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Some aspects of draught buffaloes in Vietnam

Tong Quang Minh¹

Le Xuan Cuong¹

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Les auteurs ont porté un intérêt particulier au développement des buffles de trait au Viêt-nam dans deux principales zones agroécologiques : le delta de la rivière Rouge et celui du Mékong. La croissance moyenne annuelle de cette population est de 2,4 p. 100. Les méthodes de labour avec les mini-tracteurs fabriqués localement ou celles traditionnelles qui utilisent des tracteurs d'importation ont des effets limités, en raison des conditions naturelles assez complexes, alors que l'alimentation des buffles doit faire face au manque de fourrages verts dans les zones de haute production rizicole. La mécanisation de l'agriculture au Viêt-nam doit être fondée sur une coordination harmonieuse entre le recours à la machine et la puissance de traction du buffle. Bien que les résultats sur l'emploi des buffles de trait ne soient pas en nombre suffisant, l'avenir de son développement s'oriente, simultanément, vers un programme d'amélioration par croisement et une meilleure qualité de la paille de riz afin d'améliorer les aspects qualitatifs et quantitatifs de l'élevage de buffles de trait. *Mots clés* : Buffle - Culture attelée - Amélioration - Viêt-nam.

1. Institute of Agricultural Science of South Vietnam, Department of Buffalo and Cattle Research, 121 Nguyen Binh Khiem St., Ho Chi Minh City, District 1, Vietnam.

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Introduction

Draught buffaloes (DBs) have always been considered as the most precious animals of Vietnamese farmers. Nowadays, DBs still play an active role, though mechanization is largely contributing to agricultural production.

The buffalo population in Vietnam represented 2.9 million heads in 1989, its growth rate was 25.6 % in 1980 and the annual growth rate gained 24 %, on an average. About 67 % of the buffalo population is at work per year. The quantity of DBs in North Vietnam is 3-4 times higher, but the growth rate is slower in comparison with that in South Vietnam (table I).

As affected by agrarian reform policies, destruction by war and intensification of agro-machinery, DBs have still been paid attention to develop for more than 30 years. Just in 1955, thousands of DBs were imported from Thailand and Cambodia to South Vietnam in order to meet draft power (6). Destructive war killed a great deal of DBs in the 1965-1968 period. Thereafter, the mechanization helped the country out of the difficult situation in agricultural production through the importation of USSR tractors in the North and Japanese ones in the South. But similarly to the other developing countries, the importation of machinery to Vietnam has faced the limitation of foreign currency.

In the strategy of mechanization of agro-sylviculture and fishery in Vietnam, it is noteworthy that the long-term composition of power supply will be the coordination of human labour, draught animal power (DAP) and petroleum-based power with a suitable component in each zone. DAP will be an important draft source in agricultural production for the coming 10-15 years, because it takes charge of about 50 % cultivated area without taking into account the power for transportation in agro-sylviculture (5).

TABLE I Annual buffalo population in Vietnam.

Year	Whole country		North Vietnam		South Vietnam		Separatedly in Mekong delta	
	Total	At work	Total	At work	Total	At work	Total	At work
1979	2292.8	1506.4	1821.3	1214.2	470.5	290.4	256.6	167.8
1980	2313.0	1542.1	1710.4	1242.1	502.6	300.0	271.6	175.1
1981	2379.1	1563.5	1851.5	1243.6	527.6	319.9	279.9	178.0
1982	2445.0	1676.3	1880.8	1329.7	564.2	346.6	298.6	182.7
1983	2500.2	1718.5	1898.6	1357.5	601.6	361.0	313.2	205.4
1984	2540.2	1736.1	1907.2	1364.6	633.0	371.5	325.8	210.2
1985	2590.2	1734.0	1935.1	1350.6	655.1	383.4	329.1	216.4
1986	2657.6	1793.4	1986.3	1403.6	671.3	389.8	331.9	208.5
1987	2752.7	1868.4	2061.0	1458.7	691.7	409.7	334.7	219.4
1988	2806.8	1913.1	2102.9	1491.7	703.9	421.4	341.6	223.4
1989	2900.0	1932.0	2201.4	1526.0	698.6	406.0	334.3	214.9
Growth rate in 1980s (%)	26.5	28.4	20.9	25.7	48.5	39.8	30.3	28.1
Average annual growth rate (%)	2.4	2.6	1.9	2.4	4.0	3.4	2.7	2.5

Source : National statistical yearbook.
Figures in 1000 heads.

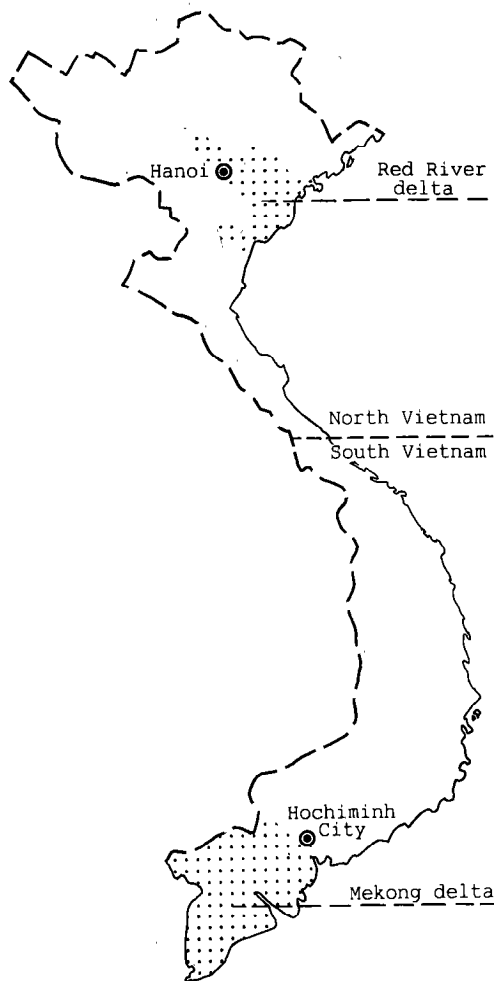
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Requirement for draught buffaloes in plains

There are two most important agro-ecological zones in Vietnam, the Red River delta (RRD) and the Mekong delta (MD), which provide a great quantity of foodstuff for Vietnamese people.

TABLE II Natural conditions and requirement for draught buffalo utilization in plains.

Zone	Natural area (10 ⁶ ha)	Rice cultivated area (10 ⁶ ha)	Clay in soil structure (%)	Min. air-temperature (°C)	Draught buffaloes at work
Red River delta	1.7	1.0	12-16	4-8	Single
Mekong delta	4.0	2.2	45-60	16	Paired



Map 1 : Location of two main rice-cultivated zones in Vietnam.

The difference in the natural conditions and the request for land preparation between the two zones (table II, map 1) show that DBs in the Red River delta are exposed to cold weather, so they often fall down when working at the beginning of the winter-spring crops. Some buffalo cows abort in the 3rd-4th months of gestation when the hard period of land preparation comes (1). In addition, trypanosomosis is also a cause of heavy loss of DBs when mountain buffaloes migrate to the Red River delta (3).

There are 35 783 tractors in the whole country, of which 19 451 are big ones (54.3 %) (National statistical yearbook in 1988). Advantage cannot be taken of their power because most rice fields are segmental and the fields are low and slushy, so that big tractors cannot work efficiently. Areas of acid and saline soils occupy 58 % of the whole MD, so tractors are often unstable and early destroyed by acidity and salinity of soil and water (2).

On the basis of total horse power, the percentage of DAP is higher than that of tractors, DBs occupy 45.2 % of the draft power in the whole country ; some provinces in MD consider DBs as the main draft power (table III). In fact, indigenous tillers are very few and so simple that they do not meet the requirement for agricultural production. On the other hand, maintenance facilities are inadequate for imported tractors. Therefore, the exploitation of DBs in the Mekong delta is necessary though their annual working force is less than half of that of DBs in the Red River delta (12).

TABLE III Distribution of draft components in the Mekong delta (1988)

Province	Tractor		Working animal		Total
	Big	Small	Buffalo	Cattle	
Long An	47.3	4.7	43.9	4.1	100
Tien Giang	49.9	0.7	45.5	3.9	100
Ben Tre	34.0	2.4	52.5	11.1	100
Cuu Long*	7.5	0.1	69.4	23.0	100
Dong Thap	9.2	2.4	57.8	30.6	100
An Giang	52.9	1.2	40.9	5.0	100
Hau Giang	66.6	10.5	2.8	20.1	100
Kien Giang	61.5	0.6	33.7	4.2	100
Minh Hai	54.1	0.1	45.8	0.0	100
Whole zone	47.3	3.0	40.2	9.5	100
Whole country	30.7	6.2	45.2	17.9	100

Figures in %.

* Province where DBs play the most important role in draft component.

In the North, the average ploughing level per day for single DB is 900-1080 m² in dry fields and 1260-1440 m² in wet fields (7) in comparison with that of DB pairs in the South 1020-1080 m² (14).

Present status of draught buffaloes in high-yield rice areas in Cuu Long province (Mekong delta)

The Mekong delta belongs to South Vietnam, where the rice production not only meets the native requirement, but also serves the exportation. Records on DBs in the high yield rice area (HYRA) show that their bodyweights reach 400 kg at the age of 5 years, *i.e.* after 2 years of working (table IV). Male buffaloes are often castrated at the age of 7 years in order to continue better exploiting DAP ; females also play an active role in land preparation. Pairs of DBs plough 450 m² per hour in wet fields. They are put to work for 3-5 hours a day, from early morning (10).

TABLE IV Bodyweight of draught buffaloes in high-yield rice area in Cuu Long province (Mekong delta).

Age (years)	Sex		
	Male	Female	Bullock
3	325 ± 63	336 ± 40	—
4	367 ± 56	367 ± 33	—
5	405 ± 42	406 ± 53	—
6	430 ± 69	426 ± 48	—
7-10	461 ± 68	438 ± 54	480 ± 68
> 10	498 ± 54	458 ± 46	526 ± 65

Figures in kg.

A survey on villages located in high-yield rice areas shows that the role of DBs is very important because rivers and canals are reticulate, bridges are insufficient ; tractors operate limitedly and fuel expenditure is high. Most rice after harvesting and fertilizers are transported by motor-linked boats, therefore DBs are only used for land preparation such as tillage, harrowing and croskill, but not for carting.

In HYRA, green forage is very scarce, plots for grazing are highly insufficient, DBs are only supplied with rice straw (RS) for maintenance, but RS collected from high-yield rice fields is so rough and hard that DBs have a poor appetite and eat very little. The utilization of urea-ensiled RS should be carried out in some farmer households for demonstration (11). This technique will help DBs out of the long-lasting insufficient feeding in the dry season, so that DBs can gain strength to work when the ploughing time starts.

The poor reproductive ability of the females and the loss of DBs by haemorrhagic septicemia during extra-working time are the reasons which prevent the increase of draught buffalo population. If these causes are overcome, the farmers might obtain a better development of their buffalo herds.

Prospect on draught buffalo improvement

The potential of DBs has not been fully exploited because buffalo beef is cheap. DBs work at the maximum 100 days per year, at the beginning of annual land preparation and at crop harvesting. They must then be fed throughout the year. Psychologically, farmers would like to purchase hand-tillers when they have the wherewithal, but they have not calculated carefully the total expenditure including maintenance cost. If the programme of crossbreeding between riverine buffalo and local swamp buffalo is implemented at a large scale by using MURRAH males in a better way, perhaps many farmers will choose DBs instead of hand-tillers, because they can receive some milk from crossbred females and draft power from crossbred males. The latter can plough 1.2 fold more than the native swamp buffaloes (8, 9). In the same experimental condition, the ploughing ability of crossbred DBs in the Red River delta is better *i.e.* : draft, speed, area and the time for strength restoration (13) (table V). The creation of crossbred dairy buffaloes will not only allow to exploit draft power, but will be significant in the renovation of the countryside in Vietnam.

TABLE V Comparison of draught buffalo DAP in Red River delta.

Breed	Type of field	Sex	Draft (kg)	Speed (m/sec.)	Power (HP)	Ploughing area (m ² /h)	Strength restoration time (min)
Indigenous swamp buffalo	Dry	Male	75	0.43	0.40	230	170
	Dry	Female	68.7	0.40	0.36	221	170
Murrah crossbred (F1)	Dry	Male	76.1	0.48	0.46	362	150
		Female	76.3	0.45	0.45	246	160
	Wet	Male	60.9	0.46	0.37	342	135
		Female	57.8	0.43	0.33	326	140

Source : Thac, 1977.

DAP : draught animal power.

There is a national project of increasing the quantity and improving the qualitative aspects of DBs in the Red River delta as well as in the Mekong delta, which includes methods for applying progressive techniques of breeding, reproduction and feeding.

On the other hand, a way for land preparation was proposed involving ploughing by tractors and then harrowing by DBs, and this represents an economic efficient solution in the sulphate-acid soil of Mekong delta for summer-autumn rice crops (4). This technique is a harmonious coordination between machinery and draught animal power, a popular model for land preparation in water-submerged, muddy and slushy areas, and it is very practical for rice production in the Mekong delta.

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In conclusion, research and development of DBs in Vietnam has been taken into account in agricultural production systems. Advances in draught buffalo husbandry should be transferred up to the farmers. This also requires various supports from the international cooperation together with governmental appropriate extension programmes.

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Attention is particularly paid to draught buffalo development in Vietnam in two main agro-ecological zones, the Red River delta and the Mekong delta. The average annual growth rate of the buffalo population is 2.4 %. Indigenous tillers and imported tractors operate limitedly due to rather complex natural conditions ; whereas draught buffalo nutrition faces the lack of green forage in high-yield rice areas. Strategy for agricultural mechanization in Vietnam will be based on the harmonious coordination between draught animal power and machinery. Though results on draught buffalo research are insufficient, the outlet of draught buffalo development is tending towards a crossbreeding programme simultaneously with the improvement of ricestraw quality, in order to upgrade the quantitative and the qualitative aspects of draught buffaloes. *Key words* : Buffalo - Drought culture - Improvement - Vietnam.

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