketed

Year	Numbers	Liveweight (M. T.)
1965	22,242,000	64,502
1966	19,980,000	57,942
1967	19,657,000	57,005
1968	20,005,000	58,014
1969	20,048,000	58,130
1970	19,260,500	55,855

Source: Ministry of Agriculture, Saigon

Although the Delta produces the largest number of chickens, the larger commercial flocks are concentrated in the provinces adjacent to Saigon and average

2,000 to 3,000 birds. In other areas, backyard flocks account for 80 percent of poultry production, while small commercial flocks (200-300 birds) account for the remaining 20 percent.

Vietnamese consumers generally prefer live poultry; however, some chickens are sold dressed in the marketplace. As home refrigeration is introduced and becomes more common, preferences are likely to change and acceptance of dressed poultry more likely. The greatest potential for marketing dressed poultry in the foreseeable future appears to be food service firms servicing schools and hospitals, the military, and restaurants.

The per capita consumption of chicken is relatively low in Vietnam. In 1970, it was estimated 3.3 kilograms. However, the quantity consumed varies geographically. For example, in the Delta, per capita consumption was reportedly 1.5 Kg. Obviously, the large quantity of ducks available at relatively lower prices in the Delta is a major cause of lower chicken consumption. Although current consumption of chicken is low in Vietnam, the potential for expanding the market for chicken appears to exist. The Vietnamese have accepted poultry in their diets and are willing to consume greater quantities, but the relatively high price of chicken has limited the quantity actually consumed.

4. Ducks and Duck Eggs

South Vietnam is currently one of the largest duck producing countries in the world.

**Table 3. Ducks : Numbers, weights and egg production
South Vietnam, 1960-1970**

Year	Numbers (Thousands)	Marketing liveweight (M. T.)	Total egg Production
1960	9, 948	33, 574	138, 857, 440
1961	11, 035	37, 243	154, 030, 070
1962	11, 494	38, 792	160, 436, 980
1963	12, 992	43, 848	181, 346, 580
1964	12, 614	42, 572	176, 070, 330
1965	13, 484	45, 508	188, 213, 960
1966	13, 939	47, 044	194, 565, 130
1967	13, 742	46, 381	191, 815, 270
1968	15, 149	51, 128	211, 454, 620
1969	14, 102	47, 594	196, 840, 270
1970	14, 745	48, 852	202, 043, 980

Source : Ministry of Agriculture, Saigon

The Delta is the largest duck producing area in Vietnam, accounting for 78 percent of the number of ducks. The number of birds in a flock varies from the backyard type with up to 20 ducks, to the commercial producer with up to 10,000 ducks. It is apparent that raising dusks is closely related to the rice harvest season. During harvest, the flock is allowed to free feed, making feeding costs minimal. From July-September the movement of ducks from the Delta to Saigon is insignificant, during October-February it is at its peak; and it declines significantly from March-June. It usually requires 100 days to raise ducks to market weight and when ducks reach market age, 12 to 20 percent of the flock may be retained for breeding

purposes. The birds will commence to lay at 20 to 22 weeks, and will be kept 5-6 months for laying purposes. The average rate of lay is reportedly 80 percent.

Large flocks are normally attended at all times by one adult and 2 children. The requirement for capital resources involved in raising ducks appears to be minimal under current production techniques. The death loss in raising ducks without medication is approximately 13 to 15 percent.

There are duck feeder operations near Saigon whose primary function is to fatten ducks for roasting by force feeding with broken rice for 7 days before selling to restaurants.

Dressed duck appears to be more common in market than dressed chicken; apparently the market value of duck feathers encourages retailers and duck feeder operators to dress the ducks. In 1972, dry feathers were worth VN\$ 200 per kilogram. Most feathers are exported to Japan, Germany, and the United States, the export price varying from US\$.60 to \$ 5 per Kg. depending on quality and use to be made of the feathers. The Saigon feather mill reportedly has the capacity to dry and grade 10 MT of duck feathers per 24 hours of operation. This plant can also process large quantity of hydrolyzed duck feather meal to manufacture protein concentrated for export as animal feed.

Table 4. Duck export, Vietnam

Duck products	1962	1964	1960	1968	1969	1970
Duck feather, kg	415, 610	524, 961	276, 114	167, 250	203, 850	158, 000
Duck egg, ea.	19, 500, 000	25, 608, 000	—	—	—	—
Live duck, bird	4, 000	2, 067	—	—	—	—
Dry duck, kg	7, 502	6, 200	—	—	—	—
Frozen duck, kg	198, 306	27, 500	—	—	—	—
Duck egg powder, kg	200, 470	269, 900	—	—	—	—
Feather meal, kg	—	—	—	27, 000	225, 000	—

Source: Ministry of Agriculture

Most duck eggs are marketed fresh, but some are made into specialty items such as salted eggs and herb smoked or ash eggs.

C. Cattle and Buffalo

1. Production

Cattle and buffalo in South Vietnam have been traditionally kept as a source of farm traction. Although they possess reasonably good meat-type, any beef they supply can be considered a by-product resulting largely from the salvage of worn out work oxen and cows past breeding use. The practice of milking is of low order.

The present cattle population is not precisely known, but has certainly been declining since 1968 as the result of war and the replacement of oxen by farm tractors.

Based on 1969 cattle population figures, Table 5 presents the cattle density per square kilometer (5.4) for Vietnam. This table also gives the relative distribution of cattle over three different geographical areas of the country.

It is to be noted that the decline in cattle numbers since 1968, has probably been more pronounced percentage-wise in the highlands than elsewhere in the country. This results from widespread military activity in this area. Assuming that the national herd presently numbers 775,000 head—land area 174,289 square kilometers—

Table 5. Cattle density per square kilometer (1969) South Vietnam

Geographical area	Land area		Cattle population		Cattle density per sq. km
	Square km	%	Number	%	
Southern Vietnam	68,172	39.1	399,300	42.5	5.9
Central VN lowlands	55,705	31.9	489,300	52.0	8.8
Central VN highlands	50,412	29.0	51,500	5.5	1.0
Total or average	174,289	100.0	940,100	100.0	5.4

Source: Ministry of Agriculture, GVN

then the cattle density for the nation is only 4.4 head per square km.

While no official statistics are collected relative to cattle imports, it is generally agreed that some unknown number yearly crosses the border into Vietnam from Cambodia. Cattle entry is mainly through the provinces of Chau Doc and Tay Ninh. It is estimated that 15.4% of the total cattle slaughter would have originated outside Vietnam before the fighting occurred.

At present time, the retail price of high quality boneless cuts from the better grade animals commands about the same price (VN\$1,300 or 2.5 US\$ per kg) for both pork and beef on the Saigon market. Per capita beef consumption amounts to less than 2 kg annually.

The history of local cattle is lost in antiquity, but their genetic background unquestionably traces to an early mingling of India (humped or Zebu) and Chinese (humpless) stocks. The local yellow cattle resemble the *Bos Taurus* Jersey to a great extent with a genetic background mostly *Bos bibos* and some *Bos indicus* but they are not known to contain any *Bos Taurus*. A mature bull weights about 340 kg with a moderate hump while the mature female weights about 250 kg and possesses little or no hump. The mature male measures about 118 cm at the withers while the female measures about 112 cm.

The background of Vietnamese breeds over past 70 or 80 years can be traced to Cambodia. When the French colonized this area, they used Cambodia and Laos as the main source of livestock for the rest of Indo-China which was specifically used for plantation crops. From 1930 to 1935 an average of 2,000 steers and 185 cows were imported into Vietnam as draft and breeding animals along with swine 10,000 head as slaughter beasts. India has been another very important source of breeding stock for Vietnam. The Ongole, Sindhi, Tharparker, Sahiwal, and Haryana Zebu breeds have been imported over the years to upgrade indigenous breeds for meat and milk production.

In 1928 Ayrshires were imported and evaluated at Dalat, a region with an altitude of 1,500 meters above sea level. Their milk producing ability was tested and in general they did not do well.

Santa Gertrudis cattle were imported from the United States in 1960 and kept at the Phan Rang experiment station and being crossed with local cattle. In 1961, Australian Jersey cattle were also introduced. The total effect of these various importations is difficult to evaluate.

Regardless of variety, all Vietnamese cattle are reckoned to be well adapted to the local environment, especially with respect to climate, disease incidence and poor nutrition associated with the long dry season.

The buffalo of Vietnam belong to the genus and species *Bubalus Bubalis*. The history of Vietnamese buffalo like that of the cattle can be traced especially to

Cambodia and India. From 1926 to 1937 an annual average of 3417 head were imported to Republic of Vietnam.

Through a 1956 law, the Government of Vietnam encouraged importation of Thai buffalo by giving easy loans to farmers.

The Nili and Murrah breeds have been imported over the years from India but their numbers are still quite low.

It is traditionally not a part of the Vietnamese culture to consume large quantities of milk and milk products. This attitude is changing as contact with Western countries increases.

Average milk production for all Vietnamese cattle is about 3 to 5 kg/day/cow with a lactation lasting 180 to 240 days. Short lactations of Vietnamese cattle are due partly to poor nutrition, poor management and the hot climate. Thus, despite low demands for milk, Vietnam imports over 95% of its commercially sold dairy products.

Table 6. Dairy product imports (tons)

	1962	1963	1964
Milk	20,490	19,672	28,180
Butter	151	112	265
Cheese	122	661	83

Source: Ministry of Agriculture, Saigon

It is planned to cross imported, genetically superior, stock to indigenous cattle but due to poor security in some areas, this has been done only on a limited basis. Small commercial dairies of about 15 cows are found around Saigon and usually operated by people of Indian origin. Processed milk products include "Sweetened condensed milk," a reconstituted milk product composed of fat or coconut oil imported from Australia, milk powder from U.S. It has been well accepted by the Vietnamese people.

2. Diseases of Cattle

Statistics on cattle mortality resulting from specific diseases are fragmentary at best in Vietnam. Rinderpest was the most important disease in terms of annual losses and cost of control. Before 1958 an average of 6,000 cattle died from this disease annually. Extensive Government funds have been allocated toward controlling this disease. Beginning in 1956, a National Rinderpest Eradication Program reduced annual losses through use of lapinized (and more recently through use of lyophilised) vaccines. Since 1962 annual losses have averaged between 50 and 100 cattle per year. Lack of security in many areas and the clandestine entry of cattle into the country hampers control measures. Contagious diseases which are thought to contribute most to outright death losses are hemorrhagic septicemia, rinderpest and tick borne diseases, especially anaplasmosis. Foot and mouth disease is not as extensive as in temperate climates and does not seriously affect or kill local cattle but economic losses are due to lost work time of the animal, loss of weight and lesions on feet. It is logical to suppose that numerous other diseases common to cattle production countries, such as contagious bovine pleuro-pneumonia, shipping fever, brucellosis, tuberculosis, black leg, anthrax are present in Vietnam. Although little is known concerning internal parasites in cattle, the tropical nature of the country more or less guarantees widespread prevalence.

Other livestock production such as goats and sheep is of minor economic importance. Goat milk demands high price but their production is too low. Goat meat and mutton are not very popular among Vietnamese people but can be sold for special dish for certain foreign people.

D. Supporting Fields

1. The National Agricultural Institute

The National Agricultural Institute has 3 dimensions:

- a. Education
- b. Research
- c. Extension

The College of Veterinary and Animal Sciences of the National Agricultural Institute produces graduates with the degree equivalent to Bachelor of Science.

Each year the College admits 60 students. The curriculum aims at producing specialists both in Animal Husbandry and Farm Management as well as in Veterinary

A graduate program is planned for the next year and by then the College will be able to perform fully the role of research and extension in livestock production.

2. The Vietnam Livestock Feed Industry

At the present time, there are 32 feed mills in place throughout Vietnam representing a combined yearly production potential of 483,100 MT measured in terms of 300 working days per year/8 hour shifts per day. Since most large poultry and swine farms mix their own feeds, sales of commercial poultry and swine rations are mostly for small farmers. Most feed ingredients are being imported up to present time, however, the Government has been trying to get the feed grains and soybean produced locally. Until then, livestock producers suffer severe losses due to high feed price from overseas.

3. The Animal Health Service

The National Institute of Bacteriology in Saigon produces vaccines for cattle, swine and poultry to meet the country's requirement. A total of 22.5 million doses of all types of vaccines were produced in 1972. A system of storage and distribution of vaccines has been established, and operates through four regional vaccine banks. Each regional bank in turn serves the provinces in its respective region, resulting in all 44 provinces having vaccine storage facilities. This service is further supported through the training of local vaccinators by the Government. Other than for rinderpest which is free, vaccines are sold to private sectors at a nominal price.

Significant progress was made in updating vaccine production techniques with the introduction of a lyophilized fowl pox vaccine, and tissue culture hog cholera and rinderpest vaccines. Along with the new production processes, the quality control program for all major vaccines was improved. The common vaccines being produced at present time for local uses are: newcastle, fowl pox, fowl cholera, hog cholera, swine pasteurella, salmonella, rinderpest and hemorrhagic septicemia.

4. The Agricultural Development Bank

The Government of South Vietnam created the Agricultural Development Bank to offer loans on easy terms for all small or big livestock producers and related industries. The Bank has local offices in different provinces and recently in all major districts throughout Vietnam to offer loans directly to farmers

5. Producer Associations

At present time there are three official livestock producer associations adequately providing needed support services to members. Joint importation and distribution of breeder stock and other inputs continue to be common practice. In addition, the associations have organized and financed livestock and poultry exhibits and seminars, published and distributed educational materials, cooperated in a government vaccine testing program by supplying pigs and fertile eggs to the National Institute of Bacteriology.

Animal Research

Applied research on livestock production was initiated long before the war at various Government research stations throughout the country.

The National Livestock Research Station at Tan Son Nhut, near Saigon concentrated their research activities on nutrition, feed analysis, swine and poultry and to lesser extent, other animals such as horses, cattle, sheep, goats, etc... However, with the rapid expansion of Saigon city to accommodate war victims, the Government of South Vietnam with the financial assistance from U.S. Government has completed the construction of a new National Livestock Training Center at Thu Duc to replace the old station in the city. This new Center is provided with modern equipments to conduct all phases of livestock research on a nationwide basis.

—The cattle research stations at Hung Loc and Khanh Duong (Highland) emphasized only on cattle production research including breed performance and adaptability, cross-breeding programs, forage and pasture crops, diseases and parasites etc... These stations have been closed due to war situation.

—The Dairy Research Station at Ben cat, assisted by the Australian Government under the Colombo Plan, conducted research on possibility and adaptation of Jersey cattle to Vietnam. This station also served as a pilot dairy farm and processing plant and produced breeding dairy cattle for small and commercial producers. Unfortunately, this was also destroyed by the war.

—Small pilot research farms in each province to demonstrate and conduct applied research under local conditions. However, these farms had to be closed either due to the war or lack of operating funds.

—The College of Agricultural Research Station at Bao Loc had to move to Saigon and then to Thu Duc, 10 miles from Saigon, because of security reason. Students and professors at the College conduct survey on local livestock production and other research projects as graduation requirement for students.

In general, most research works have been stopped due to security conditions and/or lack of research funds. Although most research data are not available, certain general observations could made from research works done in the past under Vietnam conditions.

1. Santa Gertrudis and Jersey cattle are well adapted to warm climate of Vietnam, especially when crossed with local cows.

Other foreign breeds of cattle could do well in the Highland with special care and management.

2. Most swine breeds such as Yorkshire, Duroc, Landrace... perform well in different parts of Vietnam under well managed conditions. Cross-breds are best suited for farmers in villages.

3. Most foreign breeds of poultry could be well raised throughout the country if well fed and managed.

4. Brown rice, sorghum could replace corn on the same weight basis. This will be

Table 7. Preliminary results from crossed offsprings

Age	Local breed	Santa gertrudis local
At birth	20 kg	27 kg
6 month	80	158
12 month	135	250
18 month	190	312
24 month	240	355

Source: Ministry of Agriculture, Saigon

very significant in the future for the livestock industry when large quantity of high yielding varieties of rice is planted by Vietnamese farmers.

5. The following grasses and legumes appeared to be least suited in Vietnam:

grasses: napier, guinea, para, brachiaria

legumes: stylo, kudzu, centro

6. The progress of Artificial Insemination program has been very promising and gaining popularity among farmers.

7. A list of analysis of local feeds has been prepared and could be used to formulate rations for livestock in Vietnam.

It is expected that when peace really comes into effect, Vietnam will be in good position to conduct useful research in the field of animal production and health for the common interest of tropical countries in Asia.

The Future Livestock Development Plans

Due to long lasting war, the greater share of the national budget has been reserved for defense. As a result the livestock industry has not been developed as much as desired or otherwise possible.

In a fast growing country such as Vietnam there should be a sound livestock production program to adequately provide the protein requirements for the population at low cost price. In the postwar reconstruction and development period, livestock production should be strengthened.

The reconstruction program in animal production and health is aimed at supporting farmers in the countryside in terms of commodities, techniques and breeding stocks, and vaccines to help them meet national postwar economic development goals. The main purposes will be to increase both quantity and quality of livestock for local consumption and for possible export.

1. Supporting programs for National Livestock Training Center.
2. Construction of slaughterhouses in each province with standard sanitation requirements.
3. Supporting fully local production of feed grain.
4. Construction of a modern poultry processing plant.
5. Supporting programs for private livestock producers including:
 - a. Importation of breeding animals
 - b. Training programs
 - c. Production of quality vaccines
 - d. Production and importation of veterinary medicine
 - e. Adequate Government loans to livestock producers.
6. Develop processing and marketing and distribution system for animal products.
7. Re-establishment of Cattle Research and Training Centers, especially in the Highlands.

8. Establishment of Duck Research and Training Center in the Mekong Delta.
9. Animal Protection program throughout Vietnam.
10. Beef Cattle Production program in the Highlands.

This is a long-term and costly program and the Vietnamese people need co-operations and assistance from friendly nations in order to carry out successfully.