Buffalo Production Situation in Vietnam and Development Plan to 2020

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I. PART ONE

BUFFALO PRODUCTION SITUATION

1.1. Introduction

In Vietnam, buffalo is very popular animal and it has been known as Swamp type. Traditionally, buffaloes were raised by small farm holders for multipurpose in agriculture production. The local swamp buffalo have low meat and milk production and low reproductive efficiency due to long gestation period, long calving interval, silence heat and low conception rate. However, swamp buffaloes are well suited to poor feeding management as well as adapted to the hot-humid tropical climate conditions. Buffalo rearing is closely integrate with paddy rice cultivation and it plays an importance role in total agriculture production of the country. Buffalo is also considered a friend of farmer family not only for draught power and fertilizer but also for take full advantage of feeds resources, free time and subsidiary labors etc... of small farm holder in rural area.

From 1990 to present the growing rate of Swamp buffalo population of Vietnam had been affected by various factors, such as cattle is consideration more importance than buffalo in livestock development plan and no policy for buffalo development for last 10 years, fast national population grow, local economic development, mechanization and fast Urbanization....

1.2. Population and distribution

Although buffalo population in the world is increasing about 1.3% annually but the rate of increase of swamp buffalo in Vietnam is low (0.73%). At present, buffalo population of Vietnam is about 2.9 million heads and cattle population is 4.16 million. Because the buffalo body size is larger than cattle so annually, total buffalo meat production is always contributed more than 50% of total ruminant meat production of the country.

Table 1: Buffalo population changes in Vietnam (1990 to 2009).

Year	Buffalo population	% Compare with 1990
1990	2854100	100.0%
1991	2858600	100.2%
1992	2886500	101.2%
1993	2960800	103.7%
1994	2977300	104.2%
1995	2962800	103.7%
1996	2953700	103.6%
1997	2943700	103.1%
1998	2951400	103.3%
1999	2955728	103.5%
2000	2958355	104.5%
2001	2818376	98.74%
2002	2814452	98,61%
2003	2834886	99.32%
2004	2869802	100.5%
2005	2922155	102.3%
2006	2921051	102.3%
2007	2996415	104,9%
2008	2897734	102.5%
2009	2900000*	101.6%

*Source: State Statistic Department, 2009; *Estimated number*

There was a reduction in the population of swamp buffalo from 2001 to 2003 compare to 1990 due to a decrease in the grazing land as a result of an increase in the area under cultivation (Table 1). This situation was happened in the lowland, particular in the Mekong and Red river delta provinces where the buffaloes are grazed extensively. However, there has been an increase in number in areas, where grazing lands are still available, so the increasing rate buffalo population of Vietnam in last 20 years was very low (0.73) when compare with cattle population (2.8%). The population of Buffalo of Vietnam in 2009 is estimated about 2900000 heads.

Swamp buffalo is distributed in all parts of Vietnam but its more concentrated in the Northern Mountain and Upland part because the ecological condition of this region is suitable for buffalo production. More than 52 % of buffalo population is distributed in the Northern Mountain Upland, where the buffaloes are more valuable to the small holder farmers not only for farm work and transportation of farm products but also for economic income of the farmers. In 2008 buffalo population reduce about 3.3% compare with 2007.

Table 2: Buffalo population in different regions

Ecological regions	**Year**			
	2007 Heads	2008 heads	Growth rate (%)	The rate of population %
1. Northern Mountain	1763204	1688415	-4.3	58.2
2. Red River delta	110813	107495	-3.0	3.7
3. North Central coast	755585	733575	-3.0	25.3
4. South Central coast	163158	163072	-0.1	5.6
5. Central Highland	84727	88672	4.6	3.0

6. North East South	80680	73290	-9.2	2.5
7. Mekong river delta	38248	43135	12.7	1.4
Total Vietnam	**2996415**	**2897734**	**-3.3**	**100**

Source: State statistics Department, 2008

1.3. Body size and growth

The body size of swamp buffalo in Vietnam is not as big as river type buffalo, but it is two times bigger than the size of the local yellow cattle. The average live-weight of the adult female swamp buffalo is about 420-450 kg and about 480-550 kg for the adult males, the body weigh at birth of buffalo calf is about 22 - 25 kg. The live-weight of adult swamp buffalo are different between regions (Table 3). Buffaloes in the Mekong delta tend to be larger size than in other regions of Vietnam. Thu (1987) reported that swamp buffalo in Dong Thap province of the Mekong delta were the biggest in Vietnam with an average live-weight of 593 kg for adult female and 700 kg for male.

The small farm holder priority raising buffaloes were draught power, manure as fertilizer for crop fields and as saving bank. So meat production was not the main focus of these small farmers. Traditional farming practice are used extensively and generally include day time grazing; supplemented with rice straw when animal is confined or at night.

Feed insufficient during the dry season and cold season is a major factor causing slow to negative body growth in farmer's buffaloes. Techniques for improved utilization for rice straw are available as urea treatment or silage and hay making but adoption of these technology has been extremely low in buffalo feeding due to lack of economic incentives.

Table 3: Basic measurements and live-weights of adult swamp buffaloes in Vietnam

Regions / Parameters	Mekong Delta	South Eastern Provinces	Central Area	Northern Provinces
Female				
Height at withers (cm)	127	126	121	118
Length of body (cm)	141	132	128	127
Height girth (cm)	192	193	191	180
Live-weight (kg)	458	434	417	358
Male				
Height at withers (cm)	131	129	129	121
Length of body (cm)	143	135	136	133
Height girth (cm)	198	197	198	190
Live-weight (kg)	494	464	494	428

1.4. Reproduction

The buffaloes attain puberty at a later age than cattle (Table 4). The river type exhibits first estrous earlier (15 to 18 months) than swamp type (21 to 24 months). First conception occurs at an average body weight of 250 to 275 kg, which is usually attained at 24 to 36 months of age.

In Vietnam, female buffaloes attain puberty at around 3 years old. Their first calving is at 4 to 5 years of age, and they continue to have calves to the 18 years old. The average duration of estrous varies from 24 to 72 hours. Normal estrous interval or cycle is about 20 - 22 days. The incidence of silent estrous is high, in general, only 25 - 30% of buffalo have clear symptom of estrous.

Table 4: Female reproductive characteristics of cattle and buffaloes

Parameters	Cattle mean (range)	Buffalo mean (range)

Sexual season	polyestrous	Polyestrous
Age at puberty (months)	15 (10 - 24)	21 (15 - 36)
Oestrous cycle		
Length (days)	21 (14- 29)	21 (18 - 22)
Oestrus (hours)	18 (12 - 30)	21 (17 - 24)
Ovulation		
Type	Spontaneous	Spontaneous
Time of onset (hours)	30 (18 - 48)	32 (18 - 45)
Number of eggs shed	1	1
Life span of corpus lutetium	16	16
Gestation on length (days)	280 (276 - 293)	315 (305 - 330)
Age at first calving (months)	30 (24 - 36)	42 (36 - 56)
Post- part intervals (days)		
Uterine involution	45 (32 - 50)	35 (16 - 60)
First evolution	30 (10 - 110)	75 (35 - 180)
Calving interval (months)	13 (12 - 14)	18 (15 - 21)

The fertility rate of the swamp buffalo herd, on average, is low at about 30-40%. The factors contributing to the low reproduction rate are numerous, such as the stress of working condition, poor nutrition and management, shortage of grazing area and poor knowledge about reproduction of farmers. The "silent estrous" is also a serious problem when attempts to implement artificial insemination (AI). Up to the present, availability of good quality breeding bulls at village level is still a limitation for increasing reproductive efficiency in swamp buffaloes. Farmers often mate female buffaloes to good bulls available in the village, regardless of the risk of inbreeding and usually a field-master bull mates all female buffaloes in a given area.

1.5. Feeding and management

In Vietnam, farmers have a long traditional and experiences of buffalo raising but techniques are mostly primitive. Management practices are based on

extensive systems and buffaloes are freely grazed on natural grasses land, forests, roadsides, canal banks, rice field after harvesting and dikes, etc... They are also fed with rice straw or other crop residues in the dry season and working season. Farmers normally do not fatten buffaloes before sell for meat but middle man occasionally by and fatten them by good quality grass and some concentrate before sale. Buffaloes are mainly slaughtered when they are not able to work due to old age or as a result of accidents. Housing for buffaloes is simple and often made by local materials such as wood or bamboo with a palm leaves roof in the mountain area, but in the plain area the housing for buffalo is better with concrete floor and brick wall and tile roof .

After harvesting, farmers in most areas let their buffalo free to look after themselves in the natural grazing areas. But in irrigated areas, farmers have to look after their animal everyday. Tending buffalo is usually regarded to children and the old family members who can not work hard.

1. 6. The function of swamp buffalo in agriculture production

a, Farm integration: In Vietnam, agriculture production system now is mainly belong to the small farm holder. Buffaloes are still the main animal for preparing paddy fields and transportation mean of farm products, The integration of crops and buffaloes make use of available crop by-products, and transfer to the form of protein as meat and milk for human consumption. Manure from buffalo is good fertilizer for paddy field and also improve soil structure. So buffalo represent buffer assets which can be realized at any time, adding further stability to the self-sufficiency crop livestock production.

b, Farm cash income: Swamp buffalo can utilize waste and crops by products as straw, grasses which can not utilize by human. It can serve as long term capital reserve by using local natural resource as long as fodder resource are freely accessible at no charge. Rearing buffalo as mean of financial security for the small

farm holder. In addition, sale of progeny or unproductive buffalo and their dung provide cash in come to the small farm holders.

c, Food security: Food security can defined by a combination of balance between availability and need, avoid of food shortage & nutrition different and adequate food quality. Buffalo can transform non-edible human food into high quality food for human consumption. Increased buffalo production may add to food security: the poor farmer access to more food with low cost and increase local products with reduce import and save foreign currency.

1.7. The role of swamp buffalo in mall farm holder

In Vietnam, swamp buffaloes is main source of draught power in agriculture and crops cultivation. The large feet slow steady movement and heavy draught capacity of the swamp buffaloes make them particularly well suited for paddy cultivation in swampy, waterlogged rice-fields. In addition, exist various social, cultural and economical conditions which make the use of buffalo for draught a very appropriate and profitable farming technique. However, it is difficult to guaranties the draught power and thus, the buffalo's contribution as a source of draught power to the nation's economy has been quite often underestimated.

An important by-product of the swamp buffalo was manure which farmers used as fertilizer in plant cultivation. This made the cost of crop production lower. Moreover, small form buffalo production is highly sustainable from biological, social, economic and ecological stand points.

The draught buffalo would gain weight if a supply a feed was available and a good selling price would be received. Besides draught power from female buffalo, farmers obtained other by-product in form of the offspring when the females were bred. The household's asset were thereby increased. The buffalo was

counted as an asset by the member of the family. This asset will be converted into cash as required.

Table 5: Meat production of buffalo in 2008

Ecological regions	Meat production1000 tons		
	2007	2008	Growth rate (%)
1. Northern Mountain	28.8	31.2	8.3
2. Red River delta	5.8	6.4	10.3
3. North Central coast	15.9	18.2	14.4
4. South Central coast	3.5	3.5	1.0
5. Central Highland	2.1	2.6	23.8
6. North East South	9.5	7.9	-17.0
7. Mekong river delta	1.6	1.5	-10.0
Whole country	**67,5**	**71.1**	**5,98**

Source: State statistics Department, 2008

The estimation of swamp buffalo meat production for the year 2000 is shown in the Table 5. Because of many prejudices about buffalo meat made it has a low rating with consumers. In Vietnam, only old buffaloes are slaughtered without for meat, which is inevitably of poor quality. In fact, buffalo meat can have high quality comparable with beef.

Swamp buffalo production is less economic importance in term GDP but its economic importance to small farm holder is generally underestimated by their multipurpose contributions which increase income of the poor in rural areas

1.8. Problems and Constraints

As may countries in the world, swamp buffalo is most neglected and forgotten animal in Vietnam due to many reason as following:

Institution problems

- More consideration of cattle production compared to buffalo in livestock development plan. There were no extension program and less research budged support for buffalo production, so buffalo production system had been paid no attention by State management organizations from Central to grass-root levels.

- From 1990 to present, there is a few program and no policy for buffalo development and some extension service concerning to buffalo from Department of Agricultural and Forestry Extension (DAFE) of MARD.

- Lacking of grazing land areas by the result of reforestation program and shortage of forest during the winter season affected to the growth rate and low reproductive efficiency of swamp buffalo.

Production problem

- Acceptability of buffalo meat: A major problem of swamp buffalo development is low acceptability of buffalo meat. It is considered to be more fibrous, darker, less tender and poor nutrition. The main problem for this is that buffalo meat is mainly from old and reared under poor plan nutrition.

- Price distortion of buffalo over cattle. Buffalo contribute more red meat than cattle to the market, but buffalo live-weight price is lower than cattle, so the butcher tends to prefer buffalo as he sells buffalo and beef at the same price. In the slaughter house, the number of buffalo slaughter per day is more than the number of cattle but in the market no body selling buffalo meat. All of buffalo meat had been sell as same price of beef.

- Low productivity: low growth rate and specially low calving rate, the reason for this including due to lacking of common grazing area and bulls.

- Lacking of breeding improvement program and policy supporting for raising or keeping of the breeding buffalo bull for natural service.

II. PART TWO

BUFFALO DEVELOPMENT PLAN TO 2020

Population of Vietnam is about 87 millions capita in the year 2010, the GDP will be about 1000 USD/capital and the demand of high quality food will be increase. At present, the demand of buffalo meat increase day by day. Buffalo rearing will really have good beniffite due to buffalo very well utilization of roughage and good adaptation to the high tropical humidity climate condition. High market demanding of buffalo meat will help Vietnam to increase buffalo population development and its product.

Development of buffalo will exploy of the land potential, natural resourcese, ecological condition and available labours in different regions. Also utilization of buffalo rearing poteltial of each ecological region condition.

Development of buffalo production create the new job oportunities, available labour power in rural area and hungry reduction for the minorlity in remost and difficulty areas.

Intensive and semi-intensive feeding for buffalo production in small farm with intensive grass production and utilization of agri-byproducts to meet the local market demand.

2.1. Objectives

General objectives

Master plan for buffalo production for bestter use of ecological potential of each region: Northern Mountainous, North Central coast, Highland and some provinces of South East region.

Buffalo development by semi-intensive and intensive feeding systems with small and medium size farms to produce good quality buffalose meat for bestter income and bestter living condition for the farmers in rural areas.

Cross-breed the local swamp bffalo with murrah bulls for bestter meat and milk production in difference regions condition of the country

Detail Objectives

Stable maintail the buffalo population of 2.9 millions in the period from 2007-2009.

Try to increase total buffalo meat yield from 64.300 tones in 2006 to 72.400 tones in in 2010, about 79.900 tones in 2015 and 84.000 tones in 2020.

Improve buffalo meat production, each year from 2009-2010 produce about 500 -1000 F1 50% Murrah blood or Murrah semen by using Murrah bull cross breeding with local swam buffalo femal by AI or using ET technology.

2.2. Bufalo Development Plan

Master plan and general direction

Buffalo development program by intensive faming system in Northern moutain and Northern Central coast rregions, beter utilization of natural resources potential and social condition of the local areas. Diseminate the intesive buffalo feeding system and buffalo feedlot procedure.

Master plan for swamp buffalo production according to local ecological system, grass field, agriculture byproducts and industrial processing byproducts.

Build the traditional culture village combine with ecologial tourist program in the good buffalo production regions. Maintain the local culture festival, local traditional buffalo festival. Support and encouraging the region and local bufalo breeding compatition festival.

Buffalo Breeding

Selection and improve the number and quality of local swamp buffalo for breeding program. Support and encouraging each village with a good breeding bull for local herd breeding service.

Select the good local bull which have body weight more than 500 kg with good status and conformation, trong, good libido, high grade class, the rate of bull about 2-3% of female buffalo population.

Selected good female buffalo herd with body weight from >320kg, good female conformation, strong health, good udder system and development with good breeding grade female in buffalo breeding regions.

Using good breeding bull rotation system for improving and increasing the reproduction and growing rate.

The buffalo breeding project of MARD from 2001-2010 support to build the local breeding for project improve reproduction rate of local buffalo herd.

Artification Insermination breeding for local sawmp buffalo

Import Murrah buffalo bull frozen semen from 1000-2000 doses/each year use for breeding program for 1000-2000 seleted local female buffalose with body-weight from 300-400kg.

Improve State Management system and service system on buffalo breeding and feeding program

Feed and Feeding

Bester use of local feed resourses avalable, local agriculture byproducts and industrial processing byproducts for semintensive and intensive buffalose feeding system and buffalo feedlot procedure.

The province spend suitable land areas for intensive grass production, fordder plantation for buffalo prduction and grass production as same as other croops in agriculture farming system .

Buffalo population development plan

Vietnam Buffalo population at present is about 2.9 million head and plan from now to 2020 would be 3.0 millions and increase rate in population about 0.6% per year.

The Buffalo population and development plan from 2006 to 2020

	Unit	2007	2008	2009	2010	2015	2020
Buffalo population	1000 head	2900	2920	2940	2960	2980	3000
Herd increase rate	%		0.68	0.68	0.68	0.67	0.66
Meat	1000 Tone	66,87	69,55	72,33	75,22	78,23	84,00
Increate rate	%	3	3	3	2	2	2

Siencetific and technology in buffalo production

Priority in research and technology transfer in buffalose production, apply the biotechnology spesial in reproduction for improving productivity and quality of buffalo herd of Vietnam

Pure breeding of local bufflose, selection of buffalose breed with hight productivity and quality to meet the demand of population on meat utilization.

Improve the buffalo population and breed quality in some project provines to meet the reqiurement for meat and drough power for mountain area farmers.

Study and investigate for feed processing, management of agricultutral byproducts for buffalo feed production. At the same time build the technical infrastructure and Lab. equivement for buffalose research center and research organizations.

Strengthern the research capacity for buffalose research organizations. Establish and train the research staff for buffalo research, management and technology transfer to meet the demand for buffalo production.

Summary and Conclusions

Until now 2009, Swamp buffalo production in Vietnam still play an importance role in total agriculture production of small farm holders, specially to the farmer in the mountain areas by supplying of draught power, fertilizer and take full advantage of available as feed resources, spare time and subsidiary labor.

Annually, buffalo population increasing rate in the last ten year is very low (0.78%) compare with cattle (2.8%). It is need to improve buffalo population quality in the coming years by establish the breeding program for swamp buffalo and focus on selection of good bulls & cows for producing high quality of buffalo herd.

It is necessary to improve feeding and management system for swamp buffalo in small farm holder for higher meat production and better reproductive efficiency.

In the coming years and to 2020, it is need to have the state budged for breeding program, including research and extension services for buffalo development in Vietnam. Better use of available by-products and transfer the appropriate technology to farmer for improving buffalo production in rural areas.

APPENDIXES

Table 1: Number of buffalo and meat 2001-2006

	2001	2002	2003	2004	2005	2006	2001-2006
Buffalo population (head)	2818376	2814452	2834886	2869802	2922155	2921051	
Increase rate (%)		*-0.14*	*0.73*	*1.23*	*1.82*	*-0.04*	*0.77*
Meat yield (tone)	51380	51814	53061	57458	59800	64317	
Increase rate (%)		*5.25*	*2.41*	*8.29*	*4.08*	*7.55*	*4,62*

Table 2: Average meat per capital/year (kg)

	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2001-06**
Buffalo meat (1000 tone)	51380	51814	53061	57458	59800	64317	
Increase rate (%)		*5.25*	*2.41*	*8.29*	*4.08*	*7.55*	*4,62*
Average meat/capital/year	0.63	0.65	0.66	0.70	0.72	0.76	
Increase rate (%)	*0.87*	*3.87*	*0.92*	*6.79*	*2.71*	*6.17*	*5.12*

Table 3: Development plan of buffalo population and meat to 2020

		2007	2008	2009	2010	2015	2020
Buffalo population	1000 head	2927,80	2927,80	2927,80	2927,80	2927,80	2927,80
Increase rate	%	0	0	0	0	0	0
Buffalos meat production	1000 tone	66,87	69,55	72,33	75,22	78,23	84,00
Increase rate	%	3	3	3	2	2	2