

## BUFFALO PRODUCTION IN RELATION TO RICE CULTIVATION IN VIETNAM

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### INTRODUCTION

Vietnam is traditionally a rice producing country and a great deal of archaeological, ethnological, linguistic, and botanical evidence as well as folklore indicates that rice was domesticated there. We also have strong evidence that, from the Dong Dau civilization (C 14 date - 3750  $\pm$  150 BP), buffaloes were the main domestic animal raised by rice-growing people in the Red River Delta (North Vietnam). At that time, buffalo/cattle, pigs, poultry, dogs and goats were considered farm animals. When the "seeding in submerged soil" method of rice cultivation was developed around the beginning of the Common Era, buffaloes were used as a main draught power (for puddling rice fields before seeding). The development of rice cultivation has been historically integrated with buffalo production.

From this starting point, buffaloes became the unique farm animal

that has made an enormous contribution to the rural economy and played an special role in the farmers' lives; in other words, the buffaloes are a multi purpose animal and even more, an integral part of our social and cultural matrix. It is unthinkable that Vietnamese rice cultivation and agriculture could exist without buffaloes, and agriculture is the main sector of the national economy.

### BUFFALO POPULATION AND DISTRIBUTION

The domestic buffaloes in Vietnam are of the swamp type of the species *Bubalus bubalis* (Linnaeus, 1758) with a diploid chromosome number of 48. From their external appearance and especially from their horn shape and length, our buffaloes could be classified in the sub-type "Indochina" of the swamp type, and are domesticated descendants of the wild species *Bubalus arnee* (Kern, 1792), which were

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widely distributed in South and South east Asia, including Vietnam.

Because buffalo are the main source of draught power in rice cultivation, buffalo production is developing as an integral part of this sector of the economy (Table 1).

Data from Tables 1 and 2 show clearly the historic trend of farm animal development: cattle and pig production mainly provides beef and pork for human consumption, while buffalo production satisfies the draught power requirement and depends

Table 1 Buffalo population and rice acreage in Vietnam

Year	1930	1975	1980	1985	1987
Buffalo population (1000 head)	1,270.1	2,193.9	2,315.8	2,590.2	2,753.0
Rice Acreage (1000 ha)	4,300.2	4,940.3	5,514.3	5,703.9	5,588.5
Rice Acreage (ha per buffalo)	3.38	2.25	2.38	2.20	2.02

Table 2 The relative place of buffalo among other main farm animals (1000 head)

Year	1930	1975	1980	1985	1987
Buffalo	1,270.1 (100)	2,193.9 (172)	2,315.8 (182)	2,590.2 (203)	2,753.0 (216)
Cattle	800.0 (100)	1,485.7 (185)	1,660.6 (207)	2,597.6 (324)	2,979.1 (372)
Pig	1,949.9 (100)	8,800.7 (451)	9,999.5 (512)	11,807.5 (605)	12,050.8 (618)

on the rice acreage. The new policies in animal husbandry stimulating family farms influence mainly the cattle and pig populations. A small part of the cattle population is also used for draught in rural areas. Cattle are distinguished by their heat tolerance and their endurance; they can plough all the day long while buffalo normally plow up to 10 a.m. only.

The percentage of draught buffaloes usually reaches 65-68% of the total population (68.4% in 1981 and 67.8% in 1987). Data for draught cattle (use mainly as pack animals) for these years are 43.1% and 39.8%, respectively. Presently cattle and

buffalo provide about 75% of the draught power requirement in agriculture.

The buffalo distribution is closely related to rice production. The biggest rice-producing areas (the deltas of main rivers in the North and South) are also the largest buffalo regions, and the percentage of draught buffaloes is also higher (Table 3).

Buffaloes are kept mainly on family farms, with 1-2 head in Northern delta regions and 2-4 head in Southern regions being the average holding. In mountainous areas of the North, where breeding tends to be more emphasized in buffalo husbandry, the family herd may number 20-30 and some-

Table 3 Buffalo distribution in Southern part of Vietnam (1000 head, 1987)

Region	: Total herd	: Draught herd	: % of total
Vietnam	: 2,752.7	: 1,868.3	: 67.8
North part	: 2,061.0	: 1,458.6	: 70.7
South part	: 691.7	: 409.7	: 59.2
Coastal area*	: 143.6	: 87.7	: 61.0
Central Highlands	: 57.7	: 17.6	: 30.5
Eastern area	: 155.7	: 84.9	: 54.5
Mekong Delta	: 334.7	: 219.4	: 65.5

\* with many small plains along the seashore.

times up to 50-60 head. On average, about one third of the all family farms practice buffalo husbandry. The buffalo herds on state farms range from 50-60 to 200-300 head, but state farm buffaloes constitute only 0.2% of the total population.

### WORKING CAPACITY

The main purpose of buffalo production in Vietnam is to provide draught power, and animals have been selected for working ability from time immemorial.

Training for work regularly begins at 18 months of age. First, the calf assumes light work (harrowing light

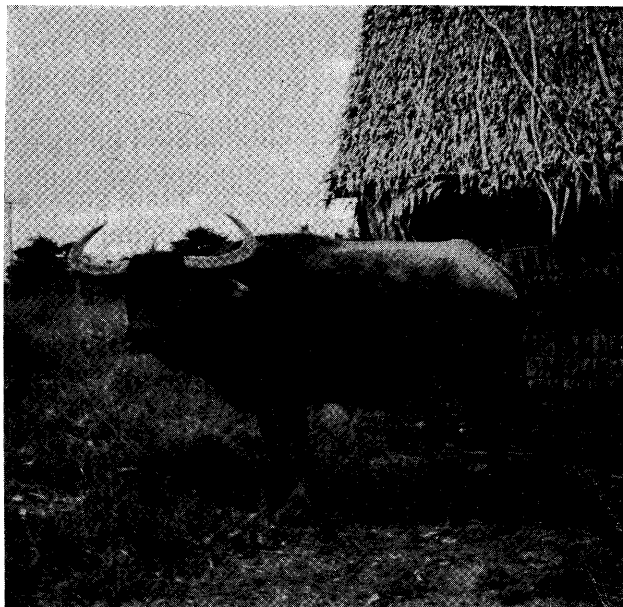
soil) of short duration (1.30-2.30 hours per session). From the age of 2-3 years, young buffaloes begin to work normally. The working day begins at 5:00-6:00 a.m. and ends at 10:00-11:00 a.m. in North Vietnam and at 6:00-6:30 and 11:00-12.30 a.m, respectively, in South Vietnam. Buffaloes rarely work in the afternoon. The number of work days per year is about 90-120 in mountainous rice-growing areas and about 150-180 in main rice-growing areas. The limit of work service is 13-18 years. After working, buffaloes usually wallow in small muddy hole for refreshment.

In North Vietnam, a single buffalo can plough 360 m<sup>2</sup> per work day; in South Vietnam, one pair of buffaloes can plough 1500-2000 m<sup>2</sup>. Southern buffaloes are stronger and bigger than Northern ones. Vietnamese farmers believe that white-coated buffaloes (albinos) give poor draught performance, as compared to dark-coated ones. Buffaloes serve in ricefield cultivation: ploughing, harrowing, levelling, threshing, haulage (of paddy and rice straw), and as pack animals. Among the tribal minority M'nong R'lang (Daklak province, Central Highlands), buffaloes are used for puddling waterlogged rice fields before seeding.



### FEEDING

After working hours, buffaloes are freely grazed grasses growing along rice field borders, canal banks, river dykes, and roadsides.



In stables, buffaloes are supplied with natural cut grasses (usually of poor quality) and rice straw and other crop by-products, such as corn stover and bean vines. In South Vietnam, farmers sometimes provide rice soup (prepared from rice bran, middlings, and brown rice) to working buffaloes and suckling dams.

In general, the quantity and

quality of fodders, roughage and feeds for buffaloes fluctuate with season and the place. In some brackish and acid-sulphate areas, during the off-rice season, buffaloes have to be fed mainly on rice straw, and natural rough grasses and drink acidified or brackish water, so they lose weight rapidly. In high-yielding rice areas, buffaloes are fed sufficiently so they are often vigorous and sometimes fat.

### BY-PRODUCTS OF BUFFALO PRODUCTION

In main rice-growing areas, where two or sometimes three crops are grown per year, buffalo droppings are the main component of local farmyard manure. In some deep-water rice-growing areas of the Red River Delta, buffalo manure is the main source of organic matter for rice fields. In general, one adult buffalo can provide at least 10 metric tons of farmyard manure per year, and this amount is sufficient to manure two hectares of rice field. The problem now is to improve the gathering and storage and to ameliorate the manure quality\*.

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\* Buffalo farmyard manure contains 20.3% organic matter, 0.45% total nitrogen, 0.23% phosphorus, and 0.50% potassium.

Buffalo meat has relatively minor importance in the meat diet of Vietnamese people. Most consumers prefer pork to beef, and beef to buffalo meat. One of the reasons is the darkness, the toughness, and the rough texture of this kind of meat; moreover, its strong odour makes it generally unacceptable at local markets. Traditionally, only retired buffaloes are slaughtered for meat, and the palatability of meat from a 18-20-year-old animal that has been worked hard all its life is low.

The dressing percentage of buffaloes is slightly lower than that of cattle: about 45-48% at slaughter of buffaloes of 500-550 kg live-weight; hide and gastro-intestinal tract make up a high proportion.

Vietnamese rice farmers are not, traditionally, milk consumers, so all the milk of a dam is reserved for the calf, which normally sucks all day long to an advanced age (about one year).

Buffalo hides are the main raw material in leather manufacture. Buffalo horns and bones are used in handicrafts, from necklaces and earrings to bracelets and hand fans. Nothing from the buffalo's body is use-

less to Vietnamese peasants and crafts men.

The dearest dream of generations of Vietnamese rice farmers has been to own one or a pair of buffaloes -- in the peasants' words: "to plough their own rice fields with their own buffaloes". This aspiration has been embodied in these words:

Oh my dear buffalo, listen to me,  
We go together to the rice fields,  
And we work there from dawn till dark,  
One day, we'll share a bumper  
(rice) crop,  
And we'll enjoy ourselves.

From early in our history, buffaloes have been considered members of the rice farmer's family, and at the same time, a fortune -- the most valuable item owned by the family.

For Vietnamese people, the buffalo plays a quadruple role: that of cattle and of horses (draught power), of sheep (meat supplier), and of dogs (family membership with high faithfulness) in Western communities.

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#### REVIEW ABSTRACTS

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on crossbreeding river x swamp types suggests that this combination could be achieved in the crossbred. However, the best river breed, be it Nili-Ravi, Murrah or Surti, for such crossbreeding has yet to be determined. Additionally, the crossbred has to be evaluated as a multipurpose animal under the small-holders' nutritional and management environment. Selection within existing swamp populations would be too slow to meet the foreseeable needs of small farmers over the next century. If multipurpose animals are to be produced, the F<sub>1</sub> (river x swamp) animals may need to be mated inter se to yield F<sub>2</sub> animals rather than backcrossed to either the parental river or swamp types. However, if increased draught-ability

is required while maintaining a certain quantum of milk and meat traits, then backcrossing  $F_3$  to the swamp types would be necessary. Since chromosome polymorphism has been shown in the  $F_3$  generation as well as in the backcrosses and offspring, of  $F_3$  males x  $F_3$  females, a chromosomal evaluation of production traits is required in these generations so as to indentify the most suitable genotype for multipurpose use. Other complementary ways of rapid genetic improvement of the buffalo include the use of nucleus breeding units with or without 'MOET' and new technologies such as cloning, IVF, and embryo transfer. The new technologies will be practical only if low costs are maintained and success rates high.



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#### FROM THE EDITOR

Time really flies; 1990 has come to an end. This last issue of the ninth volume of the Buffalo Bulletin brings also to an end my term of duty as the editor of the Bulletin. The incoming editor will be Prof. Dr. Peerasak Chantarapruteep, who is widely known in buffalo research and development. I will remain very much involved in the activities of the IBIC as well as the Buffalo Bulletin.

May I take this opportunity to commend the kind assistance of my editorial staff members, namely, Mrs. Rungsima Petchmedyai, Dr. Masao Sasaki, Mrs. Chantra Konanta, and Dr. Metha Wanapat, and reviewers, whose names I do not mention here, who spent countless hours reading manuscripts during my term (1986-1990). I also thank for their kind cooperation all the contributors and users who have made the Buffalo progress and live.

It has been a great pleasure and honor to have had the opportunity to serve the readers of the Buffalo Bulletin. I wish you all success and prosperity in your work and in buffalo research.

The Editor

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