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THE CHANGING ROLE OF WATER BUFFALO IN RURAL VIETNAM

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ABSTRACT

Vietnam is rapidly industrializing, and many of the rural agriculturally-based communities in the periphery are no exception. On the flatter lands around Hanoi and more heavily populated areas in some of the provinces to north of the capital for example, the gasoline powered tractor is replacing the labour of the water buffalo. Additionally, as the population demands more meat in its diet, water buffalo are now raised for human consumption, often in pens, rather than for power needed for agricultural cultivation. Indeed, as in the case of Chiem Hoa district in the Tuyen Quang province, what was once the plough has become a marketable and commodified brand of meat. Stated otherwise, an animal that was once common-place, interacted with daily, prized for its intelligence, decried for its stubbornness, and was considered by many across the countryside as another working member of the family, now seems somewhat exotic or has been reduced to simply another source of consumable protein.

This chapter centres the water buffalo as a living framework to explore the complex social, cultural, environmental, and economic histories of the people of Chiem Hoa district in the Tuyen Quang province and by inference rural Vietnam. While the trope of economic progression dominates the academic literatures of rural development, this study focuses on structural changes in the economy notwithstanding. This present that agriculture in Vietnam is mechanizing and industrializing, and as it does generations of shared history between rural people and their most valued animal is being altered forever.

Keywords: *Bubalus bubalis*, buffaloes, rural development, structural change, Vietnam

INTRODUCTION

Water buffalo (*Bubalus bubalis*) are one of the most common domestic animals in developing countries. In much of Southeast Asia, they have long

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provided the main draft animal for rice cultivation. As the region develops economically however, this is changing. In Vietnam for example, since 1995 the total population of buffalo has been in decline, especially in the lowlands of the Mekong River and the Red River Delta provinces. This chapter focuses on a region in the Northern Mountainous Region (NMR) of the country where the buffalo population remains an important part of farming livelihoods and rural development (Berthouly *et al*., 2010; Kingsbury *et al*., 2019).

Incorporating buffalo into production is one of the best ways to increase the sustainability of a farming system for the rural poor. Buffalo can be used for plowing, harrowing, pulling heavy loads, lifting water from wells, threshing rice, smashing bricks, and as packing and riding animals. In short, they provide energy for a variety of daily chores required in rural agricultural communities. They are especially beneficial for smaller farmers who often own only two or three working buffaloes. With proper rest, a buffalo weighing 600 kg or more can transport 250 kg at 3 km/h in a 10 h workday (Cockrill, 1981).

Of particular importance to many farmers is the use of buffalo in wet paddy rice cultivation. Although cattle are more agile, they lack the weight and brute strength of a slow and methodical buffalo. Pulling lightweight wooden plows, fields can be plowed much deeper than with cattle. The buffalo's large hooves and flexible fetlock joints are also an added advantage. Furthermore, labor requirements in rice-producing regions are seasonal. Mechanical tractors designed for wet paddy rice production have too much downtime and require too many costly inputs. The buffalo, the 'live tractor', offers low maintenance requirements and a long service life at a fraction of the cost.

In countries across Southeast Asia, buffaloes are valued most as working animals or dairy producers. In previous generations in Vietnam, only after an animal had aged and was no longer productive was it consumed as meat. Meat sold in markets was from these older animals, slaughtered after a long working life. Such meat was chewy and considered less flavorful than other meats. As the economic situation of many rural communities in Vietnam has improved, consumers are now able to consume more protein from animal sources. With pleasant temperaments and higher meat conversion efficiency than cattle, the consumption of buffalo meat has risen expediently to meet this new demand. These meat buffalo are dehorned and castrated, slaughtered young, and their meat is considered by many to be lean, tender, and delicious. Many consumers rate the meat from buffalo as superior to even the highest quality cuts of beef. Therefore, we suspect that the image of buffalo working in the fields with farmers is gradually being replaced by the image of nutritious human food. This study will attempt to demonstrate a role change with secondary data in Vietnam and survey data in Chiem Hoa District.

MATERIALS AND METHODS

In this study, we employed the secondary data on buffalo production from the General Statistics Office of Vietnam (GSO). This data helps us to see population and structural change in buffalo production in Vietnam. Then, we begin to investigate the structural change in Vietnam's buffalo production in a specific location, particularly in Chiem Hoa district, Tuyen Quang. The primary data in Chiem Hoa district was collected using participatory rural assessment techniques (Chambers, 1994) to obtain information

on buffalo use in local agricultural production in 2019. Responses were obtained by conducting focus group discussions with key informants, farmers with buffalo in their households.

More specifically, Chiem Hoa district is located between 22.02' to 22.22' North latitude and between 105.01' to 105.25' East longitude. Its topography is largely divided by a system of rivers and high mountains that are limestone mountains and soil mountains. Its natural land area is about 128 000 ha with the area of agricultural and forestry land about 118,725.93 ha. Its weather have two distinct seasons: Summer from April to September and winter from October of the previous year to March of the following year. Chiem Hoa District has 25 communes, 01 town with 378 villages.

RESULTS AND DISCUSSIONS

The contribution of buffalo to the agricultural economy of the North in Vietnam

With 2.9 million total head in 2005, buffalo in Vietnam accounted for only 1.64% of the world's total (Berthouly *et al*., 2010). Table 1 confirms that Vietnam experienced a discrete pattern of buffalo population in different regions. Of particular importance is the rapid decline in buffalo numbers in the Red River and Mekong deltas. In the NMR and Central Coast regions of Vietnam, buffalo numbers have remained more stable.

In Vietnam, the average buffalo labors 109 days annually (Sanh *et al*., 1995). Less than 10% of farmers use buffalo manure and those that do only in small quantities (51 kg/ha). Vietnamese buffalo produce between 1.55 to 2.15 kg of milk/day depending on breed (Thu, 1997). The country produces 96,750 tons of meat with an average growth rate of 1.42%. Despite recent increases in the consumption of buffalo meat, it only accounts for less than 5% of all meat consumed (Thu *et al*., 1995). In the NMR of Vietnam, 94% of farmers raise buffalo, mainly for draft purposes (Sanh *et al*., 1995).

Table 2 shows the number of buffalo in the provinces of the NMR between 1995 and 2017. Generally, the total number of head buffalo increased to over 1,697,000 between 1995 to 2007, before falling moderately afterwards. This trend is as the same as the buffalo quantities in the midland mountainous provinces that include Hoa Binh, Phu Tho, Tuyen Quang, Yen Bai, and Bac Kan. The early rise in buffalo numbers can be attributed to the economic changes brought by Doi Moi policies in the mid-1980s. In particular, buffalo ownership was converted from cooperatives to private farmers, which led to rapid increases in their number. After Vietnam was admitted to the WTO in 2007, the government changed its industrial development policy for some provinces to increase competitiveness in manufacturing and encourage the development of agriculture in others. Thus, a reduction of buffalo occurred in Thai Nguyen and Bac Giang, which were converted to industrial zones. Conversely, provinces such as Ha Giang, Son La, Cao Bang, Lao Cai, Dien Bien and Lai Chau experienced increases in buffalo numbers following agricultural policies targeting poverty reduction in rural communities (Circular No.08/2009/TT-BNN. (2009). Guiding the implementation of a number of policies to support the development of agriculture, forestry and fishery production under the Government's Resolution No. 30a / 2008 / NQ-CP of December 27, 2008). As such, buffalo quantities in each province reflect the unique top-down policies and socio-economic situation of their communities. What is of considerable importance, however, is that buffalo play a vital role in poverty

reduction in the economically disadvantaged communities across the Northern Mountainous Region of Vietnam.

As buffalo comprise such an important component of rural farming communities, increases in mortality rates equate to considerable social and economic stress. Recent extended periods of cold in the NMR, for example, are adding a number of complications to livelihoods. The cold often kills the grass that was earmarked for buffalo fodder. With less to eat, buffalo lose body fat, which in turn increases their vulnerability to cold. Simultaneously, buffalo are required to spend more time exposed in the open, trying to consume sufficient calories from less grass.

Suppliers of natural fertilizers, buffalo are thought to be more effective under local agronomic conditions. Indeed, they are still revered as an integral part of the local working culture and are one of the most important elements of economic survival. For many, the trip to the market to buy a new buffalo is a significant economic decision. Buffaloes also have their own personality and recognize their owners, sympathizing with farmers. Emotional connection with these animals can be made beyond mechanics. Thus, for many rural Vietnamese farmers, buffalo are still considered to be part of the family.

The role of buffalo in the households in the Vietnamese Northern Mountainous region

While the data points to a decline in the role of buffalo to the larger Vietnamese economy, many families keep them. This chapter now shifts to focus on the role of buffalo more generally in households across the Vietnamese NMR. Specifically, it presents as a case study an analysis of the role of buffalo and the effects of rural change in Chiem Hoa district, Tuyen Quang Province.

According to 2014 data of Chiem Hoa district, there are 26,364 head of buffalo in the district. In Chiem Hoa, buffalo are raised and distributed in most communes and towns, most concentrated in communes such as Tan An, Tan My, Yen Lap, Trung Ha, Minh Quang, and Phuc Son. The number is highest in Tan A commune (2,371 heads) and lowest in Vinh Loc Town (125 heads). Of the total number, only 31% of buffalo were male, and the total number under the age of one was 4,663 (18%). As seen in Table 3, the majority of buffalo in the district are female. As male buffalo tend to be stronger than females, this indicates that the motivation of households for raising buffaloes is not to plow. Additionally, with a higher average rate and better feed conversion ratio, the male buffalo produce more meat than the female buffalo. This means that these animals are not being raised for meat. Thus, as other breeds of buffalo are better suited to milk production, it can be concluded that the study area households raised buffalo for breeding.

Table 4 shows that the number of buffalo per household in Chiem Hoa averages between 1 and 2 heads. The number of households with 3 or more head were concentrated in communes such as Tan An (320 households), Yen Lap (286 households), Tan My (252 households), Phu Binh (209 households), and Hung My (185 households). Respondents noted that areas available for grazing per household were getting narrower due to increases in other crops than grass.

As seen in Table 5, in the Chiem Hoa district, households mainly raised their animals inside pens (98.25%). Only 5 households allowed their animals to free range. There were no households raising buffalo on an industrial scale. This is arguably similar to most communities across the NMR.

Table 1. The quantity of buffalo in the regions of Vietnam between 1995 and 2017. Unit: Thousands.

Year	Red river delta	NMR	Central coast	Mekong delta	Total
1995	349.6	1467.8	825.0	124.6	2962.8
1996	333.2	1494.2	817.5	112.5	2953.9
1997	316.2	1521.5	821.1	98.9	2943.6
1998	302.7	1559.7	818.6	90.2	2951.4
1999	293.7	1591.0	815.8	75.8	2955.7
2000	278.1	1562.0	823.5	63.7	2897.2
2001	244.0	1537.8	826.5	40.2	2807.9
2002	233.3	1550.6	832.4	37.3	2814.5
2003	227.1	1561.4	851.5	35.8	2834.9
2004	216.4	1589.1	867.0	36.4	2869.8
2005	209.1	1616.3	894.6	38.8	2922.2
2006	184.1	1639.4	906.8	38.8	2921.1
2007	176.9	1697.2	931.9	38.1	2996.4
2008	171.6	1624.4	908.9	43.1	2897.7
2009	170.6	1626.3	893.6	43.3	2886.6
2010	168.3	1618.2	889.8	44.4	2877.0
2011	155.3	1506.2	855.7	43.9	2712.0
2012	145.7	1453.6	839.0	40.7	2627.8
2013	137.6	1424.2	815.4	37.1	2559.5
2014	134.4	1410.6	803.4	35.0	2521.4
2015	130.5	1412.2	814.6	33.9	2524.0
2016	128.0	1415.0	816.4	31.4	2519.4
2017	125.0	1403.7	808.2	28.8	2491.7

Source: General Statistics Office of Vietnam (GSO)

Table 2. The number of buffalo in the NMR between 1995 to 2017.

Year	Ha Giang	Cao Bang	Bac Kan	Tuyen Quang	Lao Cai	Yen Bai	Thai Nguyen	Lang Son	Bac Giang	Phu Tho	Đien Bien	Lai Chau	Son La	Hoa Binh	Total
1995	110.5	140.5	82.5	122.9	90.9	75.5	103.0	198.6	138.8	84.8	..	102.9	107.3	109.6	1467.8
1996	113.7	111.9	85.1	126.3	92.9	77.6	136.0	198.7	136.1	85.8	..	105.8	111.3	113.0	1494.2
1997	117.0	113.9	87.3	129.4	94.5	79.1	134.7	204.4	134.6	84.9	..	109.5	114.6	117.6	1521.5
1998	120.5	115.3	91.5	132.5	98.2	81.1	135.9	211.0	131.1	86.2	..	118.2	115.3	122.9	1559.7
1999	126.2	115.9	92.3	134.6	100.4	82.2	137.3	218.2	131.0	87.6	..	122.6	116.1	126.7	1591.0
2000	132.2	108.7	87.0	137.4	100.3	83.3	135.9	188.8	125.3	88.5	..	127.1	119.2	128.3	1562.0
2001	130.2	106.2	80.1	136.7	117.0	87.6	122.1	185.2	100.8	90.7	..	134.6	128.7	117.9	1537.8
2002	129.9	107.5	83.0	131.8	120.9	89.2	121.5	185.2	99.0	92.3	..	139.0	130.8	120.5	1550.6
2003	133.0	108.8	81.7	129.5	124.4	93.2	114.7	188.2	94.2	94.3	..	144.1	133.1	122.2	1561.4
2004	134.7	111.2	83.5	131.8	102.4	96.3	112.3	188.7	94.3	96.1	95.9	79.8	139.6	122.5	1589.1
2005	138.1	112.5	83.0	133.1	106.7	101.1	111.1	188.5	92.0	97.1	99.6	84.7	143.8	125.0	1616.3
2006	141.1	114.7	83.9	138.4	121.3	107.1	109.1	175.1	90.7	92.9	101.2	86.1	155.2	122.6	1639.4
2007	147.0	117.4	87.9	143.2	127.0	111.7	108.6	182.2	91.2	95.2	105.2	92.4	162.1	126.1	1697.2
2008	146.4	107.1	77.7	145.1	125.5	110.0	106.9	160.9	87.3	89.2	107.9	89.0	158.6	112.8	1624.4
2009	152.8	108.0	75.2	144.8	131.0	112.4	96.7	155.7	84.6	88.8	111.1	92.8	162.5	109.9	1626.3
2010	158.3	109.3	66.9	134.6	134.9	102.4	88.5	155.3	83.7	86.5	115.4	98.8	170.2	113.4	1618.2
2011	156.3	102.1	60.8	116.9	123.6	102.3	73.9	132.4	74.7	77.3	113.4	96.0	166.1	110.4	1506.2
2012	158.7	100.8	53.0	104.9	123.7	97.4	70.6	122.7	68.8	73.5	116.2	89.3	168.5	105.5	1453.6
2013	158.3	97.4	52.2	102.8	120.9	96.4	69.9	119.8	62.0	70.9	119.5	90.2	158.4	105.5	1424.2
2014	155.2	97.2	53.4	104.6	120.1	95.8	69.6	118.7	59.5	70.6	118.5	90.3	153.0	104.1	1410.6
2015	157.1	98.8	55.0	107.2	122.0	97.5	69.0	121.2	56.5	69.1	119.2	93.8	142.8	103.0	1412.2
2016	158.3	100.1	55.3	108.7	123.6	98.7	62.0	121.4	51.3	69.7	121.2	94.2	145.6	104.8	1415.0
2017	159.3	101.0	55.5	106.6	124.5	100.1	57.2	118.1	47.7	67.0	122.4	95.0	143.3	106.0	1403.7

Source: General Statistics Office of Vietnam (GSO). Unit: Thousand.

Note: Between 1995 - 2003, the data of Lai Chau province included Dien Bien province.

Table 3. Gender characteristics of buffalo herd in Chiem Hoa district.

No	Area	Quantity						
		Total	Male		Female		Infant (<12 months)	
			#	%	#	%	#	%
1	Vinh Loc	125	30	24	65	52	30	24
2	Ngoc Hoi	593	188	32	291	49	114	19
3	Vinh Quang	627	260	41	269	43	98	16
4	Phuc Son	1.618	601	37	839	52	178	11
5	Yen Lap	1.796	379	21	912	51	505	28
6	Yen Nguyen	750	363	48	291	39	96	13
7	Linh Phu	770	369	48	322	42	79	10
8	Minh Quang	1.6	315	20	965	60	320	20
9	Phu Binh	1,185	277	23	658	56	250	21
10	Tan My	2,047	544	27	1,093	53	410	20
11	Hoa Phu	821	297	36	391	48	133	16
12	Kim Binh	604	417	69	128	21	59	10
13	Tri Phu	758	325	43	365	48	68	9
14	Nhan Ly	681	212	31	435	64	34	5
15	Binh Nhan	274	141	51	95	35	38	14
16	Trung Hoa	479	197	41	227	47	55	11
17	Phuc Thinh	535	200	37	246	46	89	17
18	Tsn Thinh	839	325	39	460	55	54	6
19	Tan An	2,371	623	26	1,266	53	482	20
20	Ha Lang	991	249	25	494	50	248	25
21	Trung Ha	1,513	305	20	963	64	245	16
22	Binh Phu	540	147	27	329	61	64	12
23	Kien Đai	1,134	266	23	392	35	476	42
24	Hoa An	1,065	293	28	642	60	130	12
25	Xuan Quang	1,176	294	25	611	52	271	23
26	Hung My	1,472	532	36	803	55	137	9
Total		26,364	8,149	31	13,522	69	4,663	18

Source: Animal Quarantine Sub Department of Chiem Hoa district.

Table 4. Characteristics of buffalo herd in Chiem Hoa district.

No	Area	Total buffalo	Total households	Average of buffalo (Household)	Farm size		
					1 Buffalo	2 Buffalo	3 or more buffalo
1	Vinh Loc	125	54	2.31	18	16	20
2	Ngoc Hoi	593	343	1.73	165	121	57
3	Vinh Quang	627	415	1.51	273	112	30
4	Phuc Son	1,618	989	1.64	565	277	147
5	Yen Lap	1,796	742	2.42	185	271	286
6	Yen Nguyen	750	518	1.45	354	120	44
7	Linh Phu	770	428	1.8	224	122	82
8	Minh Quang	1,600	904	1.77	405	382	117
9	Phu Binh	1,185	469	2.53	126	134	209
10	Tan My	2,047	965	2.12	399	314	252
11	Hoa Phu	821	473	1.74	194	218	61
12	Kim Binh	604	346	1.75	169	120	57
13	Tri Phu	758	481	1.58	293	136	52
14	Nhan Ly	681	391	1.74	185	151	55
15	Binh Nhan	274	212	1.29	102	54	56
16	Trung Hoa	479	275	1.74	114	127	34
17	Phuc Thinh	535	256	2.09	61	132	63
18	Tan Thinh	839	509	1.65	240	217	52
19	Tan An	2,371	1,049	2.26	301	428	320
20	Ha Lang	991	408	2.43	128	135	145
21	Trung Ha	1,513	847	1.79	378	317	152
22	Binh Phu	540	194	2.78	49	53	92
23	Kien Đai	1,134	396	2.86	92	121	183
24	Hoa An	1,065	690	1.54	382	235	73
25	Xuan Quang	1,176	620	1.9	255	226	139
26	Hung My	1,472	737	2	317	235	185
Total		26,364	13,711		5,974	4,774	2,963

Source: Animal Quarantine Sub Department of Chiem Hoa District.

Table 5. The form of breeding buffalo in Chiem Hoa district.

No	Form	Unit	Quantity	Percent
1	Raised inside	Household	280	98.25
2	Free range	Household	5	1.75
3	Industry	Household	0	0

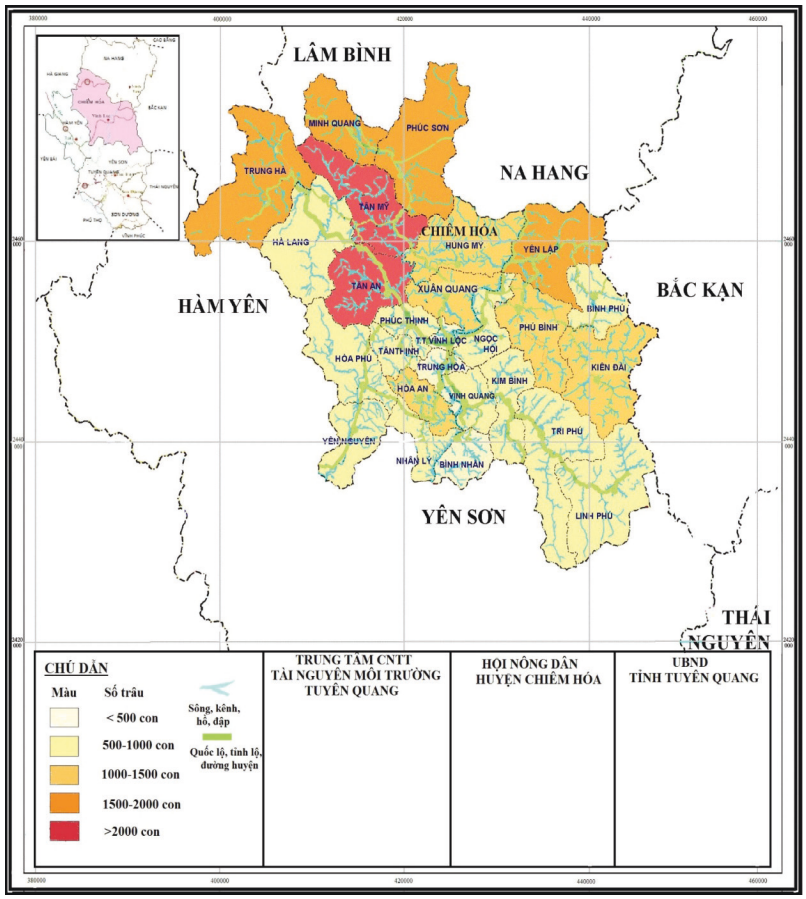

Figure 1. The distribution of buffalo in Chiem Hoa District, Tuyen Quang province.

The main fodder sources for buffalo were hybrid grass and straw (used by 100% of households as the main foods for raising buffalo) and home-made fodder such as corn, potatoes, rice bran, cassava, and fermented sugar cane tops (17.19% or 49/285 households).

CONCLUSIONS

This chapter has provided a brief overview of the evolving role of buffalo in many rural Vietnamese communities. While buffalo was once an animal used across the country for farm labor, their use has become more fractured and dependent on the socio-economic status of the community. In wealthier areas, the gas tractor has replaced the labor of the buffalo. In such places, buffalo are now more likely raised in pens to provide income when sold as meat. Animals are slaughtered young.

In still other locations, including in communities such as Chiem Hoa district in Tuyen Quang Province in the Northern Mountainous Region, a bi- or trifurcation of production styles was found. Buffalo remains vital to systems of sustainable agricultural production, comprise a form of collateral, and remain entrenched in the culture of rural Vietnam. As the country continues to industrialize its agriculture, questions remain as to what future role buffalo will hold in rural Vietnam.

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