Beef Cattle Production in Vietnam

by
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September 1996

Sectors:

1. Beef Quality Standards
2. Performance Recording and data analysis
3. Artificial Insemination of beef cattle
4. Pasture management and forage utilization
5. Data communications via the internet
6. Beef production observations

Length of the Report: 15 pages

Goals:

1. To obtain an understanding of the present beef production practices in the country of Vietnam.

2. To meet individuals who are actively involved in the development of various sectors of the beef industry in Vietnam.

3. To observe what factors may inhibit or encourage increased production of quality beef for the country of Vietnam.

Methodology:

Working under the guidance of the National Institute for Animal Husbandry of Vietnam, NIAH, and specifically Professor Dr Nguyen Van Thien, an effort was made to obtain on site observations of cattle production as well as to visit A.I. production centres, the Animal Husbandry Association of Vietnam office and Agricultural Universities. Each of these locations provided information about the present state of the beef industry in Vietnam with the latter three giving some indication of planned future developments . In addition, the author was asked to review the English

translation of numerous agricultural research papers. Even though English language tutoring was not part of the original assignment, these hours of review gave access to information about the present state of agricultural development in Vietnam that would not have been obtainable in such a short time through any other means.

Statement of Accomplishments, Results, and Benefits:

The task of assessing the present state of the beef cattle industry for the entire country of Vietnam would have taken much more than the allotted three weeks. These observations pertain only to the beef production practices for the immediate area surrounding Ha Noi. There are dramatic differences in beef production practices throughout the country of Vietnam - the central region has more available pasture land with the consequence of larger herd size when compared with the single cow per family operations around Ha Noi. By focusing research on cattle production in the Ha Noi region, the author was able to gain a greater insight into the potential for beef production for this specific region. While land for forage production is greatly limited in this delta region of high rice production, an area has been identified, namely the two main dikes that run the length of the Red River, that could be greatly improved through reseeding and pasture management. The resulting increases in production and quality of forage could improve the beef production capacity of this region substantially.

Many of the present methods used to increase production in Vietnam rely on crossbreeding local cattle with larger framed breeds. The author's suggestions that increases may also be realized by decreasing calving interval and increasing growth rate of fattening cattle through improvement in nutrition were considered.

This region around Ha Noi also has the advantage of being close to agricultural extension services provided by the NIAH, Agricultural University Number One Ha Noi, Agriculture and Forestry University Bac Thai, Cattle and Pasture Research Centre Ba Vi and the Animal Husbandry Association of Vietnam. After meeting with representatives from each of these institutions, the author can now appreciate the problems that they face, however there are some opportunities that they may be able to take advantage of at this stage in their beef industry's development. Declining revenues from governments to fund research and administration costs

might be replaced, at least partially, through producer check off. If producers can be provided with a premium for their product, then they may be willing to direct a portion of these profits to organizations that will assist them to retain this profit advantage. The time to initiate such a programme would be in the early stages, especially if farmers were pleased with their increased financial returns.

Genetic improvement programmes for cattle are just being initiated in Vietnam. Many of the computer programmes presently available for cattle performance analysis are very complex and require an extensive data base before meaningful results can be obtained. The author was able to convince many individuals responsible for the the design and implementation of cattle performance programmes to begin with a simple index or ranking system. Information from individual animals analysed by this method can be retained electronically and used in the future when the numbers warrant more sophisticated evaluation.

Very few cattle are permanently identified (tattoo or tag). Even the semen used only indicates the breed with no means of identifying the specific sire. Many were convinced that some form of permanent identification must be in place before cattle performance programmes can be initiated. It may be wise to follow the identity conventions used in other countries so that data can be universally understood. As an example, Canadian registered beef breeders use a letter to identify the animal's birth year [1996 (F), 1997 (G), 1998 (H)] when tattooing.

In Vietnam, beef producers tend to retain ownership of the animal from birth to slaughter. By means of a number of lectures, the author was able to describe the complexities of the beef industry in North America. There is a tendency to pigeon hole a country's agricultural methods into"extensive" and "intensive" production methods where, in fact, there may be a mixture of both. (cow-calf = extensive while feedlot = intensive for some areas of North America).

A long history in Vietnam of providing fresh beef to consumers through on farm slaughtering techniques has been adequate up to the present. By showing excerpts from the University of Guelph meat technology video course, as well as the slide presentation "Beef Quality Assurance" kindly provided by Dr Paul A. Doig, Boehringer Ingelheim (Canada) Ltd.[1] , the author was able to acquaint officials with the best management practices required to produce high quality beef. A copy of each of these course materials has been provided as a teaching aid.

Meat stall, Ha Noi market

Conclusions

There is little doubt that beef consumption will increase in Vietnam as well as the entire South East Asian region. Vietnamese agriculture has the ability to meet this demand for high quality beef product but this will require a number of major management changes. If research and pilot programmes focus on the development of high quality beef and not just on increasing beef production, then Vietnamese producers and support personnel will be able to reap the benefits of this high margin product.

Increased Quality Beef Production in Vietnam - The Challenges

(1) Decreased funding for research, education and agricultural extension will stifle the pace of improvements to Vietnamese beef production. The challenge is to show that increases in funding will provide excellent future dividends.

(2) Advancements in beef production in neighbouring countries may allow those countries to be the first to capture market share in the region, making future Vietnamese beef production less viable. The challenge is to not only improve production levels but to enhance product quality. It is in this sector that financial returns will be the highest.

(3) Too often, major programmes are sought as simple solutions to resolving a problem. New beef enterprises in the mountain regions of Vietnam will serve to increase production but it would be a mistake not to put a similar effort into the maintenance of viable household beef production units. The challenge here is more of a social nature. If viable employment is maintained in the rural areas, fewer residents will see the need to move to the already crowded cities.

(4) Increased beef production will require a corresponding increase in the level and quality of feed stuffs. The challenge is to convince producers that feed for livestock has a value equivalent to traditional crops such as rice.

(5) Along with an increase in the percentage of high quality beef produced will come the requirement for an infrastructure capable of handling this product. The challenge is to ensure that slaughter plants are designed and managed so as to produce a high quality product, delivery vehicles will have adequate refrigeration to maintain product quality, distribution networks can ensure on time delivery of product and meat inspectors are capable of ensuring product quality.

(6) Higher production levels and improved quality control will require increased effort and inputs from present day beef producers. They will ask the question: “What reward do I get for the risk I take and the effort I make?” [2] The challenge is to ensure that price premiums are paid to farmers who are willing to affect change.

Part II

Beef Quality Standards

In order to prepare for this facet of the programme the author visited and filmed a recently constructed slaughterhouse a few miles from his own farm. In addition to this, he contacted Dr Pat Johnson, programme Manager, Meat Industry Inspection Branch, OMAFRA who kindly provided a full copy of the programme for meat inspectors. Not knowing if the Vietnamese video system was similar to our own (it is, at least in Ha Noi), an 8mm copy of some of the videos to show on a small viewing screen was made. These videos were first shown at the Agriculture and Forestry University, Bac Thai, and became a very popular item, being replayed for the Animal Husbandry Association of Vietnam as well as a group at the National Institute for Animal Husbandry. It was obvious from the responses from each group that the methods of slaughtering and processing animals shown in the video were much more refined than present day practices in Vietnam. To many, achieving this level of quality control may have seemed an impossible goal. This may be true if there is an attempt to change their entire industry overnight, a task that will not be done because sufficient financial resources are just not available. Small pilot projects with this level of quality control could be implemented, especially if some assistance was acquired from foreign sources. There is little doubt that a premium price could be obtained for beef produced with this level of quality, a fact that may not only initiate the building of more high quality standard facilities but also instil in the farming community the idea that research funding can provide dividends. This particular idea will be discussed in more detail later in the report.

The educational programme developed for Canadian Meat inspectors would be a very useful teaching aid for the developing meat industry in Vietnam. These courses relate to the entire industry, not only beef. This initial contact could be advanced to the point where Canadian teachers would be employed to guide the Vietnamese towards higher quality control in their meat processing. Canadian suppliers of equipment used in meat processing might be interested in partially funding such a proposal as it would provide them with an excellent opportunity to advertise their products.

Performance Recording and Data Analysis

The poultry, pig and dairy industries of Vietnam have all advanced to the stage where sophisticated techniques for recording and analysing performance data can be employed. With 95% of beef production in Vietnam practised at the household level where cow herd numbers are most often one or two females, performance measurement tools such as Estimated Progeny Differences (EPD) can not be easily employed because of the small contemporary group numbers. While there are some larger cattle operations in Central Vietnam and the government is actively promoting new large scale enterprises in the foothill regions, there is little doubt that the bulk of beef production will continue to take place at the household level for the near future.

Before making an assessment of the problems facing performance recording for beef cattle in Vietnam it would be useful to review some of the requirements for accurate data analysis.

Performance recording is used to measure the genetic potential of an animal for a specific trait. Growth rate would be a good example. It is useless to attempt to quantify this measurement in absolute terms because the ability of an animal to fully express its potential is very dependent on the environment under which that animal lives. All useful measurement tools, therefore, are based on comparisons between an individual and its peer group.

There is the following equation:

Phenotype = Genotype + Environment

Where **Phenotype** is what one observes and **Genotype** is the true genetic potential of the animal. Since it is impossible to reduce the **Environment** portion of this equation to zero, accurate measurement of the genotype for many traits is very difficult. By placing a group of animals in the same environment (nutrition, disease and parasite control and housing) the environment portion of the equation can be equalized. This then allows for a quantitative comparison to be made between all the members of this contemporary group. As the size of the contemporary group increases, so too does the accuracy of the relative measurements. Group sizes of less than 10 individuals may not provide very accurate data.

The major problem facing researchers, when they wish to make selections within the locally grown cattle population, is the small number of animals raised in a contemporary group. The author does not foresee, in the near future, a dramatic shift away from the present day household one cow operation. This will make analysis of maternal traits difficult at best. The Commune structure, under which most farming householders reside, may provide an opportunity to gather weaned calves into a centralized feeding compound where the environment can be standardized much like our bull and heifer test centres here in North America. A committee within the Commune might be organized to manage a cooperative calf feeding programme. These calves could be sold outright to the Commune Committee or retained ownership could take place in a custom feeding programme.

Vietnamese researchers are well acquainted with the sophisticated measurement tools such as the BLUP model and EPD's. Many discussions took place between the author and faculty members regarding the best course to chart during the preliminary stages of beef cattle performance analysis. The author's opinion was that a simple index or ranking system should be utilized during these early stages.

There are two important reasons.

Firstly, EPD's or the BLUP model require a relatively large number of records for any degree of accuracy. Second and more important ; the concepts of ranking and index are relatively easy to understand and explain. Indexes or rankings can be calculated using no more than a pencil and paper. The author did emphasize that these preliminary results should be kept on file so that they may be used at some future date when the numbers will warrant the more accurate and complex methods.

While it will be some time before Vietnamese beef cattle performance testing has reached the stage where EPD's will be of any use, the author did circulate brochures from BIO (Beef Improvement Ontario) and will provide Dr. Vu Van Su, Head of the Computer Department, NIAH, with a copy of BIO's *HERD-LINK* software. Regulations regarding foreign data communications via the internet are becoming more relaxed in Vietnam with the possibility that computer files will be able to be transferred in 1997. The present regulations only allow for up to two e-mail pages. These new regulations would allow Vietnamese researchers to input cattle performance data into the BIO computer with no greater effort than any Ontario cattle breeder. BIO is interested in custom data collection and analysis from out of province and foreign sources. The Canadian contact through BIO may also help to promote the use of semen from Canadian performance tested sires.

Traditionally, cattle production in Vietnam has been for the purpose of producing draft animals. Beef production was of secondary importance. As these roles change, producers will find that traits related to maximizing beef production will gain importance. Traits such as growth rate, carcass quality, milk production and fertility. Crossbreeding, already present, will continue to increase. Well constructed and implemented performance testing programmes will produce

valuable information regarding the most economically suitable breeding programmes.

The fledgling Vietnamese Dairy industry provides an example. In most areas of the country it has been found that the F2 cross with Holstein (3/4 Holstein + 1/4 native cattle) is best suited for Maximizing milk production. Further crossing with Holstein produces animals not suited to the tropical environment. There are many more breeds available for beef production.

Just as a navigator must know his present position before charting a course, performance programmes, that accurately quantify production levels before changes are commenced, will more ably assess the merits of various crossbreeding designs.

It is doubtful that pure strains of *Bos taurus* breeds will be viable in the environment of Vietnam. There may, however, be combinations of *Bos taurus* and *Bos indicus* breeds that are suitable. Synthetic breeds from other countries, such as Bonsmara Cattle from South Africa, should be considered. A well planned programme that is able to collect accurate data from these animals will ensure that little time, effort and financial resources are spent in attaining the goals of increased quality beef production.

Artificial Insemination of Beef Cattle

The insemination of beef and dairy cattle is a relatively common practice in Vietnam with approximately 35% of the beef cattle farms visited having calves sired through AI. The author was unable to obtain accurate figures of beef AI use in Vietnam but would consider it to be at least a more common practice than in North America where only 5% of the beef herd is bred using AI. Costs to farmers do not exceed $2.00US but this figure must be taken in the context of an average annual farming income of $207 - $237US[3].

Most households do not possess a telephone requiring a family member to travel to the local AI centre to inform the technician that there is a cow to be bred. This common practice tends to limit the use of AI to areas in close proximity to the technicians. Semen is frozen in the pelleted form with dye colouring used to indicate breed - red for Red Sindhi, black for Holstein. This simple but effective system has the disadvantage of not being able to specifically identify a sire within a breed. Many farmers, when asked, indicated that once they had decided to breed using AI the decision as to what semen to use was left in the hands of the inseminator.

The Angus cross calf above was discounted because of his brindle colour.

This Red Sindhi calf is the preferred choice.

For the region around Ha Noi, calf colour was of prime importance. Farmers preferred the smooth coated cherry red of the Red Sindhi cross calves. Breeds that produced off colour calves

would probably find little future demand in the Ha Noi area while cream coloured Charolais cross calves are apparently the preferred choice for breeders in central Vietnam.

The AI centre at Bac Thai,where the author first saw the process of thawing pelleted semen, and the Cattle and Pasture Research Centre Ba Vi, where they kindly performed the process of freezing pelleted semen for filming, provided opportunities to observe the present state of the artificial insemination industry. The process of freezing semen in pellets was learned from the Cubans during the early 70's when some of the first Holstein cattle were imported from that country to upgrade the indigenous Vietnamese cattle. There is no doubt that this technology has been very cost effective and produced an acceptable product. Now, with the assistance of the French government, the AI centre at Ba Vi will soon open a laboratory capable of freezing semen in straw containers.

The move to storage of semen in straws provides an excellent opportunity to finally identify and track the performance of AI sires. The projected date for straw semen storage is the spring of 1997, but the author was unable to find what procedures will be used to identify the sire on each straw. During a meeting with officials at Ba Vi, the author raised the question of semen identification codes and suggested that it might be prudent to investigate the various methods used throughout the world before the first straws are filled. Conforming to the practices of their largest supplier of imported semen would undoubtably avoid much confusion.

There were frequent requests made to the author for donations of semen, especially Holstein semen. The very nature of this beef project precluded any discussions regarding dairy semen but the author did note, in reply, that often individual purebred beef breeders destroy some of their semen inventory in order to defray storage costs. There may be Canadian breeders who would be willing to donate such semen on the condition that transportation and documentation expenses would be the responsibility of the Vietnamese government. Great care would have to be taken so as not to interfere with any commercial semen sales into Vietnam. There is also the possibility that such donated semen could be directed specifically to research projects perhaps even being classified as a charitable donation under the Canadian income tax act.

Pasture Management and Forage Utilization

These observations again relate only to the region around Ha Noi from Bac Thai in the north to Ba Vi in the south-west. Throughout this region there is very little land that would be set aside specifically for pasturing of livestock. Most of the forage consumed is either by the "cut and carry" method or controlled grazing of road sides or the small dikes within the rice fields. When field crops are grown, usually in small plots of less than one hectare, the title to this property remains in the hands of the government but an individual or family would have the right to farm their specific plot. Great attention is given to these field crops to ensure high production and quality. Pasture land, however, is most often accessed by many individual families with the consequence that this free resource is overgrazed and unimproved either by fertilizer or reseeding.

Grazing Management

Overgrazing is the dominant factor resulting in poor productivity. Very often native grasses do not reach heights in excess of 3cm. The plants have little opportunity to develop healthy root systems leaving them very susceptible to drought. Overgrazing to this degree greatly retards the rate of plant regrowth which severely limits the yearly forage production from these lands.

Also, it has been shown that "cattle grazing plants shorter than 10cm cannot get enough energy or protein to meet their daily requirements." [4] There is little doubt that production of these pastures could be greatly improved by a well managed rotational grazing programme then further improved by fertilization and reseeding with improved grasses and legumes. Unfortunately, the small size of many of these isolated pasture lands is not large enough to allow for the required number of divisions for a good rotational programme unless strip grazing methods were employed. Strip grazing is most easily accomplished using electric fence systems, a technology that is perhaps too advanced for local acceptance. It is quite common to see cattle tethered to a stake in pasture areas. This traditional method could potentially be modified to produce results similar to strip grazing using movable electric control wires. There are some larger pasture areas, namely the dike that runs on both sides of the Red River, that could be far more productive if controlled grazing systems were implemented. These dike lands may be an ideal location for pasture renovation and controlled grazing demonstration sites.

Severely eroded dike pasture caused by overgrazing.

Forage Research

Research at both NIAH at Ha Noi and the Cattle and Pasture Research Centre at Ba Vi into the production levels of various varieties of Elephant Grass (Pennisetum purpureum), Guinea Grass (Panicium maximum) and Pangola Grass (Digitaria decumbens) has yielded much useful information regarding production yields, fertilizer requirements for maximizing production and available protein levels of each variety.

Table 1[5]

Grass	Yield (Tonnes/ha)	Protein (% dry matter)	Energy(Kcal/kg)
Elephant Grass	80-300	11	313
Pangola Grass	30-40	11	523
Guinea Grass	60-80	11	381
Para Grass	80	12	407

It is the available protein and energy levels that influence beef and milk production. Table 1 shows that increases in these levels may have to be made by the addition of other plant varieties (legumes) or supplemental feeds if production is to be improved. The low protein levels shown here may have been due to later harvesting of some of these grasses, for other sources indicate elevated levels:

Pangola grass - Trinidad[6]

Fresh pasture 10 days regrowth after grazing	14.9% CP
Fresh pasture 15 days regrowth after grazing	13.7% CP
Fresh pasture 21 days regrowth after grazing	9.2% CP

A few of legume varieties have been studied as shown on Table 2. It is possible that others may be utilized, not only to increase nutrient levels, but also to improve nitrogen levels in the soil for enhanced grass production using a rotational cropping or inter cropping methods. At Ba Vi, leucaena was intercropped with maize to be utilized as silage.

Table 2[7]

Legume	Yield (Tonnes/ha)	Protein (% dry matter)	Energy(Kcal/kg)
Stylo	35-40	26	666
Leucaena	40-50	51	600

Research plots, located at NIAH, Ha Noi, contained these and other species:

Grasses
Guinea grass
Elephant grass
Setaria (foxtail)
Pangola [Digitaria decumbens] (crab grass)
Para grass [Brachiaria mutica] - known to do well in water logged soils

Legume trees
Leucaena
Sesbania rostrata - survives seasonal flooding and tolerates alkaline soil conditions, pH 2 -4.8. Nodules form on the stems. Plants grow to 5 metres.

Legumes
Desmodium

Dr Ha with 4 month old Sesbania rostrata, NIAH

It is perhaps the legume tree varieties that may hold the greatest promise.They can not only provide excellent nutrients for livestock, but also their branches function as fuel, a double benefit to farmer households. Very few farmer households have taken advantage of this resource even though these plants have been studied for some time. An interesting observation was made at the Trang Viet Commune site where a large plantation of legume trees, Sesbania rostrata, had been established. Local inhabitants were using these plants almost exclusively for fuel supplies, but were not taking advantage of the valuable feed resource provided by the leaves. Legume tree species such as Sesbania should not be fed ad lib due to the presence of tannins and or alkaloids in the leaves. "The form in which the forage is fed may affect tannin effects on feed intake. Forages rich in tannins are eaten in larger amounts when field dried ... Indeed, drying reduces the solubility of tannins and then reduces their ability to complex proteins." [8] There may be a requirement to provide livestock feeding demonstration sites within communities so that farmers can observe these benefits at the local level and, at the same time, learn how to best utilize these new feeds.

Data Communications Via the Internet

At present, data communications to foreign countries is limited to only two pages of e-mail text. It is not as yet possible to send or receive attached files to an e-mail message or to utilize such browsers as Netscape Navigator or Microsoft Explorer to access information on the World Wide Web. There is little doubt that the ability to exploit these two resources would greatly assist researchers in all fields.

The Vietnamese regulators have been hesitant to allow full access to these resources. The author was told that full service should be available in 1997. The Vietnamese are very worried in particular about access to pornographic materials, a worry that they share with many regulators world wide. Advancements in software programmes, most recently by a Canadian, that are able to

selectively block access to sensitive information, may serve to alleviate the Vietnamese regulators' fears.

The author had taken to Vietnam many OMAFRA fact sheets, Ag Canada publications and a few agricultural text books all of which were eagerly read by the faculty members of NIAH. It is now possible to easily manufacture electronic copies of these and similar publications. Open access to these types of files via the internet, for a country where the cost of foreign text books is almost prohibitive, would greatly assist teachers and their students. If Canada were to provide information in this format, it may very well forge a link with developing countries that could eventually lead to trade benefits.

While there was not an abundance of computers available to the faculty of NIAH and other institutions, the machines in use had 486 or better processors and were running contemporary operating systems. Ha Noi had retail outlets for many of the major computer companies with prices being quite competitive with the North American market but, one must remember to keep these prices within the perspective of the common $60.00US per month salary received by many faculty members.

It is not uncommon to have power outages in Ha Noi and there is little doubt that this also occurs throughout the country. Most computers are equipped with uninterruptible power supplies with voltage surge protection. It would seem that a market may exist here for battery operated notebook style computers as long as the power supply for recharging the battery would be able to isolate the computer from voltage surges. The very high humidity of the Ha Noi region should also be taken into account when selecting any electronic equipment.

It is only a matter of time for Vietnam to receive full internet service. Once this occurs, the benefits to teachers and students at all levels will greatly outweigh the few disadvantages. As mentioned previously, the author had been asked to review the English translation of a number of research papers. The internet is an excellent means by which similar translations could be sent to language experts (far more expert than this author!) for correction. While the author would continue to offer his services for this endeavour, it may be advantageous to locate Canadian agricultural students who would be willing to volunteer their time with the understanding that they would be exposed to much valuable research information.

Beef Production Observations

As mentioned previously, the majority of beef production takes place at the farmer household level. It is of interest here to relate beef production trends to those of other agricultural sectors.

Table 3[9]

year	Average yield per crop (Tonne/ha)	Rice production in the year (million tonnes)	Buffalo population (million head)	Cattle population (million head)	Pig population (million head)	Fowl population (million birds)	Dairy cow population (# head)
1975	21.2	10.29	2.18	1.46	8.70		
1980	20.8	11.64	2.31	1.66	10.00	64.53	55
1985	27.8	15.87	2.59	2.59	11.80	91.18	1256
1990	31.9	19.22	2.85	3.12	12.20	107.4	2050
1995*	36.3	24.00	2.90	3.30	16.00	142.7	14800

During the period between 1980 and 1995(*estimated), fowl population has shown the greatest increase, while the cattle population has almost doubled. Counting cattle does not always present a precise evaluation of beef production. As in North America with the advent of the exotic breeds and the eventual increase in slaughter weights, total meat production is dependent on a number of factors. To some degree this has also been true for Vietnam during this 15 year period. It is now very common to find crossbreeding with other *Bos indicus* breeds (Red Sindhi, Sahiwal and Brahman) as well as the occasional *Bos taurus* breed taking place in many communities. These new breeds have produced calves of increased frame size and body weights. Unless these larger cattle are undernourished to the level that conception rates are decreased, a factor that is very important to consider, there will be an increase in beef production solely based on body size. The traditional yellow cattle of Vietnam are quite small, having body weights of approximately 200kg. The first cross with Red Sindhi, referred to as Laisind, have body weights of 275kg. This factor alone accounts for a 38% increase in beef production!

It has been previously mentioned that calf colour is a very important criteria for acceptance of a breed for crossbreeding in the region around Ha Noi. Any breed that does not produce the desirable solid cherry red coloured calf of the Red Sindhi cross will have to exhibit vastly superior production advantages in order to gain acceptance in this region.

There has been a long history of draught cattle power in Vietnam. Small tractors are now seen working fields alongside yoked cattle and water buffalo. A 1994 report from FAO shows that the percentage of Vietnamese working in agriculture has dropped from 64.1% in 1985 to 57.7% in 1994.[10] A shift to mechanized farming practices would greatly increase the productivity of an individual farmer and cause an even larger decrease in agricultural employment. Such a shift could

produce dire social consequences. The Vietnamese government is actively promoting beef ranching in the foot hill regions of North Vietnam and similar areas in order to increase beef production. These programmes will be needed to satisfy the ever increasing demand for beef, but efforts to maintain the viability of present household beef producers will also help to satisfy this product demand as well as alleviating the need for costly social programmes that will be required for the mass of unemployed labourers. Perhaps investing in programmes that encourage farmers to continue with draught animals may be a small price to pay for social harmony.

Beef production at the household level may suffer from the economies of scale. Some of these inefficiencies may be improved through cooperative programmes organized from within the commune. Without exception, calf raising at the household level, was seen to be carried on with a high level of husbandry. Raising weaned calves in groups may offer advantages not available at the

household level. Feed rations can be properly balanced and purchased in bulk amounts at a cost advantage, animals can be grouped for performance analysis and calves destined for slaughter can be finished within the community in large enough numbers to warrant the building of a small modern slaughtering facility. Such a programme would diversify the available skills present in the community. The author, with the assistance of the faculty of NIAH as well as the executive of the Trang Viet Commune, have designed a proposal *The Trang Viet Dike Renovation Project* that would incorporate a number of these preceding ideas. If a small modern slaughter plant could be constructed at this site to provide high quality beef to nearby Ha Noi, there is little doubt that local producers would receive a premium price for this product. This would provide an opportune time for the introduction of a small fee (checkoff, similar to that used by the Ontario Cattlemen's Association), deducted at the time of sale. These funds could be used to further NIAH research and assist in the maintenance of a viable producer organization, the AHAV.

While reviewing a number of Vietnamese research papers related to beef as well as pig and goat production, the author noticed that much emphasis is being placed on improving the dressing percentage of livestock. It should be noted here that dressing percentage comparisons must be undertaken with great care. An excellent resource for further information on this topic is the text, *New Concepts of Cattle Growth* .[11] Many factors can affect the observed dressing percentage of a carcass: fat thickness; nature of the diet; live weight and pre-slaughter and slaughtering methods. Often animals were compared at similar ages only.

Some studies have shown that calving interval in the region of study approaches 12 months,[12] however other data indicates a calving interval of from 18 to 20 months for the country as a whole.[13] Few, if any, household owned cattle are permanently identified by either tattoo or tag and, as a consequence, research information such as above must rely on information given by the farmer. Calving interval is perhaps the most important factor for beef production and a calving interval of 12 months indicates near optimum efficiency. As crossbreeding programmes are introduced, especially if they result in a dramatic increases in body size, it will be very important to accurately measure their effect on this all important production component.

Animal identification is, in the author's opinion, one of the most important improvements that should be made at this stage in the development of the Vietnamese beef industry. By initiating a programme to identify individual cattle, researchers would be able to ensure that the production information gathered had a high degree of accuracy. Fortunately, this need not be a difficult task. It is common practice for veterinarians to visit communities on an annual basis to provide vaccinations to the livestock. Inexpensive numbered metal ear tags could be inserted by the attending veterinarian during this visit annual visit. Once cows and calves have been tagged, recording accurate information for future vaccination programmes, AI breeding, parentage analysis and cow productivity would be greatly simplified.

Conclusions

The author was certainly privileged to have been given the opportunity to make observations of the Vietnamese beef industry. No effort was spared by the many Vietnamese faculty members and representatives of institutions and organizations to provide him with information concerning the current state of the beef industry in Vietnam. Special mention must be made of the generous assistance given by both Dr Nguyen Van Thien and Mrs Tran Thi Mai Phuong who constantly took time from their busy schedules to assist in the organization of this project, as well as to accompany the author on his many visits through out the Ha Noi region.

An advertisement by Hongkong Bank in a recent issue of *The Economist* states: "Over the next ten years the Vietnamese economy is expected to grow by 100%". This rapid expansion will require astute decisions to be made by the Vietnamese, especially in the agricultural sector. There are a number of excellent opportunities, some of which have been detailed in this report, for the beef industry to thrive in Vietnam. The author was very impressed by the efforts that the Vietnamese people were making towards improving their economy, but he understood their frustration with their diminished access to funds for research projects, educational supplies and salaries.

The government of Canada is not alone in the Western world in curtailing foreign aid funding. The author would like to propose that this is the very time when such funding can reap the best rewards, not only for the foreign partner, but for Canada as well. If Canadians maintain an active presence in countries such as Vietnam, this can only lead to better economic ties between our nation and one on the verge of dramatic expansion. It is truly a "win, win" situation.

[1] Doig P.A.: *Beef Quality Assurance* (1996) Boehringer Ingelheim (Canada) Ltd, 5180 South Service Rd., Burlington, ON, L7L 5H4

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