

In normal sense, agricultural households of Viet Nam, even those who receive the main income from non-agricultural business, do not want to give up agricultural land. It is deeply rooted in the thought rural people especially agricultural households in RRD. They do not feel confident in earning from non-agricultural business activities for a long time because of unstable business situation. Therefore, they still keep agricultural land as a provision against risks in non-agricultural business in spite of the low efficiency in agricultural activities.

4. Structural transformation in agricultural land in RRD

As above mentioned, the agricultural land of RRD, which mainly are annual crop land, is small and in danger of strong reduction over the time. For the recent three years, the annual arable land has reduced from 626.4 thousand hectares in 1995 to 620.9 thousand hectares in 1998, in contrast, agriculture labor has increased from 4,733 thousand laborers to 4,997 thousand laborers in the same time, resulting in a reduction of agricultural land per capita in the whole region (see Table 6).

Agricultural land per capita has continuously been narrowed due mainly to the following two reasons: first, a reduction of total agricultural land; second, an increase in number of people engaged in agricultural sector. Although changes in the agricultural land use right among households in RRD are not as much as that in Mekong River delta, it appears in several forms.

Table 6 Arable land per agricultural labor in RRD

	1995	1998
The whole region	1,323	1,213
In which:		
Hanoi:	1,219	954
Hai Phong	1,238	1,171
Ha Tay	1,223	1,139
Hai Duong	1,202	1,129
Hung Yen	1,202	1,266
Ha Nam	1,558	1,348
Nam Dinh	1,558	1,306
Thai Binh	1,253	1,151
Ninh Binh	1,889	1,557

Source: Agro-forestry-fishery statistical yearbook 1990-1998; figures on 1998 is provided by General Department of Land

4.1 Land transfer

According to a survey conducted by the Institute for Economics in three communes: Quyet Tien commune (Kien Xuong district, Thai Binh province), an agriculture commune specializing in rice cultivation; Nam Giang commune (Nam Dinh provinces), developed manufacturing agricultural tools; Thanh Xuan commune (Thanh Ha district, Hai Duong province) concentrated on commercial litchi development. The finding is

that there are differences in agricultural land per household and different production directions in three communes. The agricultural land per household in Nam Giang is the lowest (see Table 7).

Table 7 The agricultural land per household in three selected communes

	Unit: m ² /household		
	Quyét Tien	Nam Giang	Thanh Xuan
Total land of household	2,279	1,172	3,965
In which			
Arable land	1,886	853	2,402
Garden	210	123	1,261
Pond	183	196	302

Source: Survey conducted by the Institute for Economics, 1999.

Given the land situation, it was revealed through interview of households of the need for arable land that 39% of respondents in Quyét Tien commune - mainly intensive rice cultivation expressed their desires of more land for agriculture; 29% of surveyed households in Thanh Xuan commune need additional land to expand their production; the lowest rate of 23% of targeted household was found in Nam Giang commune. Out of 200 selected households in each commune, only a few households involved in land transfer. However, it was noteworthy that in three communes, 150 households purchased additional land, 113 households of which (56.5% of surveyed households) lived in Thanh Xuan commune. Most of them were good agricultural households, having capital and fearlessly investing into commercial production. In Quyét Tien commune, only 31 households bought additional land, mainly during 1994-1998.

In Thanh Xuan commune, within 5 years, there were 101 households (50.5% of the surveyed households) that purchased land. Since 1990 up to now only, it was revealed that 113 households (56.5% of surveyed households) have bought land. Out of land purchased households, 1.5% bought less than 360 m²; 21% bought from 360 - 720m²; 25.5% bought from 720 - 1440m²; 8.5% bought from 1440 - 7200m². Most of them were high in income (higher than 300 thousand VND per household member per month; In the survey those people were classified into group 1). In Thanh Xuan commune: Out of 49 households in the group 1, 27 households bought more land including 14 households (28.56%) - over 360 m²; 5 households - over 720 m²; 8 households - over 1440 m². (in which there were one household bought 7200 m²). In group 2 as defined that people having income from 180-300 thousand VND/month, there were 45 households out of total 79 households bought land with the lower scale than group 1. In the group 3 (having income from 100 to 180 thousand VND/month), 31 households bought land that accounted for 54.39% of total households in this group. Especially, several households in the groups 4 and 5 bought land with small scale in spite of their very low income (See Table 8).

Quyét Tien commune, an exclusive agricultural commune, commercial production is under-developed, therefore land transfer or purchase is not the common phenomenon. Of total 200 surveyed households, only 34 households bought land, of which low-income households bought land mainly for their living

standard improvement not for commercial production expansion. Ten households purchased less than 360m²; 12 households: 360-720m²; 10 households: 721 - 1440 m²; 2 households: 2000 - 3000m².

In Nam Giang commune, where the income level is quite high because of developed non-agricultural activities, 56.5% of surveyed households have the income per capita at 300 thousand VND/month; targeted households of less than 60 thousand VND/month accounted for only 1.5%. In spite of high income, those households do not given up their land, which is considered as fixed assets, thus, purchasing or transferring land is rarely seen.

Thus, in RRD, land transfer can be seen in area that commercial production develop, especially in places that there is a presence of high-value crops.

Table 8 Purchasing more land in Thanh Xuan commune, Thanh Ha district, Hai Duong province

	Group 1 (income > 300 thousand VND)		Group 2 (income: 180-300 thousand VND)		Group 3 (income: 100- 180 VND)		Group 4 (income: 60-100 thousand VND)		Group 5 (income < 60 thousand VND)	
	House- holds	%	House- holds	%	House- holds	%	House- holds	%	House- holds	%
whole commune	49	24.5	79	39.5	57	28.5	10	5	5	2.5
In which										
1. Purchasing more land	28	57.14	45	56.96	31	54.39	6	60	3	60
2. Time of purchasing										
1990-1993	5	10.2	5	7.33	1	1.75				
1994	6	12.24	12	15.19	3	5.26			2	40
1995	5	10.2	13	16.46	7	12.28	1	10	1	20
1996	5	10.2	4	5.06	8	14.01	1	10		
1997	4	8.16	3	3.8	8	14.01	2	20		
1998	3	6.12	7	8.86	4	7.02	2			
1999			1	1.27						
3. By acreage of purchased land (in selected cases) m ²										
< 360	1	2.04	2	2.54						
361-720	5	10.2	10	12.7	6	10.5	2	40	1	20
721-1440	5	10.2	6	7.62	2	3.5				
1441-2520	6	12.24	6	7.2						
> 2520	2	4.08	1	2						

Source: Survey by the Institute for Economics, 1999

4.2 Renting and borrowing land

Besides rice cultivation and pig breeding—traditional productive activities, in recent decades, winter crop, mainly winter vegetables with huge potential, has become a major crop in RRD. While in some European countries, in order to grow vegetables or flowers in the winter season glasshouses, heating stoves, and water supply system as well as some other complicated equipment are required, RRD is considered as a giant natural glasshouse. It is a great advantage of RRD but has not been effectively exploited. By the end of 1980s, total vegetable growing area was over 60 thousand hectares, yielding the output of nearly 1

million tones annually. Since 1994, vegetable area has increased rapidly. Up to 1998, it had reached 112.6 thousand hectares, yielding 1.6 millions tones of output. The reason for the increase was the market expansion to Central and South regions. Some districts in Hai Duong and Hung Yen provinces have quickly specialized their production in vegetables in the winter season. In Gia Loc district, Hai Duong province, the vegetable growing area has increased rapidly in 1990s, from 1,190 hectares in 1991 up to 1,777 hectares in 1994 and 2,398 hectares in 1996. Though high densely populated, Gia Loc is in favorable conditions for vegetable growing, its total vegetable growing area in the winter-spring season have occupied 70% of double-rice crop areas. According to a survey conducted by Faculty of Agricultural System within Viet Nam Institute for Agricultural Science and Technique, in Gia Loc and Tu Loc districts that are known as regions of developed vegetable production in the winter-spring season: In groups 1 and 2 (households of low revenue and small agricultural land per capita), the cultivation activities contributed a major proportion in agricultural income, in which rice crops shared 56.1% for group 1 and 51.72% for group 2; animal breeding shared about 20%. Households in group 3, although, had the largest arable land per capita, their gross output were only in medium level, in which, cultivation occupied 78.14% including rice crop - 60.14%; vegetable crops - 17.4%, livestock accounted for only 20.27%. The situation of more diversified agriculture, more rational production structure, more effective exploitation of production conditions could be seen in groups 4 and 5, despite small differences in land area in comparison with other groups. Consequently, the gross output in those groups were distinguishably higher than that of other groups (see Table 9).

Table 9 Indicators by income group in the survey in Gia Loc and Tu Ky districts

	Group 1	Group 2	Group 3	Group 4	Group 5
1. Arable land per capita (m ²)	476	446	739	543	472
2. Vegetable growing area per capita (m ²)	470	483	549	522	592
In which					
Winter-spring crops	370	411	504	469	530
Spring crops	50	35	24	32	62
Summer crops	50	37	21	21	0
3. Gross output per capita (1000 VND)	2,830	3,264	4,135	5,917	8,688
- Cultivation	2,293	2,527	3,231	3,408	5,051
Rice	1,062	746	1,632	1,217	1,410
Other paddy crops	528	942	880	1,189	1,637
Vegetable crop	703	839	719	1,002	2,004
- Livestock	393	642	838	2,299	3,487
Pig breeding	293	520	536	1,630	2,112
Other animal	100	128	302	667	375
- Non-agricultural activities	144	89	66	210	150

Source: Survey by Department of Agricultural System, the Vietnamese Institute for Agricultural Science and Technique

In term of land for winter vegetable cultivation, besides their owned land, many households, especially households involved in high-value vegetable growing, rented land from others that had no favorable

conditions or from reserved land of commune.

Briefly, renting land for vegetables growing may last for a long time or for one crop only, and mainly happen in land with favorable conditions and in high densely populated regions associated with knowledge of vegetables growing. It also normally happens in regions where people have experiences of vegetable growing and is initially familiar with commercial production. Furthermore, most households, besides growing vegetables, more or less participated in pig breeding in order to supplement their income.

4.3 Different forms of land concentration for “farm” economy development

Since the Policy Bureaus issued Resolution No. 10 in April 1989 on renovation of agricultural economic management, production relationship in the agricultural sector had been reformed significantly. However, until the Resolution 6 of the Communist Party (6th Congress, March 1993) was issued, agricultural household was really defined as an autonomous economic unit. The Resolution 6 in combination with various new economic policies and regulations vigorously helps farmers to achieve remarkable achievements. Several agricultural households, who have capital, good background of working and management, experiences and willingness, invested in agriculture, forestry or fishery production and became rich. Some of them initially engaged in commercial production of large scale in the form of “farm”. According to General Statistics Office, by 1999, in the whole country there were 90,169 “farms”, in which 4,434 “farms” located in RRD including:

- “Farms” specializing in annual crops: 218 units
- “Farms” specializing in perennial crops: 766 units
- “Farms” specializing in animal breeding: 966 units
- “Farms” specializing in forestry: 1,314 units
- “Farms” specializing in aquaculture: 608 units
- “Farms” with mixed business: 562 units

In RRD, as a region of small land and high population density, the agricultural land per household in 1998 were 0.2530 hectare, even lower in some provinces. However, some households through various means accumulated land to expand their business under the form of “farms”. All “farms” in RRD are currently using 12,375.7 hectares of land, including agricultural land: 1,763.9 hectares, in which annual crop land is 613.9 hectares; perennial crop land: 1,150 hectares. Forestry land: 3,410.9 hectares. Inland surfaces for aquaculture: 7,058.5 hectares. Others: 124.4 hectares. On average, a “farm” is using 2.787 hectares.

According to a survey conducted by National Economic University in 1999 on 134 “farms” locating in the suburb of Hanoi capital, 72 “farm” owners were agricultural households, 54 “farm” owners retired state officers, 5 “farm” owners state officers and 3 “farm” owners others.

“Farms” usually focus on cultivation (annual crops and perennial industrial crops as well as fruit trees),

forestry, animal breeding (milk cow, pig and poultry) and aquaculture.

The suburb of Hanoi that includes 5 districts has 40,111 hectares of agricultural land, 6815 hectares of inland surface for aquaculture. On average, a household has 0.2122 hectares of agricultural land. While, the average land of a surveyed "farm" in this region was 6.38 hectares, in which the agricultural land: 1.06 hectares; forestry land: 3.02 hectares; inland surface for aquaculture was 2.06 hectares (see Table 10).

Table 10 Average land of a "farm" in the suburb of Hanoi, 1999

Items	Volume (ha)	Rate (%)
Total land	6.38	100.0
1. Residential land	0.05	0.85
2. Agricultural land	1.06	16.61
- Perennial crop land	0.70	66.27
Industrial crops	0.09	8.10
Fruit tree	0.62	58.17
- Land for animal breeding	0.03	2.68
3. Forestry land	3.20	50.19
- Protected forest	0.12	3.60
- Barren hill	0.34	10.52
- Planted forest	2.74	85.88
4. Inland surface for aquaculture	2.06	32.35

Source: Survey by National Economic University, 1999

Although "farms", for the time being, are small in number, there is preliminary accumulation of land in these "farms" to develop their business. Land awarded by the State occupies 48.45% of the total, in which forestry land shares 73.99% that are mainly barren hills for reforestation. Water surface for aquaculture occupies a small proportion and is largely located in Thanh Tri district—a flooded region with many large lakes and swamps. Given the large area of water surface in this area, the land allocation has been implemented following the Resolution No. 10, agriculture cooperatives could not divide them into small proportion, therefore, they offered it as land for hire which occupied up to 99.7% of total water surface area. Other land allocation is derived from other measures such as transfer, reclamation, making contracts with state farm etc. (see Table 11).

In Hai Phong, according to the Department of Agriculture and Rural Development, out of total 625 farms, 525 "farms" (84%) were allocated land in five districts in coastal region. Those "farms" were classified into:

Group 1: 277 "farms" specializing in raising salty or brackish shrimp (or sea-crab, seaweed.) in reclaimed marshes near the sea.

Group 2: 225 "farms" involving in production as the model: growing rice crop + raising fishes + animal breeding. Land of those "farms" is reclaimed from marshes near the sea. Most of those "farms" focuses on paddy growing but suffered from unstable yields, thus some "farms" gradually changed to rice transplanting

associated with fish culture.

Group 3: over 20 "farms" involving in raising aquatic breeds associated with animal breeding.

On average, a "farm" in those five districts in the coastal area of Hai Phong city had 9.275 hectares of land, in which, agricultural land shared 0.725 hectares (8.47%). In term of land size, it varied from different groups of "farms": group 1: 17 hectares per "farm"; group 2: 1.5 hectares; group 3: 2.0 hectares. Land in those "farms" usually was accumulated through renting from cooperatives or the local government. In 525 "farms", land established by renting from local state or cooperatives shared 90.58%, the higher levels are group 1 (96.39%) and 72.8% group 2. Other land sources as a result of purchase, rental from private sector and land reclamation occupied a small proportion (see Table 12).

Table 11 Land classified by sources in "farms" in the suburb of Hanoi 1999

	Agro land		Forestry land		Water surface		Total	
	Vol. (ha)	Rate (%)	Vol. (ha)	Rate (%)	Vol. (ha)	Rate (%)	Vol. (ha)	Rate (%)
I. Land allocated by State	0.61	57.84	2.37	73.99	0.08	4.02	3.06	48.45
II. From other sources	0.45	42.16	0.83	26.01	1.98	95.98	3.26	51.55
1. Renting from co-operatives or state authorities	0.31	69.43	0.07	7.82	1.98	99.97	2.36	72.75
2. Renting from private sector	0.01	2.83	0	0	0	0	0	0.01
3. Purchasing	0.08	18.00	0.13	0	0	0.03	0.21	6.43
4. Was mortgaged	0	0	0	0	0	0	0	0
5. Reclamation	0.03	6.35	0.17	20.26	0	0	0.20	6.04
Alluvial ground	0.01	1.34	0	0.18	0	0	0.01	0.23
Barren hill	0.02	5.01	0.17	20.08	0	0	0.19	5.81
Forest	0	0	0	0	0	0	0	0
Others	0	0	0	0	0	0	0	0
6. Renting from state farm	0.01	2.69	0	0	0	0	0.01	0.37
7. Contracted with state project	0	0	0.47	56.47	0	0	0.47	14.42
8. Other sources	0.00	0.70	0	0	0	0	0.000	0.10
Total	1.06	100.	3.20	100.	2.06	100.	6.32	100.

Source: Survey by National Economic University, 1999

Table 12 Land accumulation in a "farm" in coastal region of Hai Phong city 1997

	Average		Group I		Group II		Group III	
	Volume (ha)	Rate (%)	Volume (ha)	Rate (%)	Volume (ha)	Rate (%)	Volume (ha)	Rate (%)
Total land	9.275	100.0	17.00	100.0	1.50	100.0	2.00	100.0
In which								
Renting from local state and cooperatives	8.338	90.58	16.478	96.93	0.0585	3.90	1.456	72.8
Purchasing	0.0545	0.59	0.0765	0.45	0.0315	2.10	0.042	2.10
Renting from private sector	0.0201	0.22	0.024	0.12	0.0165	1.10	0.050	2.5
Reclamation	0.0298	0.32	0.0425	0.25	0.0165	1.10	0.220	1.10

Source: Department of Agriculture and Rural Development, Hai Phong city

However, among different types of land accumulation as mentioned above, for the whole RRD, renting land from commune government or agriculture cooperatives shares a major proportion. This land was used to be lakes, marshes, infertile soils or wasted water surface that is likely not to be allowed for production without reclamation.

Renting land from the local governments and agricultural cooperatives usually take place in flooded regions with lakes, marshes, flooded fields, land beside dam, dikes, or traffic roads or alluvial land in coastal regions of Hai Phong, Thai Binh, Nam Dinh, Ninh Binh provinces. Borrowing land happens in vegetable growing areas that are able to cultivate double-rice crops associated with vegetable growing in the winter season. In areas that have small agricultural land per capita, crowded population, and in favor of vegetable market, agricultural households who have experiences in growing high-value vegetables and eligible capital are willing to borrow or rent land to grow winter vegetables in order to diversify and improve their income as well as score employment opportunities.

Agricultural land transfer that includes formal and informal transfer happen in area in RRD that have a developed commercial agriculture, such as litchi development in Thanh Ha district, Hai Duong province. In other localities, this transfer has not been in common due to a lack of motivation for land accumulation. "Farms" cultivating annual crops share a small proportion of the total number, about 4.92%. Those "farms" land derived from renting from local government or agricultural cooperatives is used to be infertile land and needs to be reclaimed before use. Reclaimed land, which is still small in area, usually locates in alluvial soil areas and/or barren hills subject to the National Program 773.

Briefly, structural transformation in land use has recently taken place in RRD. Although it has not really been dynamic, this transformation has facilitated the agricultural development toward commercial and diversified production, newly established "farms", increased the agricultural production, income and improved their living standard.

4.4 Exchange of land

The allocation of land to agricultural households based on equality mechanism both in term of distance and quality of land resulted in the outcome that land was divided widely into small plots. At the beginning of land allocation process, in the whole country, there were 11 million agricultural households who possessed over 80 million of plots: on average, an agricultural household has 6-7 plots, in extreme cases 20-25 plots. In RRD, on average, a household has 7-8 plots, in extreme cases over 25 plots.

To overcome such a constraint, many provinces provide instructions to agricultural households to exchange their land associated with re-planning road and irrigation canal systems. In 1994, agricultural households in some province implemented land exchanges to reduce number of plots of individual agricultural household.

In Ha Tay, the land exchange movement happened early and strongly, due to two reasons: first, land was divided into so small lots: each household has 10 - 15 plots on average, in which there are plots with size of

some 30 m², leading to difficulty for land mapping and thus difficulties in granting certificates of right to land use occurred. Second, the dispersed allocation of land into small plots results in inconvenience and high cost of crop cultivation. In order to ensure legally, rationally, equally exchange of land between agricultural households, the local government implemented the process with a public, democratic and voluntarily principle and based on the distance and quality of each plot of households to design larger plots for households. In Tram Long commune, Ung Hoa district, before the lands exchange process, there were 24,000 plots, each household had 22 plots allocated dispersedly in many fields. Up to 1998, having implemented land exchanges, Number of plots decreased to only 2,246 plots and, on average, 2.2 plots per household. The largest plot is 9360 m² and the smallest plot is 720 m². 533 households accounting for over 50% of total households within the commune have 1 plot only; 52 households (4.4%) 2 plots; and 481 households (45.2%) 3 plots.

In Canh Nau commune, Thach That district, by 1997, there were 2,300 households managed 361.99 hectares of land that was divided into 20,820 plots, on average, a household had 8.6 plots, and size of one plot was 174 m². For instance, in the village 7th the average size of a plot is the largest, there are 1,613 plots with 270m² each. In the village 2nd there were 2,453 plots and 135m² each. 51.82% of households had over 9 plots. Only 19% households had less than 5 plots (see Table 13).

Table 13 Households by number of plots in Canh Nau commune, Thach That district, Ha Tay province: Before the land exchange movement

Village	Average No. of plots per household	In which classified by number of plots							
		Having 1-5 plots		Having 6-8 plots		Having 9-10 plots		Having over 10 plots	
		Households	%	Households	%	Households	%	Households	%
1	7.88	41	15.83	109	42.08	70	27.3	39	15.06
2	11.38	37	17.88	52	25.12	72	34.78	46	22.22
3	8.79	45	19.23	62	26.5	97	41.45	30	12.82
4	8.25	39	16.96	49	21.3	120	52.17	22	9.57
5	6.84	56	22.86	89	36.33	85	34.69	15	6.12
6	18.81	33	20.5	52	32.3	58	36.12	18	11.18
7	7.71	46	23.59	58	29.75	72	36.92	19	9.74
8	8.79	30	20.55	36	24.66	67	45.89	13	8.9
9	8.08	33	13.15	55	21.91	131	52.19	32	12.75
10	9.12	42	20.79	56	27.72	75	37.13	29	14.36
11	7.88	37	21.76	51	30	65	38.24	17	10
The whole commune	9.05	439	19.09	669	29.09	912	39.65	280	12.18

Source: Survey by some students of National Economic University, 1999

After the land exchange process, total number plots of the commune reduced to 10,893. On average, a household managed 4.5 plots with size of 307 m² each. 31.79% households had from 6 to 8 plots, 0.34% households had over 8 plots, especially, 50% households in villages 2nd and 11th had over 6 plots (see table 14).

In Ung Hoa district, there were 578,680 plots and each household had 17 plots. After the land exchange process, there are only 170,200 plots, reduced by 70.6%. Number of households who has 1-5 plots shared 71.76%, the rest of households has 6-8 plots each. Similarly, In Phu Xuyen district, each household has 18 plots, while there were total 751,588 plots in the whole district before the exchange. Afterward the number of plots was 184,880, reduced by 75.4% and each household has 4.5 plots. 82.5 households in the district have 1-5 plots; 17.5% has 6-8 plots.

Table 14 Households by number of plots in Canh Nau commune, Thach That district, Ha Tay province: After the land exchange movement

Villages	From 1-5 plots		From 6-8 plots		Over 8 plots	
	Number households	%	Number households	%	Number households	%
1	176	67.43	84	32.19	1	0.38
2	105	47.95	112	51.14	2	0.91
3	195	79.92	49	20.8		
4	165	68.75	75	31.25		
5	185	71.15	75	28.85		
6	144	67.06	56	32.94		
7	167	85.20	27	13.78	2	1.02
8	89	52.98	77	45.83	2	1.19
9	185	73.41	67	26.59		
10	150	76.14	47	23.86		
11	85	48.54	87	50.88	1	0.58
The whole commune	1614	67.87	756	31.79	8	0.34

Source: Survey by some students of National Economic University, 1999

5. Job creation and income generation in RRD.

Over the past 10 years of renovation, restructuring the economy in general and reform of state owned enterprises in particular have made a huge increase in labor redundancy. Nearly 1 million of employers lose the job during restructuring and strengthening administrative organizations. Ten thousands of employers were in redundancy when state owned enterprises implemented their restructuring. Those employers went out from state sector and had to seek for new jobs, a number of such employers have moved to rural areas for seeking job in agriculture and non-agriculture business. This situation aggravated the unemployment and under-employment in rural area. According to the Census conducted in April, 1999 in rural area, number of people in working age amounted to 32 millions, accounting for 72.92% of labor force in the whole country, in RRD this rate was 70.73%.

Rural employment heavily depends on agricultural land availability. For rural labor force, especially agriculture labor force, lack of agricultural land in a sense means lack of job. Job creation in rural area recently has taken place mainly in production activities of households and "farms". Rural households, while they changed to or associated with non-agricultural activities, still maintain their agricultural land and their

labor force is still registered as agricultural labor force.

Characterized by small agricultural land, RRD has agricultural land area per capita is half and 1/4 in comparison with that of the whole country and Mekong River Delta respectively. In addition, a rapid increase in agricultural labor force makes the under-employment situation in RRD more serious; agricultural households do not fully utilize their working hours. According to a survey conducted by the Center for Labor Scientific Information of the Ministry of Labor, War Invalids and Social Affairs in 1999, rural labor force used only 70.88% of their working hours, and 72.08% in RRD. Therefore, the idle time of agricultural household members especially in some districts is relatively high. In Chau Giang district, Hung Yen province, for example, it is only 40%.

Given that situation of large idle time, agricultural households as well as local governments have carried out to create more employment to increase their income. Main solutions are as follows:

5.1 Increasing land use coefficient

In Viet Nam, favorable conditions of annual arable land associated with tropical climate facilitate the cultivation of a few crops per year. In RRD, with traditional paddy cultivation practice, two rice crops per year: summer/autumn rice crop (lasting 175 days) and winter/spring rice crop (150 days). When the green renovation took place, advanced technology of new rice varieties were applied in several countries in the region including Viet Nam. An experimental introduction of spring rice crop lasted for seven to eight years in Thai Binh province, but only succeeded when the short-day rice crop was widely transplanted in RRD. In the period of 1976-1980, summer/autumn rice crop dominated a large proportion of rice cultivation, while winter/spring rice crop only occupied 30-35% of total rice growing acreage. In 1981-1985, winter/spring rice crop increased up to 85% and then 95-97% in 1990s. As a result, double cropping land area has a certain idle period during a year. In some localities winter crops were grown in that period and the winter crops have gradually become one of the main crops and expanded. Agricultural households in Thai Binh province cultivated winter crops like sweet potato, vegetables and azolla in the following continuous cropping patterns

winter/spring rice + summer/autumn rice + Sweet potato

winter/spring rice + summer/autumn rice + Azolla

winter/spring rice + summer/autumn rice + Vegetables

Although the high efficiency has not yet to be achieved, because of a short time employed for winter crops as well as inappropriate varieties of winter crops, but in term of cropping pattern, this attempt made a significant progress, actively contributing to soil reclamation & fertility enrichment. Some short-day rice varieties were introduced in early-winter rice crops led to a more saving of time for winter crops. Summer/autumn rice crops increased, from transplanted on 25% rice arable land in 1980s up to 30-35% in 1991-1995 and 40-45% in 1996-1999. Currently, winter cropping patterns differ according to high-value crops.

Thanks to the introduction of the winter crop in the cropping patterns, triple cropping land increased. While in 1985 in RRD it was 46.5 thousand hectares, in 1994 it amounted to 74.89 thousand hectares accounting for 12.8% of total annual crop acreage. Double cropping land also increased, resulting in a reduction in single cropping land. Consequently, land use coefficient (calculated by dividing crop planting acreage in a year by arable land) increased. While this coefficient was 1.71 in the whole country in 1989, it was 2.22 in RRD, in which Thai Binh: 2.46; Ha Tay, 2.28; Suburb of Hanoi 2.33 (see Table 15). Although in the region, arable land per labor reduced by 0.105 hectares (45.85%) in 1998 comparing to that in 1985, an increase in land use coefficient (from 1.85 to 2.22) resulted in that cropped area per labor reduced only by 0.149 hectares (35.06%). Similarly, in 1998 arable land per capita reduced 27.14% but cropping areas per capita only reduced 13.51% comparing to that of 1985. Especially in Thai Binh where the land use coefficient is the highest, arable land per person reduced 36.23% but cropping area per person 24.17%; similarly arable land per person reduced by 21.91% and cropping area per person 5.32%. It is concluded that an increase in the land use coefficient makes cropping areas per person reduce less than a half that in arable land. This is an efficient solution to maintain employment in the circumstance of small sized land and its continuous reduction and rapid increase in labor force.

5.2 Agricultural diversification and commercial production development

Because of small agricultural land, agricultural households in RRD have attempted to use it economically and rationally bias diversifying their crops in order to score employment and improve household income. Given the advantages of the winter crops where they have little land, agricultural households attempt to increase winter crop cultivation on their own land, while they borrow land from others who are not in favorable conditions for production. According to a survey conducted by Department of Agricultural System, Viet Nam Institute for Agricultural Science and Techniques of households in Tu Ky and Gia Loc districts, Hai Duong province, many interviewed households intended to grow winter vegetables in large scale. Six groups of households have different production directions, though all of them are interested in growing winter vegetables.

Group 1: Specializing in high-value vegetables growing + Pig breeding + Rice growing + Fish breeding. This group has 984 m² of arable land per capita. In a year, besides double-rice crop cultivation, agricultural households develop two vegetable crops with total vegetable growing land of 1,409 m² per capita, in which, only the winter-spring vegetables produces a revenue of VND 6,935 thousand per capita that accounted for 71% of total revenue from vegetable growing and 42.9% of total revenue per capita from their cultivation. This group has the highest revenue, about 16,150 thousand VND per capita per year, equal to 1,345.8 thousand VND per capita per month.

Group 2: Pig breeding + vegetable growing + rice cultivation + fish breeding. The arable land per capita is 563 m². Besides rice growing, this group grows vegetable crops with total vegetable growing land per

Table 15 Land use coefficient in RRD

Unit: 1000 ha

	1985	1990	1995	1996	1997	1998
RRD						
a. Arable land	720.2	710.3	626.4	621.5	622.7	620.9
b. Crop growing areas	1,334.8	1,397.0	1,361.4	1,356.0	1,366.2	1,379.2
c. Cropping coefficient (b/a)	1.85	1.97	2.17	2.18	2.19	2.22
1. Hanoi Capital						
a. Arable land	95.5	91.8	40.0	41.0	39.7	39.3
b. Crop growing areas	177.0	196.9	87.0	87.3	85.8	87.8
c. Cropping coefficient	1.85	2.14	2.18	2.18	2.16	2.23
2. Hai Phong city						
a. Arable land	55.5	55.5	52.9	54.0	53.8	53.3
b. Crop growing areas	103.9	106.5	111.7	110.1	112.5	112.2
c. Cropping coefficient	1.87	1.92	2.11	2.04	2.09	2.11
3. Ha Tay province						
a. Arable land	124.2	122.6	105.1	105.6	105.1	104.6
b. Crop growing areas	217.2	126.8	236.8	238.8	230.9	238.1
c. Cropping coefficient	1.75	1.84	2.25	2.26	2.20	2.28
4. Hai Duong province						
a. Arable land			136.9	139.9	83.2	82.4
b. Crop growing areas			303.2	307.2	190.6	188.7
c. Cropping coefficient			2.21	2.20	2.29	2.29
5. Hung Yen province						
a. Arable land	147.9	145.2			55.5	55.2
b. Crop growing areas	284.3	298.8			119.8	122.9
c. Cropping coefficient	1.92	2.05			2.16	2.23
6. Ha Nam province						
a. Arable land					44.6	44.5
b. Crop growing areas					93.7	98.5
c. Cropping coefficient					2.10	2.21
7. Nam Dinh province	198.9	199.1	142.9	133.1	91.6	94.4
a. Arable land	349.7	358.4	294.4	289.6	199.2	200.0
b. Crop growing areas	1.76	1.80	2.06	2.17	2.17	2.12
c. Cropping coefficient						
8. Ninh Binh province						
a. Arable land			54.8	54.9	55.4	55.9
b. Crop growing areas			96.2	91.6	107.1	108.0
c. Cropping coefficient			1.75	1.66	1.93	1.93
9. Thai Binh						
a. Arable land	97.9	96.0	94.1	94.0	94.20	90.5
b. Crop growing areas	202.7	219.6	222.1	221.6	226.6	223.0
c. Cropping coefficient	2.07	2.28	2.36	2.36	2.41	2.46

Source: Agro-forestry-fishery Statistics Yearbook, Statistics Publishing House, 1996-1999

capita of 416 m². The revenue from vegetables shares only 22.55% of total revenue because of a small proportion of high-value vegetable growth and lower investment - only 0.637 thousand VND/m² in equivalent to 57.96% that of group 1. Alternatively, revenue from pig breeding accounts for 52.99% of the total 6,231 thousand VND per capita per year.

Group 3: Rice cultivation + vegetable growing + pig breeding + fish breeding. The arable land per capita is 715 m². Beside rice crops, this group grows 745 m² of vegetables per capita in which winter vegetables are 646m². Because of less proportion of high-value vegetables and low investment (0.503 thousand VND /m²) in equivalent to 45.77% of that of group 1, the revenue from winter vegetables accounts for 13.81% that of group 1 though its growing land is equal to 89.47% that of group 1.

Group 4: Non-agricultural activities + rice cultivation + vegetable growing + pig breeding. This group has the smallest arable land per capita, 442m². Besides cultivated double-rice crops, on average, 441 m² of vegetables are grown annually, in which, winter vegetable growing land is 393 m². Revenue from vegetable growing is small that accounts for 21.83% of the total as a result of low investment (50% comparing to that of group 1) and small land for growing high-value vegetable crops. Revenue from growing winter-spring vegetable crops accounts for 93.25% of total revenue from growing vegetables.

In general, due to small arable land, households in vegetables regions in Tu Ky and Gia Loc district apply various cultivation methods such as mixed cropping, continuous cropping, pig breeding, fish breeding associated with handicraft development to create more jobs and improve their income. All of them have revenue per capita per year over 2690 thousand VND, in which group 3: 3,547 thousand VND; group 4: 3,734 thousand VND; group 5: 3,953 thousand VND; group 2: 6,231 thousand VND and group 1: 16,150 thousand VND. Given the estimated physical expenditures cost 40-50% of the output, even the lowest income group obtains 123-145 thousand VND per capita per month. Group 3,4 and 5 obtained 163-181 thousand VND; group 2: 285 thousand VND and group 1: 740 thousand VND. In spite of small arable land, based on the diversification of agricultural production activities, most of households escape the poverty, even some households achieve a relatively high income. Especially, Most high income households belongs to group 1 who choose a rational cropping structure, invest into high value vegetables, apply intensive cultivation and borrow land from other households to grow winter/spring vegetables.

In Khoai Chau district, Hung Yen province, farmers grow mint trees associated with producing mint extracts. In 1976-1990, mint developed remarkably and increased both in term of growing land scale and its output. The product mainly was exported to the former Soviet Union. Because of the interruption of this big market following the collapse of the Soviet Union, growing mint and producing its extracts suffered from slowdown period. However, since 1996 mint growing has been recovered. In 1997-1998 land for peppermint growing increased by 705-885 hectares; output of mint extracts amounted to 69,850 - 73,280 kg. At stable price of 90,000 VND for several recent years, farmers in this district and others in surrounding regions have gained considerable income.

The survey conducted by the Institute for Economics - Center for Social and Cultural in three communes shows that:

Quyét Tien commune, Kien Xuong district, Thai Binh province locates in the traditional water rice cropping area. The agricultural land per capita is 507 m². The lowest level is 108m², and the highest is 4575 m². Because of such a little land, in order to ensure the living, households in this commune have to diversify their business such as a combination of cultivation, animal breeding, fish breeding, small industries, services, trading etc. High-income households usually mean the households with various sources of income, for instance, from agricultural activities, small industries, services and others. On the contrary, low-income households usually solely engage in agricultural activities, or in other activities in a limited extent (see Table 16).

Table 16 Income of surveyed households in Quyét Tien commune, Kien Xuong district, Thai Binh province

	Average		Group 1 (income > 300 thousands VND)		Group 2 (183-300 thousand VND)		Group 3 (100-183 thousands VND)		Group 4 (60-100 thousands VND)		Group 5 (<60 thousands VND)	
	Volume	%	Average	%	Volume	%	Volume	%	Volume	%	Volume	%
Total income	5474.07	100	17676.75	100	9599.67	100	6481.97	100	4313.87	100	1877.44	100
In which												
1. Agriculture	3175.79	65.69	4536.75	21.15	4835.67	48.14	3549.73	55.51	3041.7	71.79	1674.01	89.39
- Cultivation	2602.87	53.71	3411.75	19.83	3415.48	35.08	2911.33	45.72	2737.75	64.64	1278.16	65.46
Food crops	2303.77	46.54	3199.25	18.37	3025.48	30.8	2543.2	39.83	2489.23	58.69	1076.77	51.77
- Livestock	467.77	10.55	675	3.91	919.24	8.96	558.67	8.65	249.36	5.77	370.21	23.21
- Aquaculture	105.15	1.43	50	0.41	500.95	4.1	79.73	1.14	54.59	1.83	25.64	0.72
2. Craft and small industry	377.4	6.77	1430	5.94	571.43	5.14	451.2	7.6	344.59	8.18	74.36	3.95
3. Trading and services	449.49	5.84	2950	11.18	1266.67	12.2	561.31	8.71	154.1	3.5		
4. Wages and subsidy	1150.6	17.24	3660	22.02	2535.43	30.26	1677.6	23.9	518.56	11.12	122.67	6.44
5. Others	320.8	4.47	5500	36.61	390.48	4.25	242.13	4.27	254.92	5.39	6.41	0.23
Income per capita	1360.05		4090.85		2718.92		1613.52		971.76		468.15	
Number of surveyed households	200		4		21		75		61		39	

Source: The survey by the Institute for Economics, 1999

High-income households classified into group 1 account for 2% of the surveyed households. In term of income per household, agriculture shares 21.15%; wage, subsidy and others occupy 58.63%. Group 2 includes 21 households accounting for 10.5% surveyed households. Agriculture contributes to 48.14% of total income and the rest comes from non-agricultural activities. Group 4 and 5: most households are under poverty line, in which 30.5% households have income per capita of less than 81 thousand VND/month and 19.5% has that of 39 thousand VND/month. Those households mainly are exclusive agriculture households that income from agricultural activities occupies a large proportion: 71.9% for group 1 (in which rice

cultivation shared 58.69%); 89.39% for group 2 (and rice cultivation shared 51.77%). Regarding households who only live on agricultural income, they cannot escape from poverty regardless of their agricultural diversification unless effective measures to increase off-farm activities are taken into account.

Thanh Xuan commune, Thanh Ha district, Hai Duong province, locates in a fruit tree developed region, especial litchi planting. In recent years, litchi has become an attractive fruit tree in terms of economic benefit and increased in the commune. Litchi has not only been planted in gardens but also in fields of several households since 1993. Normally, rich households involved in litchi planting earlier than poor household did. Different from other communes, in Thanh Xuan district purchases of land for litchi planting has been quite active.

In the interviewed households, 96 households, accounting for 48% of the total, purchased land. In general, purchasing land took place in all groups especially groups 1, 2 and 3, in which group 1: 48.98% households being involved; group 2: 53.16% and group 3: 43.86%. On average of 200 interviewed households, the income per capita is relatively high of about 268.53 thousand VND/month, in which agricultural activities contributed 86.42%, especially fruit trees 43.28%. Income distinctively differs among groups however. In group 1 (24.5% of the total surveyed households in the commune), the income was 523 thousand VND/month in which agriculture contributed 63.10%. This group developed both crop cultivating and animal breeding, while concentrating in fruit tree planting that contributed 40.97% of total income (share of the income from litchi is 27.7%).

In addition with litchi planting, this group engages in trading and service activities that facilitated litchi marketing and improved their income. Income from trading and service activities shares 27.7% of total income. Notably, the highest income household obtains 113,700 thousand VND. On average, a household earns 28,425 thousand VND in which from litchi: 40,000 thousand VND; trading and service: 45,000 thousand VND.

There are 79 households in group 2 that account for 39.5% of the selected households. The income per capita is 238 thousand VND/month, in which, agriculture: 86.94%, particularly fruit tree: 46.53%.

In the remaining groups, the income from agricultural activities shares a larger proportion, however, fruit tree proportion reduces in terms of both volume and percentages (see Table 17). Those households are in low level of income with limited diversification. It was noteworthy that all rich, fairly rich, medium and poor households are concerned much about food production although it shares a moderate proportion.

Comparing to the situation of Quyet Tien commune that locates in the rice growing specializing region, Thanh Xuan commune has a more intensive commercial production; higher income of household; higher rate of rich households (64% interviewed households in the commune); lower rate of poor households (7.5%), especially households who have income level of less than 60 thousand VND per capita per month occupy 2.5%, 8 times lower than that of Quyet Tien commune. Therefore, in this case, accelerating commercial agriculture is one of the most effective solutions to create jobs and improve household income.

Table 17 Income of surveyed households in Thanh Xuan commune,
Thanh Ha district, Hai Duong province

	Average		Group 1 (income > 300 thousands VND)		Group 2 (183-300 thousand VND)		Group 3 (100-183 thousands VND)		Group 4 (60-100 thousands VND)		Group 5 (<60 thousands VND)	
	Volume	%	Volume	%	Volume	%	Volume	%	Volume	%	Volume	%
Total income	12634.85	100	22636.96	100	11913.42	100	7488.72	100	3742.2	100	2590	100
In which												
1. Agriculture	9815.31	86.42	14282.92	63.1	10308.16	86.94	7044.09	94.25	3642.2	98.24	2310	84.86
- Cultivation	8081.35	69.43	12104.11	53.47	8604.82	72.51	5463.65	72.97	2514.2	68.17	1490	50.55
Food	2211.66	21.14	2361.42	13.68	2601.52	22.25	1893.16	25.25	1014.2	29.68	410	12.77
Fruit tree	5476.6	43.28	9274.29	40.97	5571.41	46.53	3232.6	42.49	1210	33.31	860	28.06
Litchi	3163.75	23.54	6283.47	27.76	2960.76	24.62	1513.33	19.2	370	11.94	200	7.27
- Livestock	1389.71	13.23	1797.18	7.94	1404.61	11.88	1226.95	16.76	658	17.52	480	21.29
- Aquaculture	344.55	3.76	381.63	1.69	298.73	2.55	353.51	4.52	470	12.55	340	13.12
2. Craft and small industry		0.48			80.38	1.08	8.77	0.18				
3. Trading and services	2089	7.89	6734.7	29.75	910.13	7	271.93	3.31			80	7.27
4. Wages and subsidy	502.79	3.71	1190.77	5.26	466.66	3.66	93.76	1.25				
5. Others	193.5	1.5	428.57	1.89	148.1	1.12	70.18	0.93	100	2.27	200	8.33
Income per capita	3222.27		6280.78		2856.24		1726.91		978.33		571.33	
Number of surveyed households	200		49		79		57		10		5	

Source: The survey by the Institute for Economics, 1999

5.3 Developing small industries and rural services

In RRD, because of crowded population and small-sized land, agricultural activities are rarely able to cover people's living. For long time, small industries and services have been paid with much attention by agricultural households to create jobs and improve their income. The region is also the original place of handicraft and industry village. According to the reports of localities, in 1998 there were 704 industry villages, in which traditional industry villages shared 27.5%, the rest was newly established ones. Nowadays, industry villages in RRD have been developing. In 1995, there were 430 industry villages that accounted for about one-third in the whole country. Up to 1998 this number increased to 704, accounted for nearly 50%. Industry villages formed centrally in Ninh Binh province that has 160 units, in which mainly were newly industry villages. Nam Dinh province had 90 industry villages that had 40% of traditional industry villages. On average, there were 70 industry villages in each province that attracted nearly 600 thousand people. Industry villages not only attract inside labor force but also from surrounding areas.

Bat Trang ceramic village usually attracts 3,000-5,000 workers from surrounding villages and communes. Kim Son sedge mat village (Ninh Binh province) uses number of workers for cultivating sedge (2,000 people) and wavering sedge mat (9,000 people). Van Phuc embroidering village, Ha Tay province, attracts 1,650 workers that account for 72.3% the labor force of village.

Associated with employment generation, non-agricultural activities and industry villages produce huge

amounts of products. In 1998 in Ha Tay province, gross output of rural industry was about 1,098.3 billion VND, in which industry villages contributed a large proportion; in Thai Binh province it was 992 billion VND; and 560.8 billion VND in Hai Duong province.

Thai Binh used to be an exclusive agriculture province with little agricultural land. Traditional and newly established small industries and industry villages have developed significantly. Out of 82 industry villages, 68 newly established industry villages employed 88,505 workers. In addition, in 1998, the gross output of rural industry increased by 32.89% comparing to that of 1995, in which Vu Thu district: 63.55%; Dong Hung district: 38.78% (see Table 18).

Table 18 Gross output of rural industry in Thai Binh province

	1995	1996	1997	1998
The whole province	746,551	931,108	989,802	992,116
In which:				
Thai Binh town	91,479	115,413	139,650	142,100
Vu Thu district	55,828	76,728	91,306	91,306
Kien Xuong district	101,852	90,237	103,000	105,926
Tien Hai district	76,316	89,028	95,076	98,492
Dong Hung district	82,287	101,180	111,500	114,200
Quynh Phu district	48,230	69,955	64,500	71,754
Hung Ha district	237,954	311,667	302,025	270,628
Thai Thuy district	52,605	76,900	82,745	87,710

Source: Report of Thai Binh Department of Industry.

With agricultural land of 187 m² per capita, Nam Giang commune (Nam Truc district, Nam Dinh province) is famous as a manufacturing of agricultural tools. Out of 200 surveyed households, there were 320 workers specializing in small industrial activities in which 55 workers specializing both in agriculture and handicraft, 10 workers specializing in trading and services, 33 workers involving in other jobs. 170 workers registered as agricultural labor, 34 engaged in various jobs.

Result of the survey showed that: income per capita were 382 thousand VND/month, in which crafts, small industries, contributed 72.49%, agriculture contributed 12.89% in which food production shared 7.24%, trading and services and other activities 15.63%.

The classification of household by different groups shows:

Group 1, including high-income households (over 28 million VND/per household) occupies 56.5% of total selected households. Income from craft and small industries shares a major proportion in total income, about 90.21%, agriculture contributed 2.6%, in which food production 1.63%. The income per capita of this group is 539.27 thousand VND, 41.17% higher than average level of the commune.

Group 2: small industries and craft activities contribute 62.59% of the total income; trading, services and others: 23.17%; agriculture: 14.24% in which food production: 6.55%.

In the remaining groups, income proportion from small industry and handicraft gradually reduced: 43.94%

in group 3; 16.86% in group 4; 0% in group 5. On the contrary, agriculture shared a larger proportion in those groups: 27.24% in group 3; 53.44% in group 4 and 61.89% in group 5 (see Table 19).

Given the vigorous development of non-agricultural industries, Nam Giang commune attains a considerable income per capita. Rich households share a large proportion, poor and hunger households share 9% particularly hunger households only 1.5%. Like other communes, poor households are exclusive agricultural and self-sufficient households. Despite a small land per capita and the main income as a result of non-agricultural activities, those households do not leave their land and food production, even though households in group 1 and 2 that have quite high income. For past nine years, only two households involved in land transfer while three households purchased additional land. It seems that for the time being no households has the intention to transfer their land.

Besides craft and small industry development, agricultural households in RRD are involved in trading and services, especially in commercial agriculture area. Number of households who registered for their business in trading and services has increased rapidly.

Table 19 Income of surveyed households in Nam Giang commune, Nam Truc district, Nam Dinh province

	Average		Group 1 (income > 300 thousands VND)		Group 2 (183-300 thousand VND)		Group 3 (100-183 thousands VND)		Group 4 (60-100 thousands VND)		Group 5 (<60 thousands VND)	
	Volume	%	Volume	%	Volume	%	Volume	%	Volume	%	Volume	%
Total income	20531.92	100.0	28075.89	100	14820.14	100	8540.0	100	4696.38	100	2976.33	100
In which												
1. Agriculture	1156.32	12.89	540.81	2.62	1773.23	14.24	2008.5	27.24	2341.1	53.44	1876.33	61.89
- Cultivation	736.03	8.33	360.19	1.68	1061.23	8	1193.6	16.49	1648.38	38.44	1543	51
Food crops	659.6	7.24	352.23	1.63	870.5	6.5	1073.6	14.6	1422.23	33.4	1243	40.86
- Livestock	396.61	4.22	180.62	0.94	721.07	6.24	657.07	8.49	692.62	15	333.33	10.89
- Aquaculture	23.68	0.34					157.83	2.26				
2. Craft and small industry	17334.4	71.49	25894.69	90.21	9828.78	62.59	4243.33	43.94	807.69	16.86		
3. Trading and services	1531.1	11.14	1238.93	5.29	1512.2	16.98	1630	20.79	847.69	15.1	1100	38.11
4. Wages and subsidy	383	2.68	358.21	1.69	608.29	5.24	480.67	4.6				
5. Others	126.5	1.81	44.25	0.26	97.56	0.95	240	3.43	700	14.61		
Income per capita	4585.57		6471.26		2872.71		1790.07		959.4		635.4	
Number of surveyed households	200		113		41		30		13	3	13	

Source: The survey by the Institute for Economics, 1999

In Gia Lam district, Hanoi capital, in 1998, 6,155 households registered for their business in trading and services, two times higher than that of 1995, attracting ten thousands of workers. Those activities employed 3-4 workers in small scale or over 10 workers in larger scale. Ninh Hiep commune developed service and trading. Households engaging in trade and services share 30% of the total households, mixed-type households

55% and the remaining 15% exclusive agriculture households. Thanks to active marketing activities, trading and service sector in the commune contributes 80% of gross output and make the commune one of the richest communes in Gia Lam district. Rich households occupy over 40% of total households; poor households only accounted for 1.8%. Most households who get their income from off-farm activities do not give up their agricultural land. Nowadays, agricultural land per capita is 275 m²: 255m² for rich households and 301m² for poor households. Given little land, some households engaging in trading and service business in large- scale hire workers to cultivate the land, lend or rent to others in short term. In this sense, land is considered as inheritance from their parents, and must be maintained for long time use and in case of risk.

5.4 Migration from rural area

Labor emigration out of rural area in RRD has taken place for a long time with the establishment of new economic zones in North Middle Mountain and Central Highlands. In accordance with policies on re-allocation of population among regions and establishment of new economic zones, almost all provinces in RRD organized migration in order to relocate labor force and reduce the pressure of over-population in their localities. Even in the suburb of Hanoi, migration was worked out for several years to establish a new district—Lam Ha district, Lam Dong province. In accordance with National Program for Employment, in 1999-2000 Hanoi intends to continuously implement the migration to Lam Ha district. This attempt aims to balance economic development between regions over-populated and lacking potential, and regions in the opposite conditions.

Since 1997, Chau Giang district, Hung Yen province has implemented migration to Central Highlands. For two years from 1997 to 1998, total fund for this purpose were 401 million VND and 397 people are offered employment.

Besides planned migration, spontaneous migration from some provinces to Hanoi has continuously increased. As a center for migration flows, the population growth rate of Hanoi is high, about 1.5% equivalent to 36,000 people per year. This rate seems to increase: in 1995 it was 0.8%, up to 2.1% in 1997 and 1.12% in 1998. According to the Census conducted by Hanoi Police Force in March 1 1999, 233,965 people were migrant workers. In Chau Giang district, Hung Yen province, according to district police division, in 1998, there were 6,142 people accounting for 4.3% population went out of the district, mainly migrated to Hanoi.

Generally speaking, migrant workers in Hanoi are in poor education and working skills. Most of them engage in manual jobs that not require complicated working skill. A survey conducted by Hanoi Commission for Save Children shows about 60% of migrant workers are not trained (see Table 20). Nearly 50% of them work as cyclo drivers, 12% construction workers, nearly 15% in coal processing and rubbish collection etc.

Table 20 Educational level and working skill of migrant workers in Hanoi

Unit: %

	Total	Male	Female
1. Unskilled	61.86	61.41	62.31
2. Technical worker	7.41	8.51	6.30
3. Graduated from vocational school	8.77	6.19	11.41
4. Graduated from university	21.96	23.89	19.98
Total	100.00	100.00	100.00

Source: Survey by Commission for Save Children

Table 21 Employment of migrant labor in Hanoi

	Volume (No. of persons)	Rate (%)
Total	16,340	100.00
1. Cyclo drivers	6,697	41.00
2. Construction worker	1,951	11.90
3. Coal processing, rubbish collection	2,373	14.50
4. Others	5,319	32.60

Source: Survey by Commission for Save Children

5.5 Participating in National Programs for Employment

National Program for Employment, Program 773 (reclamation of alluvial region), Program for Hunger Alleviation and Poverty Reduction etc have been implemented in all localities and achieved to create jobs and improve income. In terms of the Program for Employment (Program 120), Chau Giang district, Hung Yen province, in period of 1996-1998, 840 jobs were annually generated, especially in 1997 for 1,224 persons accounting for 0.9% of labor force. Total fund for program 773 is 600 million VND in order to support the district to reclaim and improve over 20 hectares of infertile land for aquaculture and cultivation, attracting about 700 workers to stable jobs.

Gia Lam district, Hanoi capital, annually receives 3-4 billion VND for implementation of the Program 120, thank to this support, in 1995 445 jobs were generated, in 1996 1,166 jobs, and in 1997-1998 2,000 jobs. Furthermore, some public organizations such as Farmers' Association, Women's Union, Veterans' Association, VAC Union at grassroot level greatly contributed to help agricultural households to borrow from Viet Nam Bank for the Poor, Viet Nam Bank for Agriculture in acting as guaranteeing institutions. Consequently, thousands of agricultural households had access to financial assistance to develop their activities in breeding animal, cultivation, improving mixed garden, expanding non-agricultural business etc, attracting a lot of workers and increase their income.

In spite of the smallest agricultural land per capita that is even continuously reducing, most of agricultural households in the region with characteristics of hard work and relatively high education level have attempted to exploit rationally and economically land in order to enhance agricultural diversification in parallel with the introduction of advanced techniques to increase crop production and land productivity to improve their

income.

Different from other region especially from Mekong River Delta, agricultural households grow winter crops in such forms as mixed cropping, continuous cropping etc which increase land use coefficient. In terms of animal breeding, almost all agricultural households pay attention to pig and poultry development. Although animal breeding takes place in small scale, it employs much labor force due to a high intensity of pigs per land.

According to General Statistics Office, compared with the ratio of households involving in animal breeding in the whole country of 64.32%, that of RRD was 77.6% in 1994. The ratios were particularly high in Thai Binh province 83.62%, Nam Ha province 79.81% and Ha Tay province 78.37% while it was 42.03% in Mekong River Delta. Number of pigs per arable land was 3.5 for the whole country, Mekong River Delta 1.23, RRD 6.39, especially in the suburb of Hanoi 7.69, Hai Phong 7.48, and Ha Tay province 6.5.

In some densely populated area where land is so scarce, for instance, in Nam Giang commune, Nam Truc district, Nam Dinh province, cultivated land per capita with only 187m², or in Ninh Hiep commune, Gia Lam district, Hanoi capital, with 275 m², agricultural activities cannot ensure normal living standard of people. Therefore, part of labor force has shifted to small industrial activities as in Nam Giang commune or trading and services as in Ninh Hiep. Gradually for several generations, traditional industry villages were established in these places. People have their own jobs to improve their income and become rich, thus socio-economic situation in the rural area improved. However, during the development process, non-agricultural industries in RRD as well as in the whole country have experienced several ups and downs affected by various factors including state policies.

In spite of the lowest agricultural land per capita that has continuously been reducing, the rate of landless households in RRD is not noticeable, land mortgage is rarely found, difference among agricultural householder is not considerable and poor households remain relatively few.

6. Conclusion

The agricultural land in RRD is small, accounting for about 56.92 % of the natural area of the region. Annual crop area occupies 86.15% mainly paddy or cereal crops (94.9%). As a result of dense population, agricultural land per capita is at the lowest in the regions of the country. The region therefore faces serious unemployment problem of labor force.

In the economic renovation period, thanks to an open economic policy, the agriculture in RRD has achieved high growth rate, more diversified use of land and recently formed the property market including agricultural land market. Especially in commercialized localities, high value crops such as litchi and longan etc. have been widely developed, resulting in notable formation of the land market. In these regions, fruit trees are not only planted in garden but also in rice field.

Many households having capital and rich experience in agricultural production have purchased additional land to develop high value crops. Also, hiring and borrowing land have become prevalent in many localities in RRD, especially in the area with favorable conditions for winter crop cultivation or in the area with developed non-agricultural activities.

For the current decade, winter crops have become the major crops. Households having available capital and abundant labor have expanded their production in favor of winter crops, focusing on high value vegetables, not only on their owned paddy land but also on land hiring from others. In some industry villages, although agricultural households have good income from industrial activities, they still refuse to give up agricultural land because the idea that "*agricultural households cannot be without land*" is deeply rooted in their thought. In these cases, they hire labor to cultivate or lend land from others in short term. For water surface in large scale, which requires additional capital to be invested and labor to reclaim, short-term contracts with households are usually applied. Normally, households who have good experience and capital are awarded the land. In addition, the development of other forms of land accumulation, such as hiring and purchase from other households, facilitates intensive production and generated a large amount of commercial products.

Besides above measures, in order to increase income and create job, other ways are encouraged such as increasing ratio of land use, diversifying agro-production, developing non-agricultural business and stimulating migration to larger land regions.

In addition to the achievements as mentioned above, there still remain several problems impeding the transformation of land use. It is necessary to create jobs so as to increase the income of agricultural households in the Red River Delta. In the coming years, it is necessary to attend to the following issues:

- Continue to promote and finalize the granting of land use right to agricultural households throughout the country in general and in the Red River Delta in particular so as to help them develop their production and other activities and speed up the land concentration process and land use transformation.
- It is necessary to help people be fully aware of the fact that land market including land transfer and land lease is an indispensable trend in this transformation process. Following the view that land is state owned, for many years, land purchase has been considered illegal. As a result, people's knowledge of land market has been limited. Currently the Government states that land market should be organized and developed. However, people are only allowed to transfer land use right in accordance with law. In my point of view, if the real estate market including the land market has been formed and made legal, it is necessary to officially recognize land transfers. Both of these factors should be properly incorporated.
- Continue to institutionalize and specify procedures for land transfer in accordance with law. Although land transfer has been stated by law but has not been specified for implementation, which results in the common practice of illegal land transfer. It is necessary to work out an evaluating method for land price to provide the basis for land price estimation to facilitate land transfer and land lease. Estimation

of land price should be determined by supply and demand, potential profit, and close to the market price. We should facilitate the transfer of land use right, creating opportunities for people and business so as to facilitate land assignment for sustainable production and business.

- Promote manufacturing industry and service industry in the rural area. Based on the restoration and development of traditional trade villages and traditional trade, it is necessary to rapidly strengthen those villages and develop new trades, especially labor intensive and high income ones. Rural industry must be connected with urban industry by manufacturing for urban industry in order to attract rural redundant labor force. Rural industrial groups should be formed, especially in localities with well-developed traditional trades. In association with rural industry, rural service activities including production and daily life services should be promoted. The state should issue policies that encourage and promote rural industry development by providing loans, technology and market for localities so as to increase income of agricultural households and promote non-agricultural activities in rural area.

Overview and Perspectives of Agricultural Statistics System in Viet Nam

Nguyen Sinh Cuc

General Statistics Office

1. Roles and characteristics of agricultural statistics system in Viet Nam

Viet Nam is an agricultural country with 76% population are living in rural areas and over 72.8% of labour force being employed in the agricultural sector (including cultivation, livestock, forestry and fishery).

During 15 years of the economic renovation, Vietnamese agriculture has attained very important achievements. The agricultural production has developed rapidly, showing the annual growth rate of about 4-5%, fully meeting food and other non-food demand for both domestic consumption and export with an increasing in volume over the time, as follows:

Items	Units	1985	1990	1995	1999
- Gross paddy equivalent food output	Mill tons	18.2	21.49	27.57	34.25
- Output of paddy	"	15.87	19.22	24.96	31.39
- Output of paddy equivalent	"	2.52	2.26	2.6	2.86
In which: maize	thousand tons	587	671	1184.2	1753
- Coffee (dried kernel)	"	12.5	92	218	509.7
- Rubber (dried latex)	"	47.8	57.9	124.7	248.6
- Tea (dried bud)	"	28.2	32.2	66.7	70.3
- Pork (live weight)	"	560	729	1006	1318
- Aquatic products	"	707	890	1584	2006
- Timber, fire-wood	Mill m ³	3.38	3.44	2.65	2.1
- Concentrated planting forest areas	thousand ha	168.7	100	206	230

Given these above results, in 1998 Viet Nam reached the targeted objects in agricultural production for the year 2000. Agricultural production does not only satisfy food and non-food demand for domestic consumption for total population of 77 millions, but also fulfil requirements for local processing industries as well as for exports in an continuously increasing volume, of which paddy, coffee, rubber and seafood are the most remarkable export products.

Major exported agro-products

Items	Units	1990	1995	1999
Paddy	1000 tons	1624	2100	4600
Coffee (dried kernel)	1000 tons	90	248.1	487.5
Rubber (dried latex)	1000 tons	76	138.1	263.0
Aquatic products	mill. USD	239	600	979

The agricultural sector has played an increasingly important role in the economy, sharing 25.4% of GDP and 45% of total export revenues in 1999.

A comprehensive profile of agriculture development with numerical illustration is likely to be depicted on the basis of the agricultural statistics system. In Viet Nam, the General Statistical Office (GSO) is the sole state authority, which introduces official agricultural statistics information in accordance with the Government's regulations. Therefore, agricultural statistics activities have played a greatly important role because it provides legal and official information that helps the Government in preparing, revising and monitoring socio-economic projects and plans for rural development in particular, as well as for the whole economy development in general. The agricultural statistics information supplied by GSO can be used for analysing the structure and dynamic of agricultural and rural economy, and people's living standards by regions, locals and the whole country as well. Also, these information can be very useful for the purposes of balancing supply-demand in production, consumption, and export regarding specific agricultural products by annual and 5-year periods, acting as a foundation for effectively planning rural and agricultural development policies and strategies in specific period.

In Viet Nam, in term of statistics, all official agricultural information are collected, processed and supplied by GSO. Other information sources can be used as reference only

Accordingly, the Vietnamese agricultural statistics system was established very early (in 1956) and is incessantly improved its organisational structure, staff skills and competence, and especially the professional level of the whole system. Also, it maintains and strengthens the close relationship with agricultural statistics agencies within Ministry of Agriculture and Rural Development (MARD) and Ministry of Fishery (MOF).

During development process, Viet Nam has highly appreciated the experiences in agricultural statistics of other countries in the region and gradually applied it in accordance with given situation of the country's agricultural organisation structure and management mechanism in each period.

Obviously, features of the agricultural statistics system of Viet Nam have resulted from organisational structure and management mechanism in agriculture. From practice in GSO, some major characteristics of Vietnamese agricultural system in term of statistics can be taken into account as follows:

Broadly agricultural sector in Viet Nam consists three major production branches: agriculture, forestry and fishery. However, according to the Decision 75/CP, dated 27/10/1993 on industrial classification of all economic activities, there were only two primary production industries: agro-forestry and fishery. Forestry was used to be classified as primary industry, but now is converted into secondary industry that belongs to agro-forestry group. In the secondary industry group, agriculture and other related services, in turn, are classified into 2 sub-categories: cultivation and animal husbandry. The sub-category of cultivation consists of paddy crop, other food crops, industrial crop, herbal medicine plants, fruit trees, vegetables, bean, flower, herb and other crops. Animal husbandry includes poultry and livestock breeding. In the forestry industry group, there are activities of forestry, and related services such as animal hunting and domesticating. It is noted that, the

veterinary services in this field are excluded from services for animal husbandry development.

With respect to organisational structure of agricultural sector, three former separated ministries: Ministry of Agriculture and Foodstuff Industry, Ministry of Forestry, Ministry of Fishery, are now merged into two Ministries, namely MARD and MOF. MARD is an amalgamation of three former Ministries: Ministry of Agriculture and Foodstuff Industry, Ministry of Forestry and Ministry of Water Resource Management. The re-established MOF is the state authority in charge of fish farming and fishing management.

In provincial level, there are 2 organisations in charge of state authority in this sector: provincial department of agriculture and rural development (PDARD), and provincial department of fishery (PDOF). PDARD is served as state authority for agriculture, forestry and fishery management. In coastal provinces (16 provinces) where fishing and related economic activities account for a large proportion, the provincial departments of fishery are established separately from the departments of agriculture and rural development.

In district level, there is a district department of economic or district department of agriculture and rural development, which is assigned to manage agricultural, forestry and fishing activities.

In commune level, there is a board of economic management staffed with a specialised staff in agriculture.

In regard of production relation, in Viet Nam, the existing agricultural activities have experienced the following forms:

- State-owned sector: 1035 units (575 units in agriculture, 409 units in forestry, and 86 units in fishery).
- Co-operative sector: 6000 units
- FDI related sector
- Mixed sector
- Private and household sector: over 6,000,000 households

Regardless of different production organisation forms, the basic production unit in reality is household, while the state owned enterprises and co-operative units play as service providers. 10 million households out of over 12 million households living in rural areas are being employed in agro-forestry and fishery activities. They are considered as principle production units, from which, the original agricultural information is collected.

As for the role of agricultural sector in the economy: in 1999, this sector absorbed about 72% of labour force and shared 25.4% of GDP and 45% of total export revenue.

The distinguished feature of agricultural production in Viet Nam is small in scale, mainly under household form with self-sufficiency background. Commercial agricultural production, though, has emerged but not highly developed, and is encountering serious difficult problems to meet a commercial size of production especially in the North and Central regions. Production specialisation both in cultivation and livestock is hardly seen, while multi-crops cultivation and mixed activities in household scale are dominated which greatly limit information collection and computation.

2. Agricultural statistics system in GSO

2.1 Organization structure.

In Viet Nam, state statistics system in general, and agricultural statistics system in particular, are organized and managed centrally and led by GSO. Statistics divisions established in each ministry and their branches have a function of collecting and processing internal information useful for management. These units are also considered as component parts of the state statistics system.

The state agricultural statistics system is managed and led by GSO and established administratively from central to district levels.

In central level: The Department of Agro-Forestry and Fisheries statistics (DAFFS)—a major professional statistics department of the GSO—was established in 1956. Over the time, though several changes in name and operation assignment range, its functions and responsibilities has basically been remained that can be understood as: collecting and processing information from and supplying it to agencies at central and local level for the purpose of preparing, managing annual and 5 year development plans, being under the control of GSO and based on statistics methods in agricultural sector. Its organization structure has although been adjusted, basically includes:

- General division
- Agricultural statistics division
- Statistics division of state farming enterprises
- Statistics division of forestry and fishery

In 2000, the department employs 22 staffs (in some years it employed 35 as the highest number) all of them graduated from universities mainly in statistics profession. It has usually 1 director and 2 or 3 vice-directors in permanence.

During its operation, the department has maintained a good contact with other statistics divisions of MARD and MOF: the official information is collected, processed and published by GSO while unofficial statistical information is collected and supplied by these two ministries.

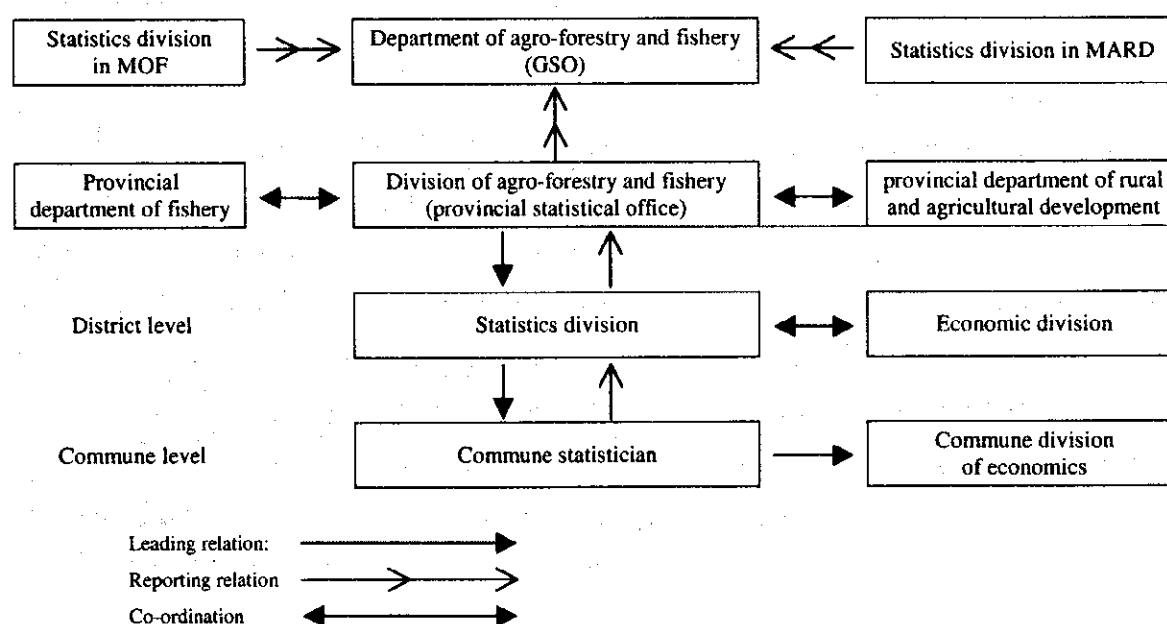
In provincial level: There is a division of agro-forestry and fishery belonging to provincial statistical department. The division has 5-7 employees on average. Its major function is to conduct surveys and to make report professionally in accordance with DAFFS assignment, to process and supply quantitative information required by local government and timely report to DAFFS. The statistics division has a co-operation relation with related divisions in functional departments of the province (department of agriculture and rural development, department of fishery) in order to produce consistent data, however, information and statistics methodology is ensured independently

In district level: a statistical division has 5 to 7 staffs that managed and paid by GSO. This division has

a group specialized in agro-forestry, fishery statistics and strictly collaborate with economic divisions especially in fields of farm visiting, paddy yield and output estimation. Surveys on agriculture and fishery (mainly aims at food indicators) are conducted by the statistics division both in terms of personnel organization, method, as well as data issue on receipt of provincial statistical department' approval.

In commune level: According to government's regulation, there is a statistician who acts also as an administrative officer of commune people's committee. The commune's statistics activities are under the control of people's committee and co-operate with the commune's economic and/or agricultural boards. Due to smallness in scale, the relationships between its activities and the commune's economic and/or agricultural board is much closer than those in district, provincial and central levels.

The following diagram briefly shows the current organization structure of agriculture and food statistics system in Viet Nam.



2.2 Surveys and publication of information in Agriculture and Food Statistics System (AFSS)

Yearly, AFSS conducts following surveys:

Surveys on yield and areas of crops

+ For annual seasonal crops, including:

Winter crops (in the North)

Spring crops (throughout the country)

Summer-Autumn crops (In Central and the South)

Autumn crops (whole country)

For annual seasonal crops only, AFSS generally have to conduct from 4 to 6 surveys, of which, 2-3 surveys on cultivated areas, 2-3 sample surveys on yield of crops.

+ For perennial plant: one survey on newly planted area, productive areas and yield is conducted annually.

Such surveys are conducted to provide officially quantitative information on cultivation, especially on food production for the purpose of meeting leading and executing requirements both at central and local levels. The results also help to balance rice production for local food consumption and for export. In Viet Nam, since food output is an indicator for planning at central, provincial, district and commune levels, data from surveys must be informative to annual, 5 year and 10 year plans for central and local governments. Consequently, both difficulties and advantages are involved. The foreseen difficulties are how to satisfy requirements of leaders at all administrative levels, even though those requirements are imposed or subjective as an ideal of "achievementism". Furthermore, there are rigorous requirements for survey's sample which should be represented for 4 levels or at least 3 levels; requirement of uniting data of food output declared by different agencies and government levels, including two main sectors: statistics and agriculture. Facing with these difficulties, GSO has unified its management, surveys method and information publishing, boosted co-ordination between statistics agencies and agricultural state authorizes.

Surveys on animal husbandry

Two surveys are conducted at 1st April and 1st October respectively every year.

The annual 1st October survey: to investigate number and live-weight of animal herd and poultry in all provinces and cities in order to estimate its output and calculate some indicators such as GO, agricultural production structure, annual growth rate of animal husbandry. There is a change in survey method from entire population survey to sample survey because the former is very expensive.

The annual 1 April survey: to investigate mainly on numbers of pig in representative provinces

Annual survey on labor forces, techno-material bases and cooperatives on 1st July

The main task is to collect information of rural household numbers, agricultural labour force, machines, equipment for agricultural production and cooperative development for the purposes of: balancing labour force, transforming labour structure, implementing mechanism, irrigation and cooperative movement in agricultural sector. For these objectives reach closer to reality, the investigation only focuses on some major indicators: number of households, population, agricultural labour force, major techno-material bases for agricultural production and existing number of agricultural cooperatives running by the co-operative law. Since 1998, the indicator of number of farms has been taken into account.

During these surveys implementation, GSO has maintained a good cooperation with local government and agricultural state organization in organizing and conducting surveys at local level. The extent of cooperation depends on the required information, the best cooperation could be found in survey on agricultural co-operatives.

Survey on non-state forestry sector

The survey is aimed at collecting quantitative information of forestry output attained by households in a year. Forestry production result is shown by several major indicators: dispersed planting areas, concentrated

planting forest areas by households and collective sector, amount of wood and other forest products, forestry protection situation, damaged forestry areas.

The survey is carried out starting at 1st October of a year for 12 months until 1st October of the following year. Nevertheless, since 1995, this survey has been undertaken every 2 years due to financial limitation. The survey methods are combination of direct and indirect interview, sampling and entire population investigation. There has been good connection between central and local levels, and clearly defined responsibilities has been assigned to specific levels and organizations. Given the closed coordination in forestry statistics data publishing, especially in central and provincial levels, information published by each organization and level seems to be consistent.

Survey on fishery

The purpose of this survey is to investigate quantitative information of infrastructure and techno-material bases and output of fishery for a period of one year. The survey is started at 1st October annually and data of a year will be collected. Required information will determine suitable survey procedures. For the indicators of techno-material bases such as number of fishing boats, fishing tools, aquaculture areas, number of cages of fish etc, direct and comprehensive survey to targeted units (commune, region) is applied. While the indirect and sample survey method is used for data collection of output of fish farming or fishing. Specific survey methods are subjected to characteristics and operations of fish farming and fishing activities. For instance, with respect to aquatic products caught on the sea, river, random sampling method based on machine capacity of active fishing boats is applied for data collection of fishing output. As for fish farming activities, sample survey based on current aquaculture areas and specific products such as mature shrimp and fish, juvenile fish, and shrimp breed etc. is applicable.

The diversification and complication of fishing activities require that the survey method should be conducted flexibly in close combination of major sample and complementary sample methods, fishery and statistics agencies, and economic and technical assessments. In the past, the collected information has been based on these combinations, particularly at local level. In central level, nevertheless, poor collaboration between fishery and statistics organizations in term of organizing and operating, partly, as a result of unstable organization structure of MOF, has still existed.

Other irregular surveys aimed to collecting particular information in accordance with leading and executing requirements of management sectors and levels, such as surveys on agro-forestry, fishing production cost for the purpose of calculating intermediate expenditure (IE), added value (AV) in each sector, reviewing farms performance, taking inventory of natural forest areas and agro-forestry land etc., are also conducted. Naturally, these surveys are supposed to be special surveys for specific issues, and undertaken in certain sites in close association with the Department of National Account Management of MARD.

For state farms and agriculture cooperatives, the information collecting methods based on periodical statistics reports can be used quite popularly. However, because of very complicated characteristics in

existing ownership such as households and state relationships within a state farm, diversified information sources and data collecting methods are flexibly combined with periodical and special investigations. Currently, for state enterprises in agricultural sector, GSO is solely responsible for collecting quantitative information. The qualitative information investigation is task of statistics of MARD. Generally, the cooperation between professional statistics and statistics of MARD has run well in many years. Nevertheless, in view of much changes in organizational structure of statistics in state enterprises, as well as more complicated activities resulting from operations, the information collected from state enterprises currently shows a lot of problems in term of both quality and quantity.

3. Problems in agricultural statistics organizations and solutions

Agriculture and food statistics has been organized vertically, ranging from central to local levels and run by GSO, which acts as a state authority for statistical activities. The thorniest and unresolved issue of the existing statistical system is that statistics organizations are managed vertically in term of profession, personnel, and salary payment while their tasks are operated by localities (districts or provinces) under the direct influences of local governments to a certain extent (communist party and social unions). In other word, local statistics agencies are under double-control system, consequently, the information would be biased by subjective points of view. Indeed the food output was declared higher than the reality due to reputation consciousness among a number of local leaders. Practically, checking results carried out by GSO in some localities revealed that the problem was very serious. In 1996, 1997, 1998 food output reported 3, 1.5 and 0.3 million tons higher than in reality, respectively. In contrast with food, collected information of coffee, rubber and pepper production was lower than reality. Inexplicably, their real export amounts were higher than reported outputs in the past three years. In 1998, GSO implemented a check on coffee production and found a big problem in terms of under-reporting outputs, mainly caused by the fact that enterprises and households had hidden actual outputs and planted areas for purpose of tax evasion. In 2000, GSO is going to check rubber output in some provinces to solve that problem.

Therefore, it is suggested is to reinforce organization of statistics agencies, and to enhance the co-ordination between statistics, agriculture sectors and local governments in managing and checking activities.

At commune level, professional statisticians are not available. Accordingly, it is not surprising that surveys on agriculture usually conducted in commune scope, but required non-statisticians who have a poor knowledge on statistics and/or district statisticians to carry out. Both ways have made separation between statistics profession and real situation understanding, which does not ensure the continuity and succession of statistical activities in communes. The effective way to address this issue is to train commune concurrent statisticians with professional skills.

Regarding professional skills: Usually, government at all levels is in need of information on agriculture

and food performance, hence, survey samples are required to represent for situations of that locality (information of paddy yield as an example). Meanwhile, due to limitation of budget and human resources on statistics only requirements of higher leader levels (provincial/ district levels) can be satisfied. To settle those conflicts, some localities have conducted their own surveys or expanded size of survey sample, which make survey procedures become more complicated. In view of different information sources, difficulties appeared in analyzing and assessing agriculture and food situation in localities are understandable. In addition, according to recent regulations, investigating and collecting information based on administrative levels must be received the verification and approval of local government, which have violated the objectiveness and independence of statistical information. In most cases, results reported by agencies at lower level are far from data collected from sample surveys at higher level, especially information of food output. So, it is essential to strictly implement statistical principles, procedures of data processing and publishing in which statistical information of agencies at a lower level must be processed and declared directly by that at higher levels.

The parallel existing of both agriculture and food statistics systems have revealed some difficulties and problems. In compliance with government regulations, state professional statistics is responsible for collecting all of official information of agricultural and food production (both production results (yield, output, effectiveness etc.) and productive conditions (land, labor force, machines etc.). While the statistical activities conducted by MARD and MOF are concentrated on collecting and supplying information related to production progress, technical, varieties, intensive farming and other daily activities of enterprises and cooperatives). This assignment has shown an advantage by specializing in statistics but revealed a problem of discontinuity. Although there has been certain cooperation among these agencies, it is impossible to make such integration as a unanimous statistics system. Both systems have two different professional staff collecting and processing information, obviously resulting to different assessment of agricultural production in general and crop cultivation and husbandry in particular.

To overcome these constraints, MARD and GSO have periodically held discussions at all administrative levels. Nevertheless, it has been undertaken differently by localities so that outcomes of such cooperation were very limited. In many cases, cooperation only appeared in meetings and field visits while collaboration in conducting surveys, reviewing and assessing collected data is rare to see. In some cases, although there is a good cooperation among professional staffs on an individual basis, outcomes are not necessarily accepted by leaders. This phenomenon takes place in districts or provinces often, in which leaders of agriculture authorities have simply agricultural profession and little knowledge of statistics and economics. For example, only in paddy yield assessment, professional statistician observed on the basic of average weight actual yield obtained by household, but agricultural professional staff usually assessed based on high yield varieties collected in field. Hence, paddy yield informed by statistician was often lower than that by agricultural staff at commune, district, and provincial levels. At the central level, generally, there have not been differences in information supplied by MARD and GSO and usually information declared by GSO is commonly used (only in inception

report it may be different). Such limitation was resulting from the fact that statistics of agricultural organization in local levels has been weak in terms of both number of staff and their knowledge of statistics. Statistics divisions in MARD is also in the same situation, so that have not enough ability to provide suitable regulations and guidance to lower levels and make periodical report to GSO as required.

In fishery sector, the statistics organization is even weaker and more unstable, there are very few staffs with limited ability, so they are not corresponding to the requirement of collecting and processing information in this sector as their assigned functions. The co-operation between fishery sector and GSO is still poor in several aspects. Those reasons lead to low quality in fishery activity information supplied and not meet the managing requirement of state authorities in this sector.

Solutions would be enhancement and upgrading of the statistics divisions in both ministries, MARD and MOF, simultaneously, to build up a plan to tie up cooperation between MARD, MOF and GSO.

The agricultural, fishing production and related service units are numerous and scattered (about 12 millions). Moreover due to complicated interrelationships among different economic sectors and small sized production, it is very difficult to collect information and data. Organization structure of state authorities in agricultural sector has been unstable at all levels leading to unsuitability of agricultural production system. Furthermore, organization and staff competence of both state statistics and agricultural statistics in agricultural sector are weak and in shortage, especially at local levels. The gap between required information and supplying capacity has been wide. It is suggested that improvement in statistical profession, especially focusing on sample survey method be conducted as soon as possible.

Noticeably, financial constraint in agricultural and food statistics is a serious problem. Total budget for statistics on agriculture, forestry, fishing in the entire country for 1999 was about VND 6 billions, in 2000 it is expected of VND 6.5 billions (equivalent to USD 430 - 450 thousand). On average, there are VND 105 millions for a province and VND 10 million for a district. Therefore, the actual amount of payment for all information collecting activities in a district is only VND 1 million on average (the highest number is VND 2 millions only). At central level, DAFFS has been operating as an administrative agency, without having independent budget so it cannot take initiatives of conducting surveys in the whole country. To settle professional problems emerged during surveys, such as verifying and checking, re-investigating some important survey sites that are exposed to mistakes, DAFFS has had to make budget plan for unexpected surveys (verifying surveys on paddy yield and output in 1996-1997, coffee, fruit trees in 1998, farms in 1998, rubber in 2000).

Given such limitation in budget, the agriculture statistical operation in GSO has been facing a lot of difficulties. To overcome the problem, many statistics agencies at provincial and district levels have had to look for subsidy from local budget. Being tied by local financial resource, statistics activities have been obviously influenced by local leaders, which in turn confine the independence and objectiveness in statistical activities.

Due to financial limitation, statistics cannot be able to pay the survey objects (interviewees) as seen in

other sectors (multi-purposes surveys) or in other countries. Consequently, households, which are is taken as interview samples, unwillingly provide necessary information. Some households, who are selected as fixed sample of annual surveys on paddy yield and pig breeding supplied inaccurate information. Such situation leads to difficulties in investigation process of statisticians.

Limited financial resource and poor staff capacity in agriculture and food statistics have still been the thorniest issues that needs to be settled as early as possible.

Also because of financial limitation, several annual surveys have to be converted into 2-year surveys, and heavily depend on local budget (e.g. forestry and fishery sector). Census surveys were not undertaken yet (in fishery sector for example) or have been expanded the intervals (in agricultural sector). Given the absence of essential census surveys, the agricultural statistic system have been facing with serious shortage of comprehensive information of land, labor force, machines, equipment and other elements for production and related services activities.

Our suggestion emphasizes to set up suitable financial norms for specific types of survey, concentrating budget for some major surveys, changing of some small annual surveys to five-year surveys (in forestry sector and cooperatives).

Obviously, in existing agricultural statistics organization structure, there is a shortage of function of collecting, processing and supplying information of rural economy. This very week point results in under-satisfaction to be seen from the view of government's leaders at all levels because a lack of quantitative information required to implement the strategy of structural transformation in rural economy and industrialization.

Solution: Function of rural economy statistics should be reviewed and amended in integration with agriculture, forestry and fishing statistics of the DAFFS.

As a major and complicated profession, agriculture, forestry and fishery statistics nevertheless has not yet received any additional support from government or international agencies. This reality is considered to be a barrier which restricts the statistics sector from improving staff skills, completing reporting procedures and survey methods, as well as deepening quality of information to supply for state authorities and international organizations.

4. Content, scope and method of collecting and processing survey information and computing major indicators for agricultural statistics in GSO

4.1 Cultivation: land, yield and crop output

Cultivated land, yield, output of crops are fundamental indicators in cultivation statistics.

Those three indicators usually vary over cropping seasons annually.

- In Viet Nam, a household is defined as a basic production unit, which produces over 90% of total agricultural products annually.

- As for households, it is impossible to use periodical reporting procedure to collect information, therefore professional surveys are carried out in evaluating production outcomes of each type of crops by seasons every year.
- In Viet Nam, several crops are cultivated and harvested within one year, thus it is necessary to specify reasonable cropping seasons of major crops in the whole country in order to avoid overlapping in information collection and to ensure the unification of indicators in different time and regions.

For paddy crop: three cropping seasons are officially determined:

- Winter-spring paddy
- Summer-autumn paddy
- Autumn paddy

In Mekong River Delta, four paddy crops can be cultivated in a year, but it must be converted into three main paddy seasons as above defined.

For other crops: There are following two cropping seasons specified in a year.

- Winter-spring crop: Includes crops that are grown in January and harvested in June.
- Autumn crop: includes the crops that are grown in July and harvested in December.

Based on the unanimous classification of cropping seasons for specific crop groups in the country as whole, statistics surveys should be conducted annually for collecting and assessing the information of planted acreage, yield, output of each crop in each season.

- For planting acreage, entire population survey method is applied.
- For yield and output, sampling survey and then inferential statistics procedure to estimate those for the whole country are applied.

4.2 Information collecting methods

For planning acreage in case of entire population investigation

Commune as survey's object

Communes inventory its cultivated land twice a year (in winter-spring, and winter season crop);

Cultivated land is determined based on the following information sources:

- Inventory report of the village/hamlet of each chief on the planted area of each crop in his/her village/hamlet.
- Report on implementation of annual crop structural transformation in each village/hamlet; annual plan of the commune people's committee or commune's agricultural extension group.
- In combination with reports on planting area of each crop, data on agricultural land use are

provided by the land officer of communes.

Based on the above information, the commune's people's committee organizes a inter-sector group (consists of statisticians, financial officer, land officer, agricultural officer, representative of farmer's union) to conduct an inspection about changes in planted acreage by crop in each village, then prepares a report on commune's cultivated land situation by cropping seasons to submit to the district statistics department, reasons for changes are of course included in the report. The district statistics division then makes a general report of whole district, which is forwarded to provincial level. On receipt of reports from districts, the provincial statistic department then prepares a general report for the whole province so as to submit to central level.

Yield and output of crops (sample survey)

For paddy crop:

Since 1996, GSO has conducted surveys in sample method on paddy yield and output in the whole country.

The method is directly interviewing agricultural households on dried and purified paddy amount that they have obtained in their cultivated areas.

This survey is called "surveys on actual output of paddy obtained by household"

All districts where paddy production is available shall implement the survey.

In district level, the survey procedures consist of two steps as follows:

Estimating paddy yield:

All communes within district have to report on estimated paddy yield to district statistical office twice a year.

- The first report takes place when heads of grains of paddy begin to form (paddy in ear in most fields)
- Making the second report when the grains are well formed.

District people's committee organizes an inter-sector group (consist of statisticians, financial officer, planning officer, agricultural officers) to implement an inspection tour in important communes so as to review and reevaluate estimates prepared by these communes.

Conclusions of the inspection group will help the district statistical office to adjust the figure of paddy yield in the whole district in accordance with real situation.

The estimated paddy yield is not only useful for management requirement of the district's leaders but also provide an important base for surveys conducting after paddy to be harvested.

Conducting survey:

Sample survey method is applied in all districts with instructions from GSO.

Based on experiences of pilot sites surveys in several previous years as well as on the real situation of regions, cultivated areas, number of communes, changes of paddy yield in different regions, financial budget, cadres' skill in district and commune, the GSO determines that, in each selected district there must be only one sample site and household is considered as sample unit.

Survey on yield and output of other crops

For other targeted crops, the survey is only conducted in main communes, in which large cultivated areas of those crops can be found.

On average, three communes are selected from a district for targeted crops (the first one has high yield, the second moderate yield, the third low yield.)

Respectively, in each commune, three villages are sampled and only 10 households are selected per village. (Process of selecting sample villages and households is similar with that to paddy)

For substantial crops of the district, the size of sample could be expanded while it should not be larger than the commune's paddy crop sample size.

Especially, for crops such as coffee, tea, rubber, mango, longan and litchi, it is necessary to pay attention to two indicators:

- Growing area
- Productive area.

In term of statistics, for perennial crops yield identification, only productive area are considered.

Therefore, the survey on perennial crop output, investigation is focused on identifying the productive area and yield on those areas only. The output is calculated by the following formula:

$$\text{Output obtained from productive area} = \text{Yield on the productive areas} \times \text{Productive areas}$$

Nevertheless, certain amount of output will be omitted if output for the first time (this amount is collected from newly planted area) is not added. Therefore, in practice we have:

$$\text{Output of perennial crop} = \text{Output in productive area} + \text{Output in the first time harvested area}$$

Therefore, it is necessary to add estimated output obtained in newly planted areas for the first time to total output from productive area to have actual output produced in the targeted year.

4.3 Animal husbandry

To collect information of animal husbandry situation, GSO annually conducts surveys on 1st October and 1st April. Survey procedures in each level are described as follows:

Survey organizing

Responsibility for conducting survey is assigned to three levels: Central level: GSO; Provincial level:

Province's statistical office; and district level: district statistical office.

Content of the surveys

The surveys undertaken on 1st April and 1st October are different both in the content and scope.

The survey conducted on 1st October:

The survey is undertaken in all provinces with the following activities.

- Investigating number of: buffaloes, plow buffaloes, oxen, plow oxen, milk cows, pigs, sows, pigs for food, poultry such as chicken, duck, wild-goose, horse, goat, sheep, stag, bee-hive.
- Investigating GO of animal husbandry's products, including: GO of live-weight of slaughtered buffaloes, pigs, number and output of live-weight pigs, milk, poultry, egg, honey, silkworm cocoon.

The survey undertaken on 1st April:

The survey is conducted for collecting data on number of pig and herd of sow in 14 provinces representing all regions of the whole country including Thai Nguyen, Yen Bai, Bac Giang, Hai Duong, Nam Dinh, Nghe An, Binh Dinh, Lam Dong, Ho Chi Minh city, Tien Giang, Can Tho, Long An, Dong Thap and Vinh Long.

Surveys procedures

The survey undertaken on 1st October:

Investigating number and output of livestock, in which animal and poultry are classified into three categories and applied three different methods of data collection including number of buffaloes, oxen and pigs; output and number of poultry and number and output of other animal such as horses, goats, sheep, stags, bee, silkworm cocoon, milk cow and milk.

Investigating number of buffaloes, oxen and pigs

Conducting in all districts in which some households are selected as sample by two levels sampling method.

Primary level: Sampling representative communes:

Applying stratified sampling method. Based on ecological, economic, animal breeding custom situation of communes within district to classify communes into 3-5 different zones. Choosing 1 commune as a representative for each zone. Therefore, there are 3-5 communes representative for the district. Commune to be selected must satisfy the following criteria: number of pigs per household equal to that of the zone; typical traits in socio-economic condition and animal breeding performance; was selected in the last surveys on 1st October, statisticians and veterinarian with qualified capacity for conducting the surveys.

Secondary level: choosing sample villages and households:

In representative commune, choosing 01 village (or production group) that was selected in the last survey on 1st October and have the number of pigs per household equal to that of the commune. All households within the villages are selected for interviewing.

4.3 Forestry sector

Up to now, there have been 2 mechanisms of collecting data in forestry sector: For state forestry enterprises, the data collection is implemented through periodical report. For non-state forestry sector, sample surveys are applied.

Collecting data from state forestry enterprises

This sector has an independent accounting system, for this reason, the information collection is implemented through periodical reports.

In 1995, GSO cooperated with MARD to promulgate the statistical report system applied for several forms of forestry enterprises such as executing board of forestry projects, state enterprises, sharing companies, general corporations, provincial departments of forest security etc.

The statistical report in forestry sector contains quantitative indicators that are suitable with both state authorizing in macro level and enterprises. These terms includes:

- Gross Output (GO) of forestry production by ownership at constant price of 1994 and at current price. This statement is reported one time a year.
- Producing, products marketing situation and revenue of enterprise: This table shows the production, marketing results mainly in physical or value terms (such as indicators of concentrated forest planting, protection forest, dispersed forest planting, forest protection contracting, forestry investigation, timber logging, fire wood collecting, bamboo, paper materials, rattan, forest products marketing situation of timber, fire wood, products inventory, tax payment.) This statement is reported monthly, quarterly, and annually.
- Situation of forestry management and protection: This includes the indicators of forest land awarding, area and value of damaged forest caused by fires and burning for agricultural production. The statement is reported every six-months.
- GO and Intermediate Expenditure (IE), Added Value (AV) of forestry sector. AV of forestry sector is divided into income, mixed income, tax, depreciation and profit. IE is determined at current price. This statement is reported annually.

Collecting data from non-state forestry sector

Non-state forestry sector has also played a substantial role, accounting for about 70% GO in forestry sector. Some forestry activities such as dispersed forest planting, collecting firewood, and bamboo has been carried out by non-state sector.

Thus, determining a suitable method for collecting data from this sector is very important.

Non-state forest production is largely run by households, widely dispersed, thus the sample survey should be the main method.

The survey has conducted with the cooperation of MARD. The content and method of the survey has

been improved continuously, and become quite perfect nowadays. The survey is conducted in the whole country.

The object of the survey is dispersed forest plants including forestry plants in household gardens, shadow plants in roadside, plants growing between industrial crops, fruit trees for purpose of wood logging, environment and field protection and water holding. Some special plants such as lace tree, palm tree, garden bamboo, cinnamon tree are defined as forestry plants. Dispersed plants are defined as plants grown in less than 1 ha.

Organising the survey

The survey on forestry is conducted by professional statistics organisation in cooperation with rural and agricultural development agencies from central to local levels. Statistics organisations have responsibilities for professional skills, preparing the survey schedule and organising training of local staffs in discussing with agricultural organisations. The agricultural and rural development organisations in association with statistics organisation have responsibilities for preparing the budget plan to submit people's committee (at respective level) for approval and participating in the survey.

The survey method to investigate dispersed forest planting has been used for more than 10 years. So far the results from the survey reflect the reality. However, in coming years, it is necessary to give more specific instructions on zoning and sampling procedures.

4.4 Fishery statistics

Statistical information of fishery sector, up to now, has been supplied by two sources: one is by professional statistics organization (GSO) and other is by statistics divisions of MOF.

Fishery statistics activities in DAFFS

In accordance with the current regulations, since 1995 DAFFS has operated fishery statistics, which comprises of fishery and aquaculture activities as well as related services, namely:

- Breeding salt, brackish and fresh water shrimp and fish in all kind of aquaculture water surfaces (pond, lake, river, stream, coastland areas etc).
- Cultivating gracilaria, seaweed, alga, etc. for food
- Fishing in off-shore, on-shore, river, lakes and collecting mollusk living in salt, brackish and fresh water.
- Catching aqua-animal such as turtle, trionytrid turtle, turtle-shell and other carapace animal, sea-urchin and other species of invertebrate animal.
- Collecting some materials from the sea such as pearls, swallow's nests, coral, sponge, seaweed etc.
- Processing sea products on boat.
- Supported services related to activities of fishing, aqua-culture, and processing as well as aquatic

variety germinating.

Briefly, DAFFS is responsible for collecting and processing information of fishery production excluding activities with regard to fishery products marketing, processing, and capital investment for construction in the fishery sector.

Since 1996, in accordance with statistical regulations issued by DAFFS, the local statistics organizations have conducted annual surveys on non-state fishery on 1st January to collect quantitative information of common situation and output from aquaculture and fishing activities in the reporting year. While the periodical reporting procedures have been applied alternatively for the state sector of fishery.

Based on the results of annual fishery surveys (for non-state sector) and of periodical reports (for state sector), the provincial statistical office has to submit to GSO the following reports.

- Aquaculture performance.
- Fishery product output.
- GO of fishery sector.
- IE and AV of fishery sector.

Since 1999, the following reports have been supplemented:

- Basic situation of fishery production.
- Off-shore fishing situation.

The method of annual survey on fishery

As assigned, fishery statistics reflects the activities of fishing, aquaculture, and supporting services, the following two parts must be conducted:

- a. Production condition (basic situation and techno-materials bases) includes: number of production units, labor employed, equipment (fishing boat, machines, fishing tools, fish source, ports, related services activities etc.
- b. Production results include: output of fishing products in year, GO (including fishing and aquaculture sector by ownership in fresh, salt, brackish water).

Different survey methodologies are applied

In term of production conditions or basic situation and techno-materials bases for fishery activities, the survey is conducted in all communes, which have aquaculture and fishing activities through direct interviews or reports of grassroots statisticians.

Tasks of the comprehensive survey on fishery production conditions at the commune's level are assigned entirely to the district statistical office. In view of an entire population survey on fishing production is not

available in Viet Nam, no strong foundation to ensure the accuracy of the collected information on basic conditions of fishery production, especially in localities where information sources mainly made from reports of related communes. Nevertheless, results of the surveys are essential for estimating GO as well as others indicators such as labor, number of fishing boats, aquaculture areas for the entire locality.

Survey on output of fishery products:

Given statistics of fishery output is a complicated task and conducted in large scale, in context of lacking necessary conditions for entire population surveys to be implemented, the sampling surveys on fishery statistics have been conducted.

In accordance with the plan of non-state fishing surveys—No.138/TCTK-NN, dated 20th March, 1996, sampling surveys are applied to collect data on total fishery output, output per capita, per fishing boats (or machinery capacity unit), per aquaculture area unit then the statistics inferring method are used for computation of general indicators for the entire targeted region.

Zoning

Each district or town can be considered as a survey site which is divided into specific zones based on the natural conditions, the fishery production development level and the information sources from the entire population survey on agriculture and rural areas undertaken in 1994. The following zones may be found:

Zone of fishing: Including communes, towns having many fishing households and labors engaged in fishing activities, mostly located around coastal land, rivers, large lakes, islands where rich fishery resources are available for exploitation

- **Zone of aquaculture:** including communes having large water-surface area (salt, fresh, brackish water), which is used for aquaculture in concentration for commercial purpose and attract a lot of skilled labors.
- Other places that have very high valuable potential of fishery production, it is necessary to classify them into specific zones such as zone for shrimp raising, zone crab raising, zone of raising fish in cages, oyster raising etc.
- Other zones that are not to be able to classify into the above two zones: where fishing production activities is in small scale, dispersedly or can be only recognized as a secondary business.

Sampling procedure.

Based on zoning classification, survey samples are selected by two levels:

Primary sample - representative communes: sorting communes administratively. In each zone, 2-3 communes are selected as survey sites.

Selecting the first representative commune in random. From the position of the first commune, the second and third commune positions are determined by adding or reducing K. K is class-width and can be defined by:

$$K = \frac{N}{n}$$

N = number of communes within entire zone
n = number of necessary representative communes

Representative communes need to be checked carefully before selecting the secondary sample. It is possible to form 2-3 primary samples then select the best one.

Secondary sample - survey unit:

In cases fishery enterprises (co-operatives, individual enterprises, joint venture companies etc.) appeared in some representative communes, it is essential to survey all of them.

Procedure of collecting data from sample units:

Information is collected through filling in printed questionnaires based on interviewing the head of selected units and referring to recording books (if any).

Generalizing and inferring results:

- General district survey results by zones.
- General sample indicators by zones
- Computing average indicators by zones
- Output of each fish-farm product per specific aquaculture area.
- Output of each fishing product per capita, ship or machinery capacity unit

Statistics inferring method:

Statistics inferring procedure for collected information of each type of products by zone can be calculated by the following formula:

$$\text{Inferred indicator} = \text{Sample indicator} \times \frac{\text{Population indicator as a base for inferring}}{\text{Population indicator as a base for inferring}}$$

The population indicator as a base for inferring is selected in survey results (table 1 in questionnaire of entire population survey)

4.5 GO, IE, AV in agricultural sector in Viet Nam.

Basing on the SNA methodology, determination of GO, IE and AV is annually carried out in accordance with the following steps.

At current price

GO, IE, AV in the agricultural sector are computed for the whole country and every province, city. GO is determined by the following formula:

$$GO = \text{Output of products produced in year} \times \text{Average unit price of agro-products sold by farmer}$$

Volume of products produced in year is specified in calendar year and estimated by agricultural statistics.

The controversial question is how to determine the price of each product? In Viet Nam, nowadays, the

price of agricultural product is specified by several ways.

First, based on result of surveys on agricultural product price in the rural market that conducted by commercial statistics agencies.

Second, based on result of surveys on agricultural product price in the urban market, by subtracting transportation & commercial cost (usually about 5-7%) from it.

Third, establishing input-output balance sheet for each major agricultural product. Based on amount and value of various elements used in production process such as: a part of output keeping for seeds, for animal breeding, self processing, domestic consumption, selling out, export, tax payment, reserve etc. to deduce the average consumption price that is considered as the average agricultural product price.

$$P = \frac{\text{Total value of consumed products}}{\text{Total volume of consumed products}}$$

Using the price defined in the third way to calculate GO, product volume transited from last year and to next year.

The third way of price identification differs from the rest, which ensures the consistent of GO produced and GO consumed in year. However, it requires more complex information.

Determine IE of agricultural sector at current price

Based on result of surveys on agricultural production cost (cultivate, animal husbandry, related services) conducted by Department of SNA (within GSO) to determine the rate of IE and GO in each agricultural sector and each province and region.

The above information source does not come from annual survey but survey in a given year and to be used for several next years so, data is less accurate.

Determine AV of agricultural sector at current price

$$AV = GO - GO \times \frac{\text{IE obtained from sample surveys}}{\text{GO obtained by sample surveys}}$$

Determine AV of agricultural sector at constant price of 1994

$$\text{AV at constant price of 1994} = \text{GO at constant price of 1994} - \text{IE at constant price of 1994}$$

Determine GO of agricultural sector at constant price of 1994

The constant price was issued by GSO in 1994, which defined that price of agricultural product sold by farmer in winter season in 1994 was considered as average price in the whole year of 1994.

Calculating GO of agricultural sector in the whole country as well as in localities can be seen from:

$$\text{GO at constant price of 1994} = \text{Output of agricultural production in current year} \times \text{Constant price of 1994}$$

What happened when the above method is applied?

+ GO of agricultural production in the whole country differs from the total of 61 provinces because

GO of each province is not equal to adjusted output in country scale.

- + Price that obtained in the autumn cropping season differs from average annual price.
- + Price of items in constant price is defined for the whole country; therefore GO at constant price does not bring up exactly the reality of each province. In some cases, GO at current price is lower than that at constant price of 1994.
- + To limit the above conflicts, some provinces have calculated average price of agricultural product at current price of 1994 and then multiply it to the output in current year to derive GO at constant price of 1994.

Determine IE of agricultural sector at constant price of 1994: Mainly based on the rate between IE and GO at current price to estimate. It could be seen from the following formula:

$$\text{IE at constant price} = \frac{\text{GO at constant price}}{\text{GO at current price}} \times \frac{\text{IE at current price}}{\text{GO at current price}}$$

Determine GO, IE and AV by quarters and every 6 months

Since 1999, statistics agencies have estimated GDP by quarter and every 6 months, which required the information is both comprehensive and in detail. Especially cropping seasons in different regions in the whole country differ from quarters or every 6 months. Statistics of output for each crop are not taken every quarter or six months. Further difficulties are found in animal husbandry activities, since only two surveys are carried out on animal husbandry on 1st April and on 1st October. Accordingly dividing agricultural production activities by quarter is not easy and takes several years to complete.

Determining IE in agricultural sector is also quite complicated. It is unreasonable to apply the ratio of IE and GO of the whole year for computation of each quarter or six months. It is essential to conduct surveys by each quarter or six months on each crops and types of animal breeding.

Information requirement for determining GO, IE and some solutions

Information of output of each crop or major animal breeding must be fully, timely and exactly supplied. Based on that, GO in agricultural production at constant price throughout the country is computed by summing up GO of all provinces. The information supplied is classified by ownership, economic region, province, and in quarter and every 6 months. Those difficulties have not been overcome in the past years.

Computing GO at constant price follows the constant price table of 1994 or of 2000 (as found in other countries) or by price index. Nowadays, almost all countries are no longer using constant price table but price index, a new concept to Viet Nam. Commercial statistics has conducted surveys on price to identify the price index of agricultural sector, though price index is not highly representative. Especially, it has not been applied for each province, region, so it has not been used for detailed calculation process.

To calculate average price of products sold by farmer (farm gate price), it is required that information be in detail of: (i) amount of agricultural products and its price when producers sell them; (ii) amount of seed

and its price; (iii) amount of products and their prices when agricultural households buy them; (iv) amount of domestic consumption of agricultural households etc.

Based on collected information, building up input-output table for cultivation and animal husbandry for each province, regions and entire country. Average prices in entire country must represent for all provinces and regions. However the ability to collect the above information has been limited leading to low accuracy of average price.

GSO, in cooperation with MARD collects data from state enterprises and conducts periodical survey on agricultural production cost. Thus, it is essential to unify the content, scope and method of data collection, statistics inferring and generalising procedures. The following questions are worthwhile to be mentioned:

Is livestock breeds produced by farmer themselves taken into account of IE in their production?

Are fees of agricultural supporting service supplied by state sector or implemented by agricultural households themselves calculated into IE?

How to determine IE by quarter and every six months and by region ?

How to determine expenditure structure of breeding cost? (High yielding varieties produced and consumed by agricultural households themselves for each agricultural product) in order to determine exactly IE in agricultural sector

The information to determine the level of home consumption products

How to assess animal herds, fruit orchard to calculate production means?

How to distribute banking, insurance fees in IE of agricultural sector?

Up to now, information of secondary business, by-products in rural area has not been available. Hence, there is an urgent need to conduct survey in coming years.

Classifying GO, AV of agricultural sector by ownership in order to determine institutional sectors in SNA system is of urgency. Therefore, it is necessary to divide separately economic ownership into such as state, collective, private, mixed, individual and household sectors.

4.6 Households, agricultural and rural population, machines and equipment for agricultural production and cooperatives

- Collecting information concerning household members, active labour force, capacity and technology for carrying out agricultural, forestry and fishery production is the basis of producing the labour allocation plan, investment plans for agriculture, forestry and fishery.
- Requirements: collection of the full and exact data of survey objects
- Contents of the surveys consisting of: (i) households, population, labour force employed in different business in rural area and those of agricultural sector in urban areas. (ii) Number and capacity of some main equipment and machines in agricultural, forestry, fishing production in both urban and rural areas.

Objects of survey: all households living in rural area, and agricultural households in urban areas, economic units of state, private, individual, mixed sector (including foreign funded units)

Scope of the survey: survey is conducted in all localities, economic sector and rural and urban areas (their criteria as defined in the census)

Questionnaire

Household, population and labour

Including indicators of households, population, labour employed in different business in rural areas, and those working in agricultural, forestry, fishery sector in urban areas. These indicators are classified by economic ownership. Labour is defined as person who is in age of 16-60. For state sector, and private enterprises, mixed sector the range of labour's age is 16-60 for male and 16-55 for female.

Main machines and equipment

Including total number of tractors, in which, big tractor (over 12 CV of capacity), small tractor (equal and less than 12 CV), some others machines, tools for agricultural, forestry and fishing production such as: water pumps, threshing machine, food grinder machine for animal breeding, pesticide spraying machine, power saw machine, fishing boat and junk, truck with frozen system, truck specialised for wood transport.

Method of interview:

Because of very large-scale of the survey and financial limitation, it is impossible to conduct the survey annually. In order to limit some difficulties, GSO requires localities to conduct sample survey at beginning and the end of 5-year plan:

In 5-year plan period of 1996-2000, the surveys were undertaken in 1996, 1998 and 2000. In years of interruption, provincial statistical offices prepare reports to GSO based on the last survey results and changes in population. Whether data are drawn out from surveys or estimated ones, any sudden changes or mistakes should be reported and carefully explained.

For enterprises of state, collective, private, mixed sector that have head offices, basing on personnel table to collect, and adjust information properly with real situation of enterprise before recording.

For number of machine for agro-forestry and fishing production, since they vary from different localities, it is impossible to use procedure of statistics inference. Hence, based on last year data set, major changes in new purchases, selling, repairs, damages can reasonably determine numbers of machines used in the locality. Regarding machine capacity, it can be referred to samples. Capacity of machine usually recorded on machine's shell, nevertheless it is difficult to collect in practice because it deteriorates in the course of time and owners do not remember exactly. Generally, average capacity of machine is used to infer other identical machines.

Timing date of the survey:

The survey is conducted on 1st July every year and its results are submitted to GSO on 10th August.

4.7 Contents of the census of agriculture and rural area conducted for the first time in 1994

In compliance with the Decision of Prime Minister and the plan of census of agriculture of GSO, the purposes of the survey was: "collecting fundamental information to assess the existing situation and potential of agriculture and rural area as the basis of preparation of the socio-economic development strategy and the 5-year socio-economic development plan (1996-2000) for the whole country and localities". On the other hand, from professional points of view, the survey provides a list of households in agricultural, forestry and fishery sub-sectors as basis to design sample frame for other annual surveys. The collected information is the original data source to make comparison and appraise the socio-economic performance for the period.

These above purposes determined the following four major contents of the survey:

- a. Basic information of rural households
- b. Infrastructure situation of villages and communes
- c. Income, consumption, and accommodation situation of rural households
- d. Rural economic structure (consisting agricultural, forestry and fishery sub-sectors) and effectiveness of cultivation of major crops.

The survey method: The survey process took place in 2 periods:

First: Conducted the census of agriculture for all rural households (including enterprises engaged in agricultural, forestry and fishery) in 1994.

Second: Carried out the sample survey (on 3rd and 4th contents of the surveys) in 1995.

Direct interview method to the head of household or representative household was applied for both surveys in avoiding indirect interview. To ensure the quality of collected data, the data must be collected through direct interview then comparing it to other information sources on household operational land, contracted cultivation land etc, and combining with intuitive observation on durable appliance, main machines, housing situation, and recommendation of village chiefs. During the survey, surveyors were required to carefully record and check data to ensure its clarity and accuracy. In addition, strict checking and monitoring by inspectors at local level and the local survey steering board ensured the quality of collected data.

The first census of agriculture and rural areas in Viet Nam was conducted during two years or time and at the end of 1995 the survey process including printing and publishing were completed. It is carried out in a shorter period than done in other countries. Such a large-scale survey has been conducted in Viet Nam for the first time that involved in about 9,616 communes, 71,952 villages, hamlets, and 11,974,515 households, 1,658 state-owned production units in agricultural sector with population of 57,088,078 and 27,380,589 active labour force. Achievements of the survey in terms of objectives, requirements, contents and method resulted from the following reasons:

- The survey had been prepared and referred to international experiences for several years. The

content was proposed reasonably (not only in agricultural sector as done in the world, but also entire rural areas) that satisfied the management requirements at local and central level, so it was actively supported (even financial support) from leaders at all levels and sectors. The survey results on situation of rural households, rural infrastructure, rural economic structure and rural living standard not only provided the great help for evaluating rural socio-economic situation and agricultural production during the time of 5-year plan implementation (1991-1995) in central and localities but also acted as a basis to formulate socio-economic development policies in period of 1996-2000.

- The survey was perfectly organised in which staff training activities were assigned clearly from central level to localities. Timing of the survey was appropriate for mountainous, midland, delta areas and other regions. Statisticians at central level were assigned to supervise closely each locality from the beginning to the end of the survey (5-6 months), leading to the assurance of the close coordination among different levels.
- Survey expenditure was timely met for each step, especially in terms of payment to surveyors at grassroot level and the local survey steering boards.
- However, the survey was conducted for the first time so it was unavoidable to reveal some limitations and problems in organising and implementing, such as:

A very big and comprehensive survey was undertaken in the context that Viet Nam had little experience in professional surveys, few referential materials and international experience, limited financial sources, while its contents and scope were complicated. Therefore, organising the survey at different level revealed a lot of mistakes originated from a lack of supervisors and supports in both central and 53 provinces and cities, while the time of preparation was short (8-9 months).

Regarding the survey scope and objects, while in other countries it was conducted solely in rural area, the survey was conducted in both rural area and agriculture households in urban area. Nevertheless, in the implementation in some localities like industrial zones of Ho Chi Minh City and Dong Nai province, the survey objects had been expanded to agriculture, forestry and fishery households in urban area. It resulted in the incomparable discrepancy of information between data of the whole country and data of provinces as well as that of other countries. However, it is a question to be addressed in the next survey whether a census of agriculture and rural area should concern to agriculture households in urban area as well in order to ensure full information on agricultural sector and rural area in the whole country.

5. Perspectives

In future, agricultural statistics system within GSO will develop toward the regional and international integration both in organisational and working skills to better satisfy government and international requirements.

- a. **Organisational structure:** In long term the agricultural statistics system will follow the structure from national to grassroot levels under the management and control of GSO. Local agricultural statistics staff should be strengthened and improved in favour of quantity stability, quality reinforcement as well as continuous application of advanced information technology in processing, analysing and collection. Furthermore, the agricultural statistics system within GSO will supplement new indicators of rural area, and enhance the cooperation among MPI, MARD and MOF.
- b. **Regarding operations:** In the context of regional and international integration, agricultural statistics system of Viet Nam will develop its operations in pursuant to the following ways:

Information collection: Information will be collected in three forms:

- Census of agriculture (includes fishery sector) will be undertaken every five years.
- Periodical report (for state-owned enterprises)
- Professional surveys

Professional surveys mainly use methods of sampling survey, special survey and pointed sampling surveys; survey in small scale; temporary survey, in which sampling survey is a major method. In order to apply effectively the sample survey, it is necessary to study and complete sample size, sample criteria, data inferring and generalising.

Statistics indicator system is to be improved by reducing quantitative indicators while increasing qualitative indicators. Content and calculation method of each indicator will gradually reach to its standard of regional countries, which facilitates to analyse and make comparison. (For example output of food, meat, milk etc.)

Data entry and calculating methods: Advanced information technology will be widely applied to ensure requirements timely, adequacy as well as reliability and to limit mistakes caused by backward calculation techniques.

Data analysis: In coming years, the analysis of agricultural information will be focused on: (i) analysing nature, development tendency of agricultural and rural economy through indicators of growth rate, economic structure and production structure; (ii) increase of comparability with international indicators, and indicators of value and quality.

Appendix

Major Concepts and Definitions in Agricultural Statistics in Viet Nam. (General Statistical Office)

1. *Rural area/Urban area.* Urban area in Viet Nam is defined to cover all cities and towns. Criteria for designating cities and towns are specified by the government. Total population of urban area in Viet Nam on 1st April 1999 was 17,918 thousand, 23.48% of the total population.

Rural area is defined as the regions out of urban areas including communes and villages. Total rural population in Viet Nam on 1st April 1999 was 58,409 thousand, sharing 76.52% of the total population.

2. *Rural household* is defined as a household that permanently resides in rural area, permanently or provisionally registered in rural area, and participates in agricultural or non-agricultural activities.

Urban household is defined as a household that permanently resides in urban area, permanently or provisionally registered in urban area.

3. *Agriculture household:* a household, in which all or the majority of household members engage in cultivation, animal husbandry or agriculture-related services like land preparation, irrigation, and more than 50% of the household's income are derived from agricultural activities. Agricultural household may work or reside either in rural or urban area.

Non-agriculture household is a household that entire or almost all household members are employed in non-agricultural activities in rural or urban area.

4. *Landless household* is an agriculture household but has not agriculture land, and its income mainly comes from wages of hired labour.

Small land household is a household that has little land (less than 0.2 ha) for agricultural production, and its income mainly comes from their employed labour.

5. *"Farm"* is a type of commercial agro-forestry or aquaculture production with household management. While this new production form has appeared since the early renovation process, its concept has been understood differently in different places, which leads to discrepancy in collected information and farm situation assessment. To cope with this emerging issue, based on the criteria of "farm" in other countries, actual surveys on "farm" in Viet Nam, and the definition of functional organisations and localities and government requirements, GSO issued the definition of "farm", as the basis for classifying and investigating required information, as indicated in Agro-Forestry and Fishing Yearbook and Forecast to 2000. These criteria were defined as the basis of statistics in conducting surveys to collect quantitative information of "farm" situation in Viet Nam. Based on these criteria, GSO, in close collaboration with MARD, issued the consistent criteria that are applicable in statistics and management of "farms" in Viet Nam.

6. *Agricultural income:* an amount of income that gained from cultivation, animal husbandry, poultry or

running agriculture-related services such as land preparation and irrigation.

Agricultural income is computed by subtracting production cost (C) from aggregate output as follows:

$$V + m = C + V + m - C$$

In which, C: Production cost

V: labour cost

m: profit

7. *Agricultural profit*: Rest of income after extracting labour cost from agricultural income.

$$m = (V+m) - V$$

In which: m: profit

V: Labour cost

V+m: Added value

8. *Paddy equivalent food output*: Consists of output of dried and clean paddy and other output in paddy equivalent. Equivalent computation is as follows:

$$\begin{array}{l} 1 \text{ kg of clean and dried paddy} = 1 \text{ kg of clean and dried maize and other cereals} \\ \phantom{1 \text{ kg of clean and dried paddy}} = 3 \text{ kg of raw cassava} \\ \phantom{1 \text{ kg of clean and dried paddy}} = 5 \text{ kg of sweet potato and potato} \end{array}$$

This formula has been applied since 1960. The concept of food output in Viet Nam differs from that of other countries. It is expected that in 2001 GSO would suggest the Government to re-define the paddy equivalent computation formula in accordance with international definition.

9. *Production price*: is the retail price of products in rural market.

Consumption price: is the retail price of products in urban market. Consumption price is usually 5-7% higher than production price depending on products, and include transportation and commercial fees.

10. *Consumption price index (CPI)*: is an average weight price index of major products monthly collected from price points (urban markets). CPI of agricultural products is classified into two major categories: CPI of food items and CPI of non-food items.

Annex Tables: Results of Production Cost Survey of Selected Crops
Expenditure of paddy crop: winter-spring paddy crop in 1994

	Units	Total	In which			
			Red River Delta	Northern Mountain	Central Coast	Mekong River Delta
1. Surveyed households	Household	2131	595	439.00	369	728
2. Cropped areas	Ha	1058	128.70	154.20	81.70	693.40
3. Output of paddy	Kg	5596800	623300	635200	330800	4007500
4. Selling price (per kg)	VND	1156	1361	1301	1228	1095
5. Production cost before tax (per kg)	VND	665	1070	1071	961	513
6. Production cost after tax (per kg)	VND	707	1148	1138	1011	545
7. Production cost (per ha)	VND million	3.52	5.18	4.41	3.89	2.96
8. Ratio of profit						
a. To production cost (before tax)	%	73.80	27.20	21.50	27.80	113.40
b. To production cost (after tax)	%	63.50	18.50	14.30	21.50	100.90
9. Production cost per 100 kg of paddy						
* Total production cost (a+b)	%	100	100	100	100	100
a. Material costs	%	58.80	42.10	43.80	53.90	71.00
In which						
- Seed	%	16.60	10.20	12.70	15.40	19.10
- Organic fertilizer	%	5.90	15.20	18.10	14.20	0
- Chemical fertilizer	%	38.90	34.10	33.30	32.10	42.30
- Pesticide	%	13.40	9.20	3.70	8.20	16.90
- Land preparation (by machine)	%	9.50	2.90	0.20	3.80	13.90
- Land preparation (by animal)	%	2.70	5.20	2.80	3.80	1.90
- Irrigation fee	%	5.40	10.80	11.30	13.50	2.20
- Depreciation	%	3.20	1.40	6.50	3.80	2.70
b. Labor cost	%	41.20	57.90	56.20	46.10	29
10. Ratio of mixed income to material cost	%	195.60	202.10	177.30	137.10	200.60
11. Income per ha	VND million	4.10	4.40	3.42	2.88	4.25

Note: Labor cost is defined as follows:

- In Northern Mountain region: VND 10,000 per working day
- Red River Delta: VND 15,000
- Center region and central highlands: VND 12,000
- Mekong River Delta: VND 17,000

Expenditure of paddy crop: summer-autumn paddy crop in 1994

	Units	Total	In which		
			Northern Mountain	Central Coast	Mekong River Delta
1. Surveyed households	Household	1750	412	521	817
2. Cropped areas	Ha	1108.9	111.6	105.2	892.1
3. Output of paddy	Kg	4523800	400700	411700	3711400
4. Selling price (per kg)	VND	1137	1322	1289	1100
5. Production cost before tax (per kg)	VND	681	1153	1015	592
6. Production cost after tax (per kg)	VND	714	1216	1061	622
7. Production cost (per ha)	VND million	2.78	4.14	3.97	2.46
8. Ratio of profit					
a. To production cost (before tax)	%	66.9	14.6	26.9	85.8
b. To production cost (after tax)	%	59.2	8.7	21.5	78.8
9. Production cost per 100 kg of paddy					
* Total production cost (a+b)	%	100	100	100	100
a. Material costs	%	64	45.6	53.6	70.4
In which					
- Seed	%	16.9	12.1	14.5	18.1
- Organic fertilizer	%	4.6	19.6	17.7	0.2
- Chemical fertilizer	%	36.8	34.7	32.3	37.9
- Pesticide	%	10.9	4.4	8.7	11.7
- Land preparation (by machine)	%	9.3	0.03	3.2	11.7
- Land preparation (by animal)	%	2.7	2.1	3.8	2.6
- Irrigation fee	%	4.7	11	17.6	1.7
- Depreciation	%	3.3	7.2	6.2	2.1
b. Labor cost	%	36	54.4	46.4	29.6
10. Ratio of mixed income to material cost	%	151.5	136.9	163.9	160.8
11. Income per ha	VND million	2.86	2.86	2.92	2.84

Expenditure of paddy crop: autumn paddy crop in 1994

	Units	Total	In which			
			Red River Delta	Northern Mountain	Central Coast	Mekong River Delta
1. Surveyed households	household	1586	574	376	160	476
2. Cropped areas	ha	790.3	119.6	93.7	41.2	535.8
3. Output of paddy	kg	2647000	508600	273300	126000	1739100
4. Selling price (per kg)	VND	1294	1417	1331	1280	1252
5. Production cost before tax (per kg)	VND	853	1212	1276	1199	656
6. Production cost after tax (per kg)	VND	911	1290	1338	1218	710
7. Production cost (per ha)	VND million	2.86	5.15	3.72	3.67	2.13
8. Ratio of profit						
a. To production cost (before tax)	%	51.70	16.9	4.5	6.7	90.8
b. To production cost (after tax)	%	42	9.8	-0.5	4.8	76.3
9. Production cost per 100 kg of paddy						
* Total production cost (a+b)	%	100	100	100	100	100
a. Material costs	%	48.60	40.4	39.5	49.1	56.6
In which						
- Seed	%	16.70	10.5	15.6	18.3	19.6
- Organic fertilizer	%	6.60	14.1	20.3	8.7	0.03
- Chemical fertilizer	%	34.10	32.1	28.3	34.9	36.3
- Pesticide	%	6.60	9.6	3.1	6.9	6.2
- Land preparation (by machine)	%	10	3.1	0.2	5.6	15.9
- Land preparation (by animal)	%	4.6	4.3	3.9	4.2	5.1
- Irrigation fee	%	5.5	12.3	11.1	9.8	1.1
- Depreciation	%	2.20	1.4	7.6	2.9	1.3
b. Labor cost	%	51.40	59.6	60.5	50.9	43.4
10. Ratio of mixed income to material cost	%	212.20	189.4	164.1	117.4	237.2
11. Income per ha	VND million	2.95	3.94	2.41	2.12	2.86

Expenditure of tea crop on household scale

	Units	Total
1. Surveyed households	household	751
2. Productive areas	ha	401.4
3. Output of raw tea	kg	1322535
4. Selling price (per kg of raw tea)	VND	1355
5. Production cost before tax (per kg of raw tea)	VND	1193
6. Production cost after tax (per kg of raw tea)	VND	1268
7. Production cost (per ha)	VND million	3.93
8. Ratio of profit (loss)		
a. To production cost (before tax)	%	13.6
b. To production cost (after tax)	%	6.8
9. Production cost per 100 kg of raw tea		
* Total production cost (a+b)	%	100
a. Material costs	%	38.2
In which		
- Organic fertilizer	%	3.5
- Chemical fertilizer	%	43.8
- Pesticide, herbicide	%	21
- Land preparation (by machine)	%	2.8
- Depreciation of tea productive areas	%	20.6
- Depreciation of fixed assets	%	0.04
b. Labor cost	%	61.8
10. Ratio of mixed income to material cost	%	197.3
11. Income per ha	VND million	2.96

Notes: Survey was conducted in 5 provinces: Yen Bai, Bac Thai, Vinh Phu, Gia Lai and Lam Dong.

Expenditure of coffee crop on household scale

	Units	Total
1. Surveyed households	household	658
2. Productive areas	Ha	275.2
3. Output of seed coffee	Kg	499799
4. Selling price (per kg of seed coffee)	VND	22593
5. Production cost before tax (per kg of seed coffee)	VND	6909
6. Production cost after tax (per kg of seed coffee)	VND	7015
7. Production cost (per ha)	VND million	12.55
8. Ratio of profit (loss)		
a. To production cost (before tax)	%	227
b. To production cost (after tax)	%	222.1
9. Production cost per 100 kg of seed coffee		
* Total production cost (a+b)	%	100
a. Material costs	%	63.1
In which		
- Organic fertilizer	%	12.1
- Chemical fertilizer	%	44.3
- Pesticide, herbicide	%	3.7
- Land preparation (by machine)	%	1.8
- Depreciation of coffee productive areas	%	13.1
- Depreciation of fixed assets	%	4.1
b. Labor cost	%	36.9
10. Ratio of mixed income to material cost	%	418.2
11. Income per ha	VND million	33.1

Notes: Survey was conducted in 4 provinces: Gia Lai, Lam Dong, Song Be and Dong Nai

Expenditure of pig breeding on household scale in 1994

	Units	Total	In which			
			Red River Delta	Northern Mountain	Central Coast	Mekong River Delta
1. Surveyed households	household	1916	528	540	344	504
2. Numbers of live pig	pig	3867	908	839	796	1324
3. Live pig weigh	kg	320182	68151	69354	53724	128953
4. Live weigh per pig	kg	82.8	75	82.6	67.5	97.4
5. Selling price	VND	8939	7883	7579	8063	10586
6. Production cost (per kg)	VND	8899	8598	8447	8133	9622
7 Ratio of profit	%	0.45	-8.3	-10.1	-0.9	10
8. Production cost per 100 kg of live pig						
* Total production cost (a+b)	%	100	100	100	100	100
a. Material costs	%	74.7	72.7	65	73.6	81.1
In which						
- Piglet	%	25.2	22.7	19.2	22.7	29.6
- Feed	%	64.7	62.1	59.4	67.1	60.7
- Fuel	%	5.5	5.9	11.5	6.6	2.5
- Medicine	%	1.6	1.1	0.9	1.8	2.1
- Insurance	%	0.03	0.02	0.05	0	0.02
- Depreciation	%	2.6	3.3	3.9	2.2	1.9
b. Labor cost	%	25.3	27.3	35.0	26.4	18.9
9. Ratio of mixed income to material cost	%	34.5	26.1	38.0	34.7	35.7
10. Income per kg of live pig	VND	2291	1632	2088	2077	2783

