



RESULTS OF RESEARCH AND THE DEVELOPMENT OF RABBIT PRODUCTION IN VIETNAM FROM 2000 TO 2012

Dinh Van Binh, Nguyen Ky Son

Full text of the communication

+

Photos of the oral presentation

How to cite this paper

Dinh Van Binh, Nguyen Ky Son, 2013. Results of research and the development of rabbit production in Vietnam from 2000 to 2012. 3rd Conference of the Asian Rabbit Production Association, 27-29 August 2013, Bali, Indonesia, 33-44 + presentation

Results of Research and the Development of Rabbit Production in Vietnam from 2000 to 2012

Dinh Van Binh, Nguyen Kỳ Sơn

Vietnamese Rabbit Production Association
Corresponding e-mail: binhthovietnhat@gmail.com

ABSTRACT

Vietnam is tropical country located in Southeast Asia with a monsoon climate. The total area of country is 33.2 million hectares, In the 2012, total population were 88.78 million consisted of 52 million farmers which are 67% of total labors who are working in the agricultural sector. The cultivated area is about 11 million ha. The agriculture is based mainly on rice production of 39-42 million tons per year. The agriculture output value contributes 25 of GDP of which food production from 73% and livestock production from 27% dealing mainly with pigs, cattle, chicken, ducks, goats and rabbit. Rabbit production have been raised in small household extensive systems in Vietnam for long time. Rabbit production is popular in rural areas and is considered to be a self-sufficient system with low productivity. In the recent years, (from 2010 to 2012 when bird flu (H5N1), Green ear and FMD diseases in the poultry and other animals have happened in Vietnam), rabbit production has been paid more attention by farmers and government agencies as a means to improve the income of the rural poor. So some achievements have been obtained in the field of breeding, nutrition, processing, preventing diseases. The population of rabbits has increased at over the last 10 years from 1,985,000 heads in 2000 to 3,450,000 in 2005; and 5,452,700 heads in 2010, 6,379.660 heads in 2011 and 7,655,590 heads in 2012 an average annual rate of increase about 17.8%. During this time, the price of rabbit products has increased from 35,000 to 80,000 VND/kg of live weight rabbit meat. Rabbit breed includes local indigenous breeds of Re Rabbit, Black rabbit and Grey Rabbit have been found to perform well under improved management conditions. Some new rabbit breeds have been imported from Hungaria and France (New Zealand white rabbit, California rabbit; Panon rabbit and Hyplus rabbit) with adaptation studies for furred keeping and crossing with local rabbit to improve meat production. A series of studies using local feed resources and strategic disease control measures were carried out in the context of developing sustainable and integrated small animals farming systems. These studies showed that up to 35% improvement in productivity can be achieved by such techniques. Some programs and projects have been carried out with the joint support of the Vietnamese government and international organizations, and have resulted in highly successful outcomes. In 2007 a new rabbit station have been setup with 1500 rabbit does to produce 30,000 rabbit provide for farmers raising per year. In 2012, there were 150 heads New Zealand and 50 heads California GP breeds were imported from France to improve productivity of rabbit. It is clear that rabbit production can play an important role in improving the incomes for poor farmers in the rural areas and is contributing to poverty and hunger alleviation in Vietnam.

Key Words: Rabbit, Production, Breed, Vietnam, Prices, Development

INTRODUCTION

Vietnam is tropical country located in Southeast Asia with a monsoon climate. The total area of country is 33.2 million hectare, with a population of 87 million, 52 million farmers occupant 67% of total labor are working in the agricultural. The cultivated area is about 11 million ha. The agriculture is based mainly on rice production of 43.7 million tons per year (in 2012) in 77% of the cultivated area supported by other crops such as maize, potato, cassava, groundnut, soybean, sugarcane, fruit trees and other perennial commercial trees as

coffee, tea, rubber and coconut. The agriculture output value contributes 25 of GDP of which food production from 73% and livestock production from 27% dealing mainly with pigs, cattle, chicken, ducks and goats. From 1990 to now rice production in Vietnam is not only enough for consuming but also for exported 6.5-7 million tons per year become one of the first largest country rice exported in the world.

Rabbit production has been raised in small household extensive systems in Vietnam for long time. Rabbit production is popular in rural areas and is considered to be a self-sufficient system with low productivity. In the recent

years (from 2010 to 2012 when bird flu (H5N1), green ear and FMD diseases in the poultry and other animals have happened in Vietnam) rabbit production has been paid more attention by farmers and government agencies as a means to improve the income of the rural poor. So some achievements have been obtained in the field of breeding, nutrition, processing, preventing diseases. Under the support of government and international

organizations some programs and projects were carried out with satisfied impact. It is clear that rabbit production is playing an important role in improvement of the incomes for poor farmers in the rural areas and is contributing to poverty and hunger alleviation in Vietnam. So, this review we discuss about the situation of research and development and also strategy of development of rabbit production in Vietnam.

Table 1. Livestock population and percentages change from 2000 to 2012 in Vietnam

| Animals | Year | | | | | Growth rate (% per years) | |
|--------------|----------------------|----------------------|----------------------|----------------------|----------------------|------------------------------|---------------|
| | 2000 (1000 heads) | 2005 (1000 heads) | 2010 (1000 heads) | 2011 (1000 heads) | 2012 (1000 heads) | 2000- 2010 | 2010- 2012 |
| Pig | 20,194.00 | 26,435.00 | 27,373.00 | 27,055.98 | 26,493.92 | +3.50 | -3.20 |
| Cattle | 4,127.90 | 5,540.70 | 5,916.00 | 5,436.56 | 5,194.18 | +4.30 | -12.20 |
| Dairy cattle | n.a. | n.a. | n.a. | 142,702.00 | 166,989.00 | n.a. | +17.00 |
| Poultry | 316,400.00 | 321,890.00 | 321,497.00 | 322,568.90 | 308,460.00 | +0.13 | -4.40 |
| Buffaloes | 2,897.00 | 2,922.00 | 2,913.00 | 2,712.03 | 2,627.81 | +0.50 | n.a. |
| Goat, sheep | 552.50 | 1,070.00 | 1,178.00 | 1,267.80 | 1,343.64 | +10.60 | +6.12 |
| Rabbit* | 1,985.00 | 3,450.00 | 5,360.00 | 6,379.66 | 7,655.59 | +16.20 | +18.50 |

n.a.: not available

Source: Vietnam National Statistic Department (2000; 2005; 2010; 2011-2012)

Table 2. Animal products and percentages change from 2000 to 2012 in Vietnam

| Products | Unit | 2000 | 2005 | 2010 | 2011 | 2012 |
|----------------|--------------|-------|-------|-------|-------|--------|
| Total meat | 1.000 tonnes | 1,997 | 2,835 | 4,017 | 4,169 | 4,271 |
| | % | 49.7 | 70.6 | 100 | 103.8 | 106.3 |
| Pork | 1.000 tonnes | 1,513 | 2,288 | 3,027 | 3,098 | 3,160 |
| | % | 50.0 | 75.6 | 100.0 | 102.3 | 104.7 |
| Buffaloes | 1.000 tonnes | 86.56 | 85.87 | 87.8 | 87.79 | 88.47 |
| | % | | | 100 | 100 | 100.77 |
| Poultry | 1.000 tonnes | 322.6 | 321.9 | 615.9 | 696 | 789.4 |
| | % | 52.3 | 52.3 | 100 | 113 | 128.1 |
| Beef | 1.000 tonnes | 149.1 | 202 | 361.1 | 287.2 | 294 |
| | % | 41.3 | 56.5 | 100 | 79.5 | 81.4 |
| Goat and sheep | 1.000 tonnes | 6.5 | 12.6 | 15.8 | 17.2 | 18.9 |
| | % | 41.2 | 79.7 | 100 | 109 | 119.6 |
| Rabbit | 1000 tonnes | 5.7 | 9.9 | 15.4 | 19.4 | 24.7 |
| | % | 57.5 | 64.3 | 100 | 125.9 | 160.3 |

Average Livestock Products per capital in 2012: Meat (LW) is 45 kg; Egg: 65 Pieces; Fresh Milk: 3.5 kg

Source: Vietnam Agriculture Department-MARD (2000; 2005; 2010; 2011; 2012)

SITUATION OF RABBIT PRODUCTION IN VIETNAM FROM 2010 TO 2012

According to the data of Vietnam Agriculture Department-MARD (2010; 2011; 2012). In 2010 there are about 5,365,000 rabbits (of which 42.3% rabbit population could be found in the Northern; 18.3% in the Center and 39.4% in the Southern). Since 2005-2010 population of rabbit were quickly increased and reached to 6,379,660 rabbits in 2011 and 7,655,590 rabbits in 2012. Of which 53.1% rabbit population could be found in the Northern; 15.4% in the Center and 31.5% in

the Southern. Rabbit population in the Northern were increased higher than in the southern and the center). Most of rabbit were distributed to rural areas (shown in Table 3).

Recent prices of rabbit products are being raised to be higher than the other animal's. 1 kg live weight of rabbit for meat is 80,000 VND and for breed is 120,000 VND (comparing with the cost of 1 kg live weight of beef or pig just is 40,000 VND or 45,000 VND). The high price of the products gives a higher income for the raisers and promotes rabbit production in Vietnam.

Table 3. Land area and distribution of rabbit population in different areas of Vietnam

| Locations | Land area* Sp. km ² | Rabbit population** in 2010 | | Rabbit population ** in 2012 | |
|----------------------------------|-----------------------------------|-----------------------------|-------|------------------------------|-------|
| | | 1000 heads | % | 1000 heads | % |
| North of Vietnam | 166,6 | 2,265,141 | 42.3 | 4,060,457 | 53,1 |
| Midland and northern mountainous | 102,9 | 826,000 | 15.4 | 1,226,000 | 16,0 |
| Central of northland | 51,2 | 352,141 | 6.6 | 752,141 | 9,9 |
| Red river delta | 12,5 | 1087,000 | 20.3 | 2,082,316 | 27.2 |
| Centre of Vietnam | 98,7 | 983,002 | 18.3 | 1,183,002 | 15.4 |
| South-central coastal | 44,2 | 630,000 | 11.7 | 730,000 | 9,5 |
| Central high land | 54,5 | 353,002 | 6.6 | 453,002 | 5,9 |
| South of Vietnam | 65,8 | 2,112,131 | 39.4 | 2,412,131 | 31,5 |
| Southeast | 23,5 | 1090,131 | 20.3 | 1,190,131 | 15,5 |
| Mekong river delta | 42,3 | 1,022,000 | 19.1 | 1,222,000 | 16.0 |
| Total | 331,1 | 5,360,274 | 100.0 | 7,655,590 | 100.0 |

Source: *Vietnam National Statistic Department (2012)

**Vietnam Agriculture Department-MARD (2010; 2011; 2012)

Table 4. Comparison price of rabbit meat to other products (VND/kg live weigh of meat)

| Kind of animals | 2010 (VND/kg) | 2012(VND/kg) | % Change/year 2010 to 2012 |
|-----------------|---------------|--------------|----------------------------|
| Goat | 50,000 | 90,000 | 180 |
| Sheep | 55,000 | 100,000 | 181 |
| Cattle | 25,000 | 40,000 | 160 |
| Pigs | 30,000 | 45,000 | 150 |
| Local chicken | 55,000 | 80,000 | 145 |
| Rabbit | 40,000 | 70,000 | 175 |

Source: Binh et al. (2010;2011;2012)

Table 5 showed that breeding doses per farm level had different change between 2010 and 2012. In all locations around country, it has been increasing number of farms and breeding doses levels from 1298 to 1631 farms. The average change of breeding does level per farm from less than 50 to over 150 at estimated increase of 25%, especially in 2012, there were 18 farms which raised over 500 breeding does. This is evidence that rabbit production development has been giving the benefit for farmers and significant improve the rural household economic in present.

RESULTS OF STUDY ON RABBIT PRODUCTION

Breeding

Local breeds

- Re rabbit: This breed is very small in size live weight at adult 2.3-2.7 kg and is usually brown, grey and white in color with their eye are black.
- Grey rabbit: This rabbit breed was selected for 10 years at Goat and Rabbit Research Centre (GRRC) their live weight at adult

3.0-3.5 kg and usually grey in color with their eyes are black.

- Black rabbit: This rabbit breed was selected for 10 years at GRRC; their live weight at adult 3.0-3.5kg and usually black in color with their eyes are black.

Local rabbit is a meat type, which is widely distributed around the country with 25-30% total rabbit population. Their performances are shown in the Table 6.

Imported breeds

Imported from Hungary in 1980, there were 1000 rabbits with New Zealand rabbit, California breed. In 2002 and 2004, there were 250 rabbits with New Zealand, California, Panon rabbit breeds and 50 Hyplus rabbits were imported from Hungary and France to Vietnam. After more than 10 years, they were adapted in Vietnamese ecological condition, their productivities are shown in Table 7.

In February 2012, there were 150 Grand Parent (GP) rabbits of New Zealand breed and 50 GP rabbits of California breed were imported from France to Vietnam. The performance of productivities is shown on the Table 8.

Table 5. Change of Rabbit population per farms in Vietnam from 2010-2012

| Locations | Unit | 2010 (Breeding doses) | | | | 2012 (Breeding doses) | | | | |
|----------------------------------|-------|-----------------------|--------|----------|------|-----------------------|--------|----------|------|------|
| | | <50 | 50-100 | >100-150 | >150 | <50 | 50-100 | >100-150 | >150 | ≥500 |
| North of Vietnam | Total | 310 | 240 | 213 | 102 | 166 | 342 | 254 | 216 | 15 |
| Midland and northern mountainous | farm | 67 | 81 | 56 | 62 | 65 | 111 | 81 | 54 | 2 |
| Central of northland | farm | 56 | 63 | 45 | 55 | 40 | 50 | 58 | 48 | 1 |
| Red river delta | farm | 187 | 96 | 112 | 85 | 61 | 156 | 115 | 114 | 12 |
| Centre of Vietnam | | 90 | 58 | 30 | 26 | 71 | 99 | 81 | 42 | 1 |
| South-central coastal | farm | 34 | 24 | 18 | 15 | 30 | 50 | 55 | 28 | 1 |
| Central high land | farm | 56 | 34 | 12 | 11 | 41 | 49 | 26 | 14 | - |
| South of Vietnam | | 57 | 74 | 56 | 32 | 64 | 115 | 123 | 58 | 2 |
| Southeast | farm | 23 | 34 | 12 | 9 | 29 | 43 | 36 | 22 | 1 |
| Mekong river delta | farm | 34 | 40 | 44 | 23 | 35 | 72 | 87 | 36 | 1 |
| Total farms | | 477 | 362 | 299 | 160 | 301 | 556 | 458 | 316 | 18 |
| Total farms/year | | 1298 | | | | 1631 | | | | |
| (P. rabbit per farm level) | % | 36.7 | 27.8 | 23.2 | 12.3 | 18.5 | 34.1 | 28.0 | 19.0 | 1.1 |

Source: Binh et al. (2010;2011;2012)

Table 6. The performance of local rabbit breeds

| Parameters | Re rabbit | Black rabbit | Grey rabbit |
|--------------------------------------|-----------|--------------|-------------|
| Body weight (female - male) | | | |
| At birth (g) | 34.7 | 40.1 | 41.4 |
| At weaning (30 days) (g) | 346.4 | 415.7 | 424.3 |
| At 3 month (kg) | 1.3-1.5 | 1.5-1.7 | 1.6-1.8 |
| At adult (kg) | 2.7-2.9 | 3.2-3.5 | 3.3-3.6 |
| Reproductive performance | | | |
| Litter/does/per years | 6.0 | 6.3 | 6.2 |
| Litter size (rabbit per litter) | 6.1 | 6.2 | 6.1 |
| Mortalities to weaning (1 month) (%) | 18.5 | 17.6 | 15.5 |

Source: Binh et al. (2001)**Table 7.** The performance of imported rabbit breeds in Vietnam

| Parameters of rabbit | New Zealand rabbits | California rabbits | Panon rabbits | Hyplus rabbits |
|--------------------------------------|---------------------|--------------------|---------------|----------------|
| Body weight | | | | |
| At birth (g) | 66.500 | 64.010 | 69.640 | 67.500 |
| At weaning (30 days) (g) | 714.700 | 707.200 | 804.500 | 716.500 |
| At 3 month (kg) | 2.870 | 2.737 | 3.006 | 2.870 |
| At adult (kg) (female - male) | 5.150-5.634 | 5.120-5.554 | 5.550-6.580 | 5.150-5.630 |
| Reproductive performance | | | | |
| Litter/does/per years | 6.570 | 6.450 | 6.370 | 6.570 |
| Litter size | 7.350 | 7.200 | 7.300 | 7.500 |
| Mortalities to weaning (1 month) (%) | 12.200 | 12.000 | 13.000 | 12.100 |

Source: Binh et al. (2009)**Table 8.** The performance of productivities of GP rabbit breeds

| Parameters of rabbit | New Zealand GP rabbit breed | California GP rabbit breed |
|--|-----------------------------|----------------------------|
| Body weight | | |
| At birth (g) | 86.500 | 74.010 |
| At weaning (30 days) (g) | 814.700 | 807.20 |
| At 3 month (kg) | 2.870 | 2.737 |
| At adult (kg) (<i>female - male</i>) | 5.150-5.634 | 5.120-5.554 |
| Reproductive performance | | |
| Litter/does/ per years | 8.020 | 7.450 |
| Litter size (rabbits per litter) | 8.350 | 7.200 |
| Mortalities to weaning(1 month) (%) | 12.200 | 14.000 |

Source: Vinh et al. (2013)

Cross breeds

Those imported rabbit breeds were developed widespread in whole Vietnam and used those buck to cross with local rabbit breeds. The results on research shown that live weight of crossed breeds at 3 month are higher than local breed 18.5-22% result were applied widely to the whole country.

CHANGE KIND OF RABBIT BREEDS IN RABBIT FARM OF VIETNAM FROM 2010-2012

In Table 9, in general, rabbit population has been increasing. However, number of New Zealand rabbit breed is the highest from 1.124 million heads (49.6%) in 2010 to 1.614 million heads (69.8%) in 2012. It means that the farmers are concentrating on the high productivity rabbit breed which is New Zealand

rabbit breed. This means that the profit of NZ rabbit farm is higher than other breed.

Housing system

Most rabbit farms housing system are raised on the cages with one floor or two floors. Studying on raised underground shelter or raised cages for rabbits with basal diet of fresh leaves of *Trichantera gigantea*; sugar cane stalk and rice bran. The main effect of the housing system was on the ambient temperature. In the underground shelter compared with the raised cage, it was warmer in the morning, colder at the midday and warmer in the evening. The temperature in the shelter varied 2.8°C during the day while the temperature in the cages varied 8°C. The differences were significant. The temperature in the underground shelter was more uniform than in the cage which should be better for rabbit reproduction. The effect to the performances production of rabbit in Table 10.

Table 9. Rabbit population per breeds in rabbit farm of Vietnam from 2010-2012 (heads)

| Locations | 2010 | | | 2012 | | |
|----------------------------------|-------------|---------|--------|-------------|---------|---------|
| | New Zealand | Hybrid | Local | New Zealand | Hybrid | Local |
| North of Vietnam | | | | | | |
| Midland and northern mountainous | 194,203 | 100,211 | 70,341 | 264,441 | 67,345 | 44,387 |
| Central of Northland | 177,362 | 76,356 | 82,235 | 244,895 | 65,438 | 52,856 |
| Red river delta | 404,513 | 76,211 | 45,212 | 584,782 | 84,208 | 23,076 |
| Centre of Vietnam | | | | | | |
| South-central coastal | 20,588 | 25,667 | 52,661 | 37,163 | 17,403 | 20,588 |
| Central high land | 28,322 | 26,516 | 52,756 | 40,550 | 20,161 | 21,344 |
| South of Vietnam | | | | | | |
| Southeast | 106,004 | 80,731 | 73,627 | 218,221 | 50,233 | 98,455 |
| Mekong river delta | 193,104 | 78,034 | 74,331 | 224,384 | 54,276 | 76,551 |
| Total | 1,124, 096 | 489,882 | 51,163 | 1,614,436 | 359,064 | 337,266 |
| % | 49.6 | 21.6 | 28.8 | 69.8 | 15.6 | 14.6 |

Source: Binh et al. (2010;2011;2012)

Table 10. The performance of local rabbit on raised underground shelter or raised cages

| Parameters of rabbit | Raised cages | Underground shelter | SE/P |
|---------------------------------------|--------------|---------------------|--------------|
| Body weight of female | | | |
| At the beginning experiment (g) | 1652 | 1659 | ±20.9 |
| At the end experiment (g) | 2637 | 2810 | 11.200/0.001 |
| Reproductive performance | | | |
| Litter/does per years | 5.80 | 6.21 | 0.120/0.001 |
| Litter size (rabbit per litter) | 5.45 | 6.80 | 0.170/0.040 |
| Mortality to weaning (1 month) (%) | 10.50 | 18.60 | - |
| Weight gain of growing rabbit (g/day) | 48.30 | 52.80 | 0.095/0.001 |

Source: Ha & Binh (2000)

Table 11. Biomass yield (tonnes/ha/year) of some promising forage species in the Bavi region of North Vietnam

| Species | Biomass | Dry matter | Crude protein |
|-----------------------------------|---------|------------|---------------|
| <i>Flemingia macrophylla</i> | 60.7 | 13.4 | 2.24 |
| <i>Trichanthera gigantea</i> | 82.7 | 10.7 | 1.83 |
| Leucaena hybrid KX2 | 54.8 | 13.7 | 2.84 |
| <i>Leucaena leucocephala</i> K636 | 49.7 | 12.9 | 2.60 |
| Mulberry (<i>Morus alba</i>) | 23.0 | 3.9 | 0.67 |
| Bananas (pure stand) | 90.7 | 13.4 | - |
| <i>Trichanthera gigantea</i> | 82.4 | 10.6 | - |
| In association with banana | | | |
| <i>Panicum maximum</i> cv likoni | 75.5 | 12.8 | 1.66 |
| <i>Brachiaria ruziziensis</i> | 76.9 | 13.8 | 1.38 |
| <i>Elephant grass</i> | 88.6 | 15.0 | 1.55 |

Source: Nguyen et al. (2001b)

Feed and feeding

A lot of experiments on planning, processing, storing and using forages multipurpose trees and by-products for rabbits were carried out. The results as following:

Biomass productivity of some forages and multipurpose trees as feed resources for rabbits

From those results, some kinds of forage and multi-purpose tree, with high biomass and high crude protein were selected. They were used widely by the farmers as they are good feed resources for rabbit especially in dry season.

Feeding system for local rabbit production emphasizing root and bananas

A mash composed of equal parts of banana fruit, cassava root and sweet potato tubers (17% of each) with 33% rice bran and 15% molasses with the same protein-rich foliages as for growing rabbits supported the same reproductive performance (size and growth rate of the litters) as the conventional concentrate/grass diet with saving cost of feed.

Using water spinach as replacement for guinea grass for growing and lactating rabbits

Water spinach foliage is potential supplement for rabbit and can replace guinea grass of 60-100% in the diet with higher live weight gain and lower feed cost comparing guinea grass alone.

Table 12. Performance of rabbit fed with banana, sweet potato tubers, cassava roots and mixed foliage, compared with the control of cereal concentrate and guinea grass

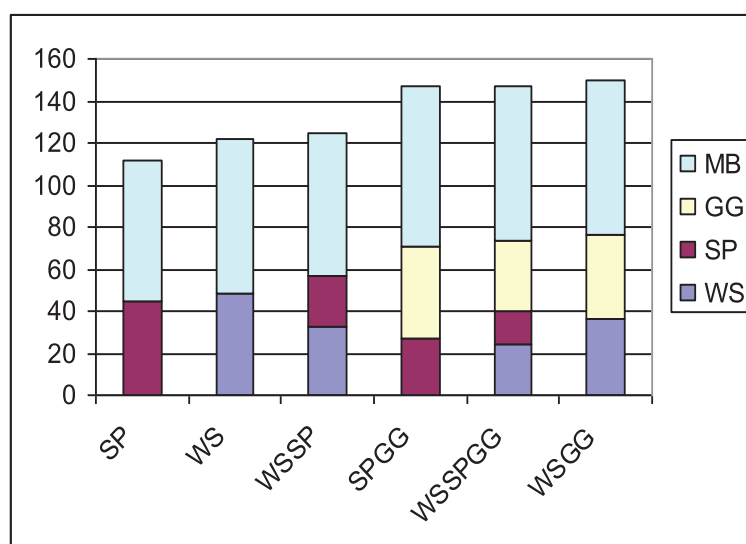
| Parameter | Control | Banana | Sweet potato | Cassava root | Mix BSC |
|------------------------------------|-----------|------------|--------------|--------------|-----------|
| Live weight of rabbit | | | | | |
| At birth (g) | 51.0±0.9 | 50.25±3.6 | 49.5±2.4 | 50.4±3.2 | 51.2±3.2 |
| At weaning (30 days) (g) | 466.0±2.8 | 332.0±14.4 | 420.0±2.1 | 395.0±3.5 | 460.0±3.2 |
| Daily gain (g) 1-3 month | 285.6±3.5 | 212.3±3.6 | 248.4±2.1 | 216.3±3.5 | 264.5±3.2 |
| Litter size | | | | | |
| At birth | 5.5 | 5.0 | 5.5 | 5.0 | 5.3 |
| At weaning (30 days) | 5.2 | 4.2 | 4.8 | 4.0 | 5.0 |
| Mortality to weaning (1 month) (%) | 15.5 | 16.4 | 12.2 | 18.6 | 16.1 |

Source: Luyen et al. (2000)

Table 13. Effect of replacing guinea grass with water spinach on feed intake of growing rabbits

| Parameter | Level of replacement: % Guinea grass/water spinach | | | | | |
|------------------------------|--|----------------------|---------------------|---------------------|----------------------|---------------------|
| | 100/0 | 100/0 | 100/0 | 100/0 | 100/0 | 100/0 |
| Initial live weigh rabbit(g) | 1390 | 1443 | 1413 | 1403 | 1473 | 1420 |
| Final live weigh rabbit(g) | 2462 | 2571 | 2557 | 2587 | 2705 | 2740 |
| LWG, g/day | 25.500 ^a | 26.900 ^{ab} | 27.200 ^b | 29.190 ^c | 29.330 ^c | 29.400 ^d |
| FCR, kg/kg LWG | | | | | | |
| DM | 4.790 ^a | 4.660 ^a | 4.640 ^a | 4.280 ^b | 4.260 ^b | 3.870 ^c |
| CP | 0.620 ^a | 0.668 ^b | 0.750 ^c | 0.731 ^c | 0.711 ^c | 0.672 ^b |
| Cost, VND/kg LWG | 18.310 ^a | 17.490 ^a | 17.330 ^a | 17.250 ^a | 16.480 ^{ab} | 15.290 ^b |

Source: Chat et al. (2004)



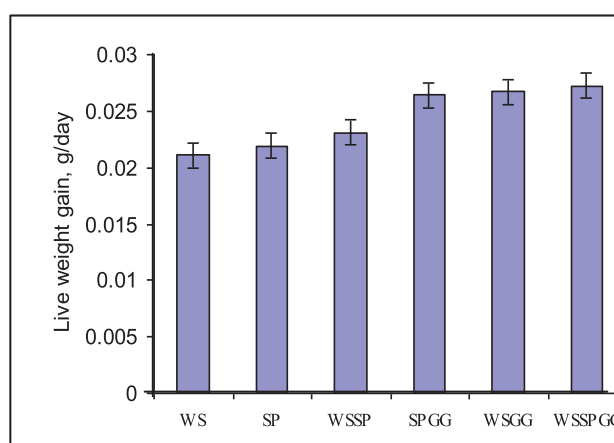
WS: Water spinach hanging; WSGG: Water spinach and guinea grass; SP: Sweet potato vines hanging; SPGG: Sweet potato vines hanging and guinea grass; WSSP: Water spinach hanging + Sweet potato vines hanging; WSSPGG: Water spinach hanging + Sweet potato vines hanging and guinea grass

Figure 1. Effect of water spinach and sweet potato to feed intake of growing rabbits

Table 14. Effect of water spinach and sweet potato on live weight gain of growing rabbits

| | WS | WSGG | SP | SPGG | WSSP | WSSPGG | SEM |
|--------------------|-------|-------|-------|-------|-------|--------|------|
| Live weight (g) | | | | | | | |
| Initial | 980 | 940 | 925 | 970 | 930 | 950 | 0.04 |
| Final | 2700 | 2890 | 2530 | 2900 | 2760 | 3060 | 0.06 |
| Daily gain (g) | 21.90 | 26.41 | 21.11 | 26.73 | 23.07 | 27.24 | 1.11 |
| DM Feed conversion | 10.72 | 8.23 | 7.68 | 7.26 | 6.21 | 7.03 | 0.52 |
| CP Feed conversion | 1.73 | 1.18 | 1.65 | 1.22 | 1.26 | 1.2 | 0.87 |

Source: Gang et al. (2005)

**Figure 2.** Effect of water spinach and sweet potato on live weight gain of growing rabbits

Using manure from rabbit, goat, buffaloes, and cow as substrate for earthworm production and earthworm as supplement for scavenging chicken

Rate earthworm production was higher on manure from goats and rabbits than buffaloes and cows. Rate of production was slow in the first two month but increased dramatically in month 3 with no further increase in month 4.

The optimum growth cycle appeared to be 4 month from inoculation of the manure (0.5 kg earthworm to 100 kg manure) to the point harvest assuming fresh manure is applied each day

The growth rate of the group of chickens supplement with 40 g/day of earthworm appeared to be higher than the control or the group fed 20/days and 60 g/day of earworm.

Table 15. Amount of manure used and earthworm produced and conversion rates of manure to worms

| Animals | Manure (kg) | | Earthworm (kg) | Conversion (kg/kg) | |
|-----------|-------------|------|----------------|--------------------|------|
| | Fresh | DM | | FM | DM |
| Goat | 236 | 85 | 5.61 | 40.9 | 14.7 |
| Rabbit | 306 | 108 | 5.38 | 51.8 | 18.2 |
| Buffaloes | 313 | 77.6 | 3.65 | 87.0 | 21.6 |
| Cow | 276 | 72.3 | 2.93 | 108.0 | 28.3 |
| SE | 10.0 | 3.0 | 0.25 | 1.5 | 0.6 |

Source: Nguyen et al. (2000)

Table 16. Growth rate of scavenging chicken supplemented with broken rice and earthworms

| | Control | EW 20g | EW 40g | EW60 | Probability |
|-----------------|-------------|-------------|-------------|-------------|-------------|
| Live weight (g) | | | | | |
| Initial | 306±81 | 306±5.60 | 294±8.22 | 312±9.80 | - |
| Final | 1,348±24.10 | 1,353±17.20 | 1,678±41.80 | 1,414±30.90 | 0.001 |
| Daily gain | 11.60±0.30 | 11.70± 0.15 | 15.40±0.420 | 12.30±0.32 | 0.001 |

EW: earth worm

Source: Ha & Binh (2000)

Health management and incidence of diseases

The major diseases reported among rabbits in Vietnam are scabies; Coccidiosis; Hemorrhagic disease; Diarrhea, Pneumonia. The important and dangerous infectious diseases with high mortality were Hemorrhagic diseases (from 1997 till now) that were controlled by vaccination (it was made in Vietnam from 1998). The other infectious diseases were treated effectively with medicines. For rabbit scabies diseases, Ivermectin 0.7ml/3 kg live weight or Dextomax 0.1 ml/3 kg live weight was used. Coccidiosis was controlled by anticoccidiosis medicine, E.coli diseases was controlled by Nory Cogen or Coli 2000; Peziza diseases (skin diseases) was controlled by BT-VN Griseovin 25 g after appropriate treatment 90-95% of all infected animals were cured (Thanh et al. 2011, 2012).

Processing and marketing of products

Products from rabbit production are not usually eaten by Vietnamese people, mainly because they are not commonly available in the markets. However, in recent years, as Vietnam's economy has been liberalised, living standards of people are improving, and this is a favourable environment in which to promote rabbit products. The market for selling products from rabbits has become easier. In addition, since 2004 the bird flu were happened in Vietnam there a strong demand for rabbit meat in many different areas of Vietnam. Some small processing units for rabbit meat were set up. Markets for these products are being readily found in the cities providing farmers with greater income and new opportunities to

further develop their rabbit production systems. The rate of increase in rabbit production in Vietnam is not sufficient to meet this demand. As a consequence, the price of rabbit meat is increasing rapidly, and the limit to meeting this demand is the lack of suitable rabbits available for breeding. This need could be partly met by expanding to current centre for rabbit production in North Vietnam to new areas in central and South Vietnam. This expansion is currently one of the new initiatives actively being pursued by the GRRC and Rabbit Breed Station at Ninh Binh province for the future.

PLANNING FOR DEVELOPMENT OF RABBIT PRODUCTION IN VIETNAM FROM 2011-2015

The plan for development rabbit production in Vietnam.

1. Set up a GP rabbit breed station at Ninh Binh province (in the Central Area) with 1000 dose to develop appropriate regional strategies and provide 30,000 rabbit breeds per year for the breeding system farms in the Central and Southern regions of Vietnam.
2. Set up small rabbit processing units in all area of Vietnam.
3. Training and dissemination of information on new technologies for improving rabbit productivity and model farm demonstrations of sustainable and integrated rabbit farming systems.
4. Develop further collaborations with International and regional agencies and organisations in Southeast Asia as a means to increase the rate of application of relevant technologies to rabbit in Vietnamese farming systems.

Table 17. Development planning of rabbit production in Vietnam from 2011-2015

| Year | 2011 | 2012 | 2013 | 2014 | 2015 |
|---------------------------------|--------|--------|--------|--------|--------|
| Rabbit product (million rabbit) | 5.30 | 5.80 | 6.30 | 6.80 | 7.30 |
| Rabbit meat (tonnes) | 12,000 | 12,500 | 13,000 | 13,500 | 14,000 |

CONCLUSIONS AND RECOMMENDATION

In the past 10 years, research and development of rabbit production in Vietnam has resulted in some very good achievements. The population of rabbits has increased at over the last 10 years from 1,985,000 heads in 2000 to 3,450,000 in 2005; and 5,452,700 heads in 2010, 6,379,660 heads in 2011 and 7,655,590 heads in 2012 an average annual rate of increase about 17.8 %. During this time, the price of rabbit products has increased to from 35,000 to 80,000 VND/kg of live weight rabbit meat. Rabbit production is playing an increasingly important role in the improvement of the income of poor farmers and is contributing significantly to poverty and hunger alleviation in Vietnam. Rabbit production has been paid more attention by farmers and Government agencies as a means to improve the income of the rural poor. So some achievements have been obtained in the field of breeding, nutrition, processing, preventing diseases. Specific studies of the selecting of local rabbits breeds and imported and introduced new breeds, of nutrition and feed resource availability and quality, animal health and product processing has lead to training programs in improved rabbit production for livestock advisers and farmers and to village demonstrations of how rabbits can be integrated into sustainable livestock farming systems for Vietnam. Vietnam has a recognised potential to develop and further expand rabbit production systems. This potential is being progressively realised through collaborative research programs run by staff of GRRC and Rabbit Breed Station at Ninh Binh province; livestock advisors and Vietnamese farmers and generously supported by the Vietnamese Government, non-government organisations and international aid agencies. The continued support of all these groups is essential for

stimulating further development of rabbit production in all areas of Vietnam.

REFERENCES

- Dinh Van Binh, Ly Thi Luyen, Khuc Thi Hue. 2004. Results on adaptation research of New Zealand white, California, Panol rabbits breeds after 4 years raised under Vietnam condition. Institute of Agricultural Sciences. In: Proceeding of workshop of Animal Production Science. Hanoi (Vietnam): Ministry of Agriculture and Rural Development. p. 235-256.
- Dinh Van Binh, Nguyen Kim Lin. 2005. Results of research and development rabbit production in Vietnam. In: Proceeding of workshop of Animal Production Science. Hanoi (Vietnam): Ministry of Agriculture and Rural Development. p. 135-138.
- Dinh Van Binh, Nguyen Thi Mui. 2000. Impact study of livestock-based intervention in villages in Bavi district in North Vietnam. Feed resources in sustainable-base on Agriculture in SE-Asia. 5:112-115.
- Ly Thi Luyen, Nguyen Quang Suc, Dinh Van Binh. 2000. Feeding system for tropical rabbit production emphasizing root and bananas. Feed resources in sustainable-base on Agriculture in SE-Asia. p.111-115.
- MARD. 2000, 2005, 2010, 2011 and 2012. Hanoi (Vietnam): Vietnam Agriculture Department-Ministry of Agriculture and Rural Development.
- Ngo Thanh Vinh, Chu Duc Tuy, Nguyen Thi Hang. 2013. Results on adaptation research of New Zealand white, California GP rabbits breeds after 2 years raised under Vietnam condition. Institute of Agricultural Sciences. Proceedings of Workshop of Animal Production Science. Hanoi (Vietnam): Ministry of Agriculture and Rural Development. p. 138-142.
- Nguyen Quang Suc, Le Thi hu Ha, Dinh Van Binh. 2000. Manure from rabbits, goats, cattle and buffaloes as sub-strata for earthworms. Feed resources in sustainable-base on Agriculture in SE-Asia. p. 95-98.

- Nguyen Thi Mui, Dinh Van Binh, Ngo Tien Dung. 2001. Farmers' reception on use of forages in Bavi District. In: Proceedings of workshop of Animal Production Science. Hanoi (Vietnam): Ministry of Agriculture and Rural Development. p. 19-28.
- Nguyen Thi Mui, Nguyen Phuc Tien, Ngo Tien Dung, Dinh Van Binh, Preston TR. 2001. Improving biomass productivity of plants and soil fertility on sloping land in Bavi mountainous area. In: Proceedings of workshop of Animal Production Science. Hanoi (Vietnam): Ministry of Agriculture and Rural Development. p. 116-125.
- Tran Hoang Chat, Ngo Tien Dung, Dinh Van Binh, Preston TR. 2004. Response of water spinach to fertilization with increasing levels of worm cast and urea. Using water spinach as replacement for guinea grass for growing and lactating rabbits. In: Proceedings of workshop of Animal Production Science. Hanoi (Vietnam): Ministry of Agriculture and Rural Development. p. 112-121.
- VNSD. 2000, 2005, 2010 and 2011-2012. Hanoi (Vietnam): Vietnam National Statistic Department.
- VNSD. 2004. Hanoi (Vietnam): Vietnam National Statistic Department. p. 37-48.

Results of Research and the Development of Rabbit Production in Vietnam from 2000 to 2012

Dinh Van Binh and Nguyen Ky Son

Vietnamese Rabbit Production Association



Introduction

Vietnam is a tropical country located in Southeast Asia with a monsoon climate

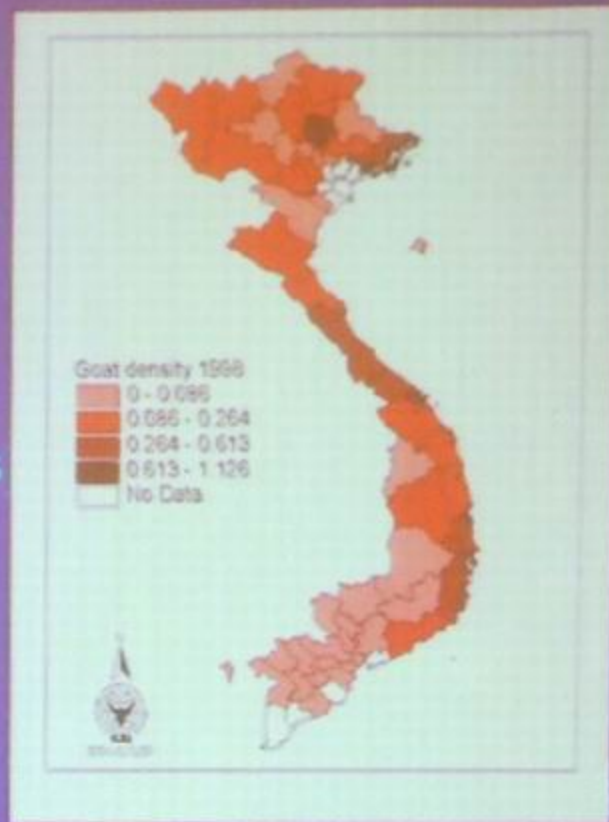
The total area: 33.2 million ha

Population: 88.78 million (59.7 million farmers)

The mountainous areas: 2/3 total area with 11mil. ha are cultivated

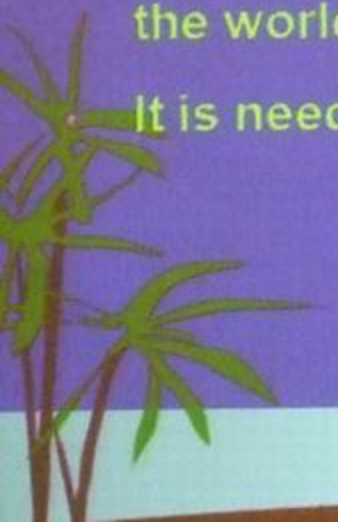
Agriculture - mainly rice production

(other crops: maize, cassava, groundnuts, soybeans, sugar cane, fruit trees, coffee, rubber, tea and coconut...)



INTRODUCTION

- Livestock production occupied 27.0 % of agricultural output. Agriculture output value contributes 22.5% GDP
- Before 1986: Vietnam - a long historical period of being grain deficit
- In 1990 to now: produced enough rice not only self-sufficient but also to export (about 6.5-7.0 million tons annually. in 2012 exported :7.72 million tons)
- Today Vietnam – one of the first largest country rice export in the world
- It is needed to concern about sustainable agriculture



livestock Population and percentage change from 2000 to 2012

| 1000 heads | 2000 | 2005 | 2010 | 2011 | 2012 | Growth rate % per years 2000-2010 2010-2012 |
|------------|-----------|-----------|------------|-----------|-----------|--|
| Pig | 20,194,00 | 26,435,0 | 27,373,000 | 27,055,98 | 26,493,92 | +3.5 and- 3.2 |
| Cattle | 4,127,900 | 5,540,700 | 5,8971,000 | 5,436,560 | 5,194,178 | +4.3and-6.1 |
| Poultry | 316,400,0 | 321,890,0 | 316,700,0 | 322,568,9 | 308,460,0 | +0.1and -4.4 |
| Buffaloes | 2,897,000 | 2,922,000 | 2,922,000 | 2,712,000 | 2,627,813 | +0.5and-3.3 |
| Goat | 525,000 | 1,014,000 | 1,145,000 | 1,212,000 | 1,218,0 | +13.and+3.1 |
| Sheep | 27,500 | 56,200 | 70,800 | 74,200 | 78,300 | +18 and+5.5 |
| Rabbit* | 1,985,0 | 3,450,0 | 5,360,000 | 6,379,600 | 7,665,590 | +17.0and+14 |

Sources: Vietnam National statistic Department 2000-2012

* Livestock Department of MARD 2010,2011,2012

livestock Population and percentage change from 2000 to 2012

| 1000 heads | 2000 | 2005 | 2010 | 2011 | 2012 | Growth rate % per years 2000-2010 2010-2012 |
|------------|-----------|-----------|------------|-----------|-----------|--|
| Pig | 20,194,00 | 26,435,0 | 27,373,000 | 27,055,98 | 26,493,92 | +3.5 and- 3.2 |
| Cattle | 4,127,900 | 5,540,700 | 5,8971,000 | 5,436,560 | 5,194,178 | +4.3and-6.1 |
| Poultry | 316,400,0 | 321,890,0 | 316,700,0 | 322,568,9 | 308,460,0 | +0.1and -4.4 |
| Buffaloes | 2,897,000 | 2,922,000 | 2,922,000 | 2,712,000 | 2,627,813 | +0.5and-3.3 |
| Goat | 525,000 | 1,014,000 | 1,145,000 | 1,212,000 | 1,218,0 | +13.and+3.1 |
| Sheep | 27,500 | 56,200 | 70,800 | 74,200 | 78,300 | +18 and+5.5 |
| Rabbit* | 1,985,0 | 3,450,0 | 5,360,000 | 6,379,600 | 7,655,590 | +17.0and+14 |

Sources: Vietnam National statistic Department 2000-2012

* Livestock Department of MARD 2010,2011,2012

Animal Products (1000 tons) and percentages change from 2000-2005-2010-2012 in Vietnam

| Products | Unit | 2000 | 2005 | 2010 | 2012 |
|---|----------------|-----------------|-----------------|----------------|------------------|
| Total meat | 1000 Tone % | 1,997.0 49.7 | 2,835.0 70.6 | 4,017.0 100 | 4,271.0 106.3 |
| Pork | 1000 Tone % | 1,513.0 50.1 | 2,288.0 75.6 | 3,027.0 100 | 3,160.0 104.7 |
| Poultry | 1000 Tone % | 332.6 54.1 | 321.9 51.1 | 615.9 100 | 789.4 128.1 |
| Beef | 1000 Tone % | 149.1 41.2 | 202.0 56.0 | 361.1 100 | 294.0 81.4 |
| Goat and sheep | 1000 Tone % | 6.5 41.2 | 12.6 79.7 | 15.8 100 | 18.9 119.6 |
| Rabbit | 1000 Tone % | 5.7 37.2 | 9.9 64.2 | 15.4 100 | 19.7 127.9 |
| Sources: Vietnam National statistic Department 2005-2006 * Animal Production Department of MARD 2006 | | | | | |

Land area and distribution of rabbit population in different areas of Vietnam

| Location | * Land Area Sp. Km ² | **Rabbit population 2010 (heads %) | | **Rabbit population 2012 (heads %) | |
|-------------------------------------|------------------------------------|---|--------------|---|--------------|
| North of Vietnam | 166.6 | 2,265,141 | 43.3 | 4,060,457 | 53.1 |
| Midland and Northern Mountainous | 102.9 | 826,600 | 15.4 | 1,226,000 | 16.0 |
| - Central of Northland | 51.2 | 352,140 | 6.6 | 752,141 | 9.9 |
| - Red river Delta | 12.5 | 1,087,000 | 20.3 | 2,082,316 | 27.2 |
| Centre of South Vietnam | 98.7 | 883,000 | 18.3 | 1,183,002 | 16.4 |
| - Central coastal | 44.2 | 630,000 | 11.7 | 730,000 | 9.5 |
| - High land | 54.5 | 353,000 | 6.6 | 453,000 | 5.9 |
| Southeast of Vietnam | 65.83 | 2,112,130 | 39.4 | 2,412,131 | 31.5 |
| - East of Southland | 23.5 | 1,090,130 | 20.3 | 1,190,131 | 15.5 |
| - Mekong River Delta | 42.3 | 1,022,000 | 19.1 | 1,222,000 | 16.0 |
| Total | 331.1 | 5,360,270 | 100.0 | 7,655,590 | 100.0 |

Sources: Vietnam National statistic Department 2000-2012

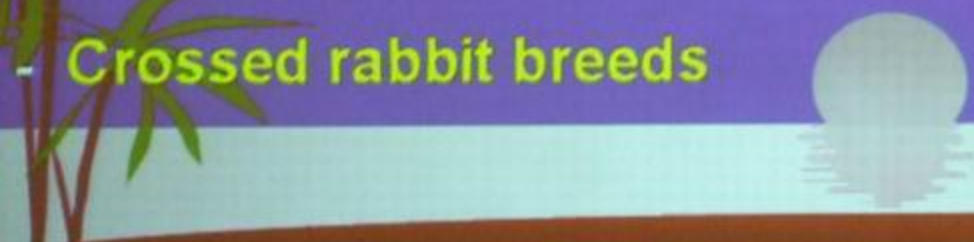
* Livestock Department of MARD 2010,2011,2012

Change of rabbit population per farm in Vietnam 2010-2012

| Locations | (Breeding does per farm) Total : 1298 farms in 2010 | | | | (Breeding does per farm) Total : 1631 farms in 2012 | | | | |
|-------------------|--|--------|---------|------|--|--------|---------|------|--------|
| | <50 | 50-100 | 100-150 | >150 | <50 | 50-100 | 100-150 | >150 | = >500 |
| North of Vietnam | 310 | 240 | 213 | 102 | 166 | 342 | 254 | 216 | 15 |
| Centre of Vietnam | 90 | 58 | 30 | 26 | 71 | 99 | 81 | 42 | 1 |
| South of Vietnam | 77 | 64 | 56 | 32 | 64 | 115 | 123 | 58 | 2 |
| Total farm | 477 | 362 | 299 | 160 | 301 | 556 | 458 | 316 | 18 |
| % | 36.7 | 27.8 | 23.2 | 12.3 | 18.5 | 34.1 | 28.0 | 19.0 | 1.1 |

I- Rabbit breeds

- Local rabbit breeds have been determined of their performance and selected for maintain the breeds
- Studying adaptation of the imported rabbit breeds:
Newzealand white;
California, Panon, hyplus rabbits
- Crossed rabbit breeds



Local rabbit breeds in Vietnam



RE rabbit : *Difference in colors with black eyes. Live weight at adult 2.7 - 2.9kg*
Litter /does/ per year: 5.8 -6.0 litters
Litter size at birth: 6 -6.1 rabbits

Black Rabbit (Local breed)



Black rabbit : black in color with black eyes

Live weight at adult 3.2-3.5 kg

Litter /does/ per year: 5.7-6.3 litters

Litter size at birth: 6.0-6.2 rabbits

Grey rabbit (local breed)



Grey rabbit : Grey in color with black eyes

Live weight at adult 3.3 -3.6kg

Litter /does/ per year: 5.7- 6.2litters

Litter size at birth: 6.0 - 6.1 rabbits

Imported Rabbit Breeds (from
Hungari 1980 and 2000)

Newzealand White Rabbits



Newzealand White Rabbit :
white in color with pink eyes.
Live weight at adult 5.0 -5.6 kg.
Litter /does/ per year: 6.5 -6.7 litters
Litter size at birth: 6.6 - 7.5 rabbits

California rabbit(Imported from Hungari)



California rabbit : white in color with black in nose, ears and pink eyes.

Live weight at adult 5.0 -5.5 kg.

Litter /does/ per year: 6.2 -6.7 litters

Litter size at birth: 6.5 -7.4 rabbits

Panon Rabbit breed (Imported from Hungari 2000)



Panon Rabbit : white in color with pink eyes.

Live weight at adult: 5.6 - 6.7 kg

Litter /does/ per year: 6.5 - 6.7 litters

Litter size at birth: 6.6 - 7.8 rabbits



Hyplus rabbit female 59 line and Hyplus rabbit male 19 line were imported from France 4-2007



Hyplus 59 : Live weight 6 -6.5kg

Litter /does/ per year: 6-7 litters

Litter size at birth: 7.3 -8.0 rabbits

Carcass percentage: 55-56%

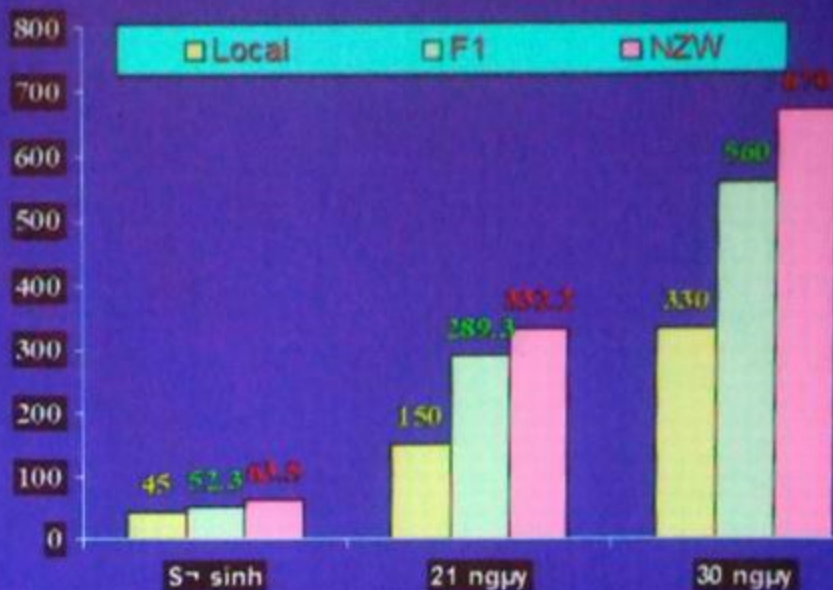
Crossbred breeds

Newzealand or Panon breed

X local breeds



Live weight of rabbit s



Imported GP Rabbit Breeds (from
France 2012)

Newzealand White Rabbits



Newzealand White Rabbit :
150 GP breed
white in color with pink eyes.
Live weight at adult 5.5 -5.6 kg.
Litter /does/ per year: 7 -7.4 litters
Litter size at birth: 7.5 – 8.0 rabbits



Change kind of rabbit breed in Vietnam

| Locations | Kind of rabbit breed in 2010 (heads) | | | Kind of rabbit breed in 2012 (heads) | | |
|-------------------|---|---------|---------|---|---------|---------|
| | Newzealand | Hybrid | Local | Newzealand | Hybrid | Local |
| North of Vietnam | 776,078 | 252,778 | 197,788 | 1,094,118 | 216,991 | 120,310 |
| Centre of Vietnam | 48,910 | 52,183 | 105,417 | 77,713 | 37,564 | 41,932 |
| South of Vietnam | 299,108 | 158,765 | 347,958 | 442,605 | 104,509 | 175,006 |
| Total | 1,124,096 | 463,726 | 651,163 | 1,614,436 | 359,064 | 337,248 |
| % | 50.2 | 20.7 | 29.1 | 69.8 | 15.6 | 14.6 |

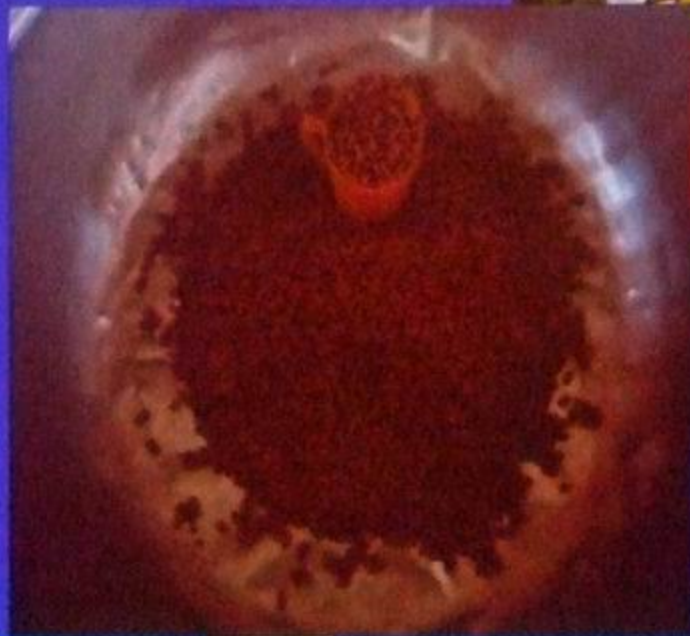
III-Feed and feeding system

+ Pellet for Rabbit made by three factories in Vietnam

- 1- Guyomar VCN (Hanoi)
- 2- Kinhbac Bacninh
- 3- Thaiduong Binhduong

+ The concentrate:

- Corn
- Cassava root
- Rice bran
- Soyabean
- Grounat cake

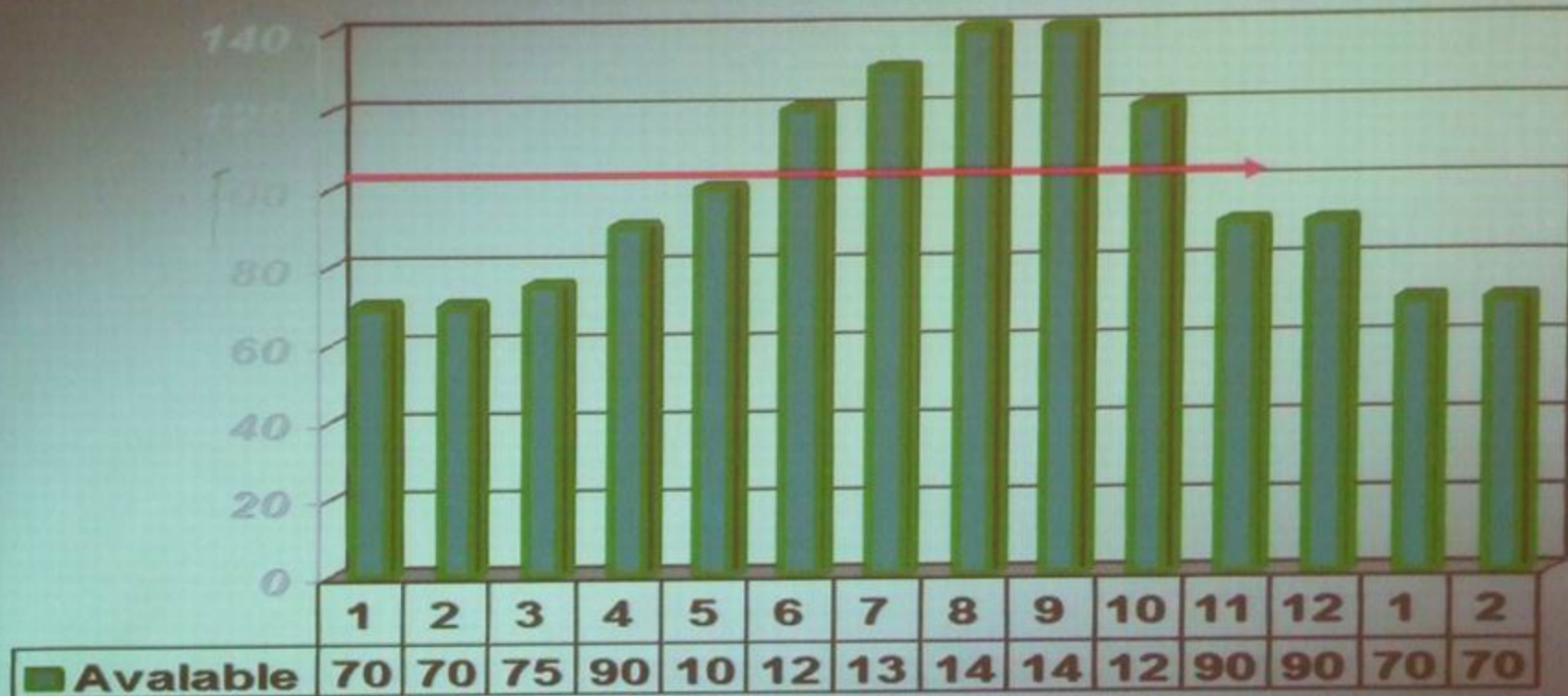


Feed processing system in pellet for rabbits at household



III-Feed and feeding system

Green Feed resources for rabbits (month of year)

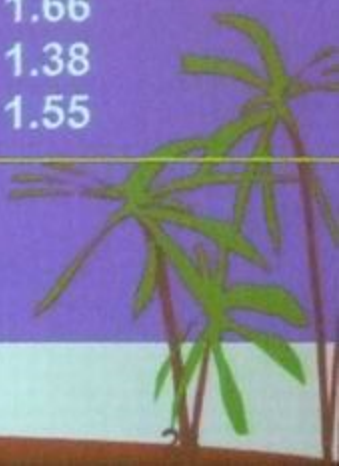
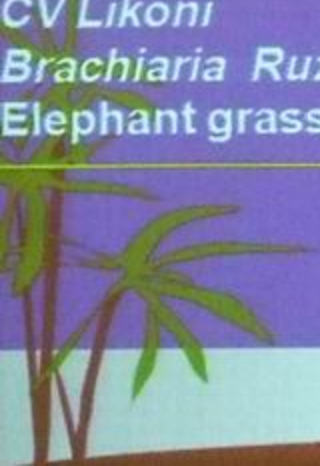


Per months of year

III-Feed and feeding system

3.1- Biomass yield (tons/ha/year) of some forages in North Vietnam

| Species | Biomass | DM | CP |
|--|---------|------|------|
| <i>Flemingia Macrophilla</i> | 60.7 | 13.4 | 2.24 |
| <i>Trichantera Gigantea</i> | 82.7 | 10.7 | 1.83 |
| <i>Leucaena Hybrid KX2</i> | 54.8 | 13.7 | 2.84 |
| <i>Leucaena L. K636</i> | 49.7 | 12.9 | 2.6 |
| <i>Mulbery(Morus alba)</i> | 33.0 | 5.4 | 0.97 |
| <i>Banana (Pure Stand)</i> | 90.7 | 13.4 | -- |
| <i>Gigantea in association with banana</i> | 82.4 | 10.6 | -- |
| <i>Panicum Maximum</i> | | | |
| <i>CV Likoni</i> | 75.5 | 12.8 | 1.66 |
| <i>Brachiaria Ruziziensis</i> | 76.9 | 13.8 | 1.38 |
| <i>Elephant grass</i> | 88.6 | 15.0 | 1.55 |



Flemingia Macrophylla



Yield: 60-70 tones/ha, 5-7 cuttings/year

DM: 19-22%, CP: 17-18%

Intercropping with cassava and mulberry to improve yield

Trichanthera gigantea



- Originated from Colombia,
- grow well in acidic ($\text{pH}=4-4.5$) and sandy soil





15 years after planting

Yield: 75-80 tones/ha

5-7 cuttings/year

DM: 19-20%

CP: 17-18%



Leucaena KX2 hybrid



Yield: 50-55 tons/ha, tolerance with acidic soil ($\text{pH} > 4.5$)
DM: 23-25%, CP: 21-25%; No damage by ply Sid

Stylosanthes Humilis:
Biomass: 70-80 tons/year
DM: 20-21%, CP:17-19%





Brachiaria Ruzi ensis
and Guinea grass





**King grass
(Elephant grass)**



Sugarcane as feed resources for rabbits



Biomass: 60-100 TONS/year

White flower forage as feed resources for rabbit



Water Hyacinth as feed resources for rabbit



Banana (leaves, stem) as feed resources for rabbit



3.3- Using banana fruits, sweet potato tubers, cassava roots and mix foliages for Rabbits



-Using 17% of each (B, S, C) + 33% rice bran + 15% molasses + Protein-rich foliages

-Mixing B+S+C for Rabbit

- Rabbit daily gain and reproductive performance with mash (mixBSC) were the same those of the control (Concentrate) with saving feed cost



III- Housing management



Razing rabbits at household with some kind of housing



IV-Using rabbit feces to raise earthworm; which used as animal feed and compost (good fertilizer)



Amount of manure used and earthworm produced and conversion rate of manure to worms

| Animals | Manure (Kg) | | Earthworm (Kg) | Conversion (kg/kg) | |
|-----------|-------------|------|----------------|--------------------|------|
| | Fresh | DM | | FM | DM |
| Goat | 236 | 85 | 5.61 | 40.9 | 14.7 |
| Rabbit | 306 | 108 | 5.38 | 51.8 | 18.2 |
| Buffaloes | 313 | 77,6 | 3.65 | 87.0 | 21.6 |
| Cow | 276 | 72.3 | 2.93 | 108.0 | 28.3 |
| SE | 10.0 | 3.0 | 0.25 | 108.0 | 28.3 |

Souces: Le Thu Ha, Nguyen Quang Suc and Dinh Van Binh 2000



Using compost from raising earthworm as
very good fertilizer for planting
forages



Using earthworm as rich protein source for animals and fishes



Supplement earthworm with broken rice for scavenging chicken

| Live weight | Control | EW20g | EW 40g | EW 60g | Prob |
|-------------|---------|--------|--------|--------|-------|
| Initial W. | 306.0 | 306.0 | 294 | 312.0 | |
| Final W. | 1348.0 | 1353.0 | 1678.0 | 1414.0 | 0.001 |
| Daily gain | 11.6 | 11.7 | 15.4 | 12.3 | 0.001 |

V-Heath management and incidence of diseases

Main diseases for rabbit in Vietnam

- 1- Hemorrhage (virus)
- 2- Scabies
- 3- Coccidiosis, E. coli
- 4- Skin disease



Hemorrhagic diseases



2- Scabies disease



Skin fungus disease on rabbit



Coccidiosis and diarrhoea



- **Using** Anticoc, HanE3 mix with feed 0,1-0,2g/kg feed or 0,2-0,4 for control



VI-Processing and marketing rabbit products



Heng and killed rabbit



Put rabbit in to hot water at 65-70 oC



Take off hair by machine and clean by hand



Using water clean again



Using gaz fire for change color be yellow



Take out all inorganes and put it in to nilon bag and store in deep refregator

Processing and marketing rabbit products

- Almost rabbit products were consumed by farmers, sold at local markets and reassurance

- Selling rabbit meat at Super markets

In the City, towns: METRO, BigC super market, restaurants, wedding party...

- Since 2004 the bird flu was happened in Vietnam there is strong demand for rabbit meat in many different areas of Vietnam. The rate of increase in rabbit production is not sufficient to meet this demand.



Processing and marketing rabbit products



Smock rabbit Products



Lien meat rabbit Products



VII- Planning for development of rabbit production in Vietnam from 2010 - 2015

1- Population and product

| Year | 2011 | 2012 | 2013 | 2014 | 2015 |
|------------------------------------|--------|--------|--------|--------|--------|
| Rabbit products (Million heads) | 5.3 | 5.8 | 6.3 | 6.8 | 7.3 |
| Rabbit meat (ton) | 12,000 | 12,500 | 13,000 | 13,500 | 14,000 |

2- Set up a new breed rabbit station in Ninh Binh province (Grand-mother and farther) with 1,500 does product 30,000 rabbit breeds per year provide for the breeding system farms to product 1.5-2 million rabbits for meat consumption and material for product medicine

VII- Planning for development of rabbit production in Vietnam from 2010 - 2015

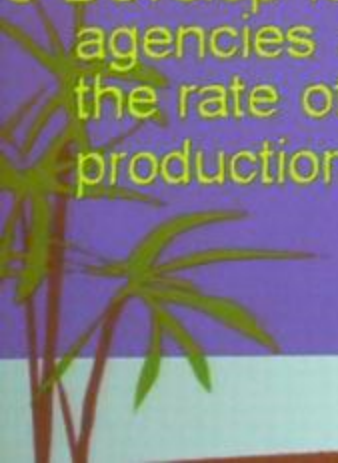
1- Population and product

| Year | 2011 | 2012 | 2013 | 2014 | 2015 |
|------------------------------------|--------|--------|--------|--------|--------|
| Rabbit products (Million heads) | 5.3 | 5.8 | 6.3 | 6.8 | 7.3 |
| Rabbit meat (ton) | 12,000 | 12,500 | 13,000 | 13,500 | 14,000 |

2- Set up a new breed rabbit station in Ninh Binh province (Grand-mother and farther) with 1,500 does product 30,000 rabbit breeds per year provide for the breeding system farms to product 1.5-2 million rabbits for meat consumption and material for product medicine

VII- Planning for development of rabbit production in Vietnam from 2006 - 2015 Conti..

- 3- Set up a national rabbit production program for development rabbit production in Vietnam from 2010-2015
- 4-Training and dissemination of information on new technologies for improving rabbit productivities and model farm demonstration of sustainable and integrated rabbit farming systems
- 5-Develop further collaboration with International and Regional agencies and Organizations in Asia as a means to increases the rate of application of relevant technologies to rabbit production in Vietnamese farming systems



Conclusion

- In the past 12 years, research and development of rabbit production in Vietnam has resulted in some very good achievements, it is playing an important role in the improvement of the income for poor farmer and is contributing significantly to poverty and hunger alleviation in Vietnam.
- Specific studies of breeding; nutrition and local feed resources available and quality; animal health; product processing has led to transferring technologies for farmers to improved rabbit production for Vietnam. Vietnam has a recognized potential to develop and further expand rabbit production system.
- This potential is being progressively realized through collaborative research and development programs run by Vietnam livestock advisors, farmers and generously supported by Vietnam Government non-Government organization and international aid agencies. The continued support of all these groups is essential for stimulating further development of rabbit production in all areas of Vietnam and hoping also for the Asia in future.

