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# A Qualitative Review of Vietnam's 2006–2010 Economic Plan and the Performance of the Agriculture Sector

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## ABSTRACT

*Vietnam's economy faced difficulties in the 2006–2010 period due to the global financial crisis. The average inflation rate (>20%) was higher than the expected level (<10%) for the period. The average GDP growth rate (6.3%) was lower than the target (7.5%). In the global context, however, Vietnam's economic growth and inflation rate were still seen as successful due to the government's strong policy and administration interventions. Nevertheless, similar to the outcomes of the country's other economic plans since 1986, the key "relative targets" of the plan for 2006–2010 were not successfully achieved, including that for reduced income inequality, thus restraining Vietnam's long-term growth. The main reason is that policies implemented to achieve these goals are not at "equilibrium" quantitative points. Therefore, more investment in research that applies large-scale mathematical economics models is urgently needed, similar to the ones used widely by many other governments in the world. In addition, the government's role in managing and developing domestic markets should be improved to protect farmers who always sell their products at prices lower than the shadow prices.*

**Keywords:** economic growth, agricultural growth, economic structure, rural development, macroeconomic policy, large-scale mathematical economics modeling

**JEL Classification:** O21

## INTRODUCTION

In Vietnam, the central and local governments usually plan the national, regional, and industrial objectives and set both qualitative and quantitative targets for given periods of time—for instance 1 year, 5 years, 10 years, 15 years, and 20 years. In recent times, Vietnam's economic plans covered five-year periods ending 2005, 2010, 2015, and 2020. Previously, the plan covering 1976–1985 focused on developing heavy industries. The 1985–2000 plan mainly aimed at developing agricultural production as well as light and consumer goods industries. In 2000, the government of Vietnam (GoV) set the goal of becoming a modern industrialized country by 2020. The five-year economic plans between 2000 and 2020 had been designed to support this priority target. The GoV also plans to modernize the agricultural sector and to reduce the contributions of crop cultivation to revenues and gross domestic product (GDP) while increasing those of processed agricultural products and the livestock, fishery, and forestry subsectors. In terms of rural development, the GoV aims to protect rural cultures and the environment and to increase the living standards of rural people. To achieve the national agricultural objectives, four broad policies are implemented: (1) encourage domestic production of primary and processed commodities, (2) encourage quality improvement, (3) encourage domestic and international trade, and (4) increase investments from various sources in physical and social infrastructure.

Due to the lack of statistical data and macro-quantitative research, this paper reviews qualitatively achievements and failures of the economic plan covering 2006–2010, focusing on the agriculture sector. It explains the causes of these failures and their policy implications for the development of Vietnam's agriculture sector.

## SOCIOECONOMIC DEVELOPMENT PLAN, 2006–2010

Vietnam's economy is composed of three main sectors: agriculture, industry and construction, and services (Hieu, Harrison, and Lamb 2011). The agriculture sector has six subsectors: cultivation, livestock, fisheries, forestry, irrigation, and services. The cultivation subsector (the highest contributor to the GDP among the agriculture subsectors) includes two industries: annual crops and multi-year (or industrial) crops. This section describes the GoV's socioeconomic plan for these sectors in the 2006–2010 period.

### Plans for Economic and Agricultural Growth

The GoV's assessment of its economic plan 2001–2005 showed that similar to past economic plans, Vietnam generally achieved most of its main targets set for the period, except those of foreign direct investment (FDI) and official development aid (ODA) (Table 1). Consequently, income per capita increased from USD 114 in 1990 to USD 220 in 1994, USD 397 in 2000 to USD 640 in 2005 (T. Nguyen and V. Nguyen 2008; Viet Bao 2006). Moreover, the poverty rate (calculated by the international standard of less than USD 1 per person per day) decreased from 60 percent in 1990 to 51.8 percent in 1993, 32 percent in 2000, 29 percent in 2002, and 19.5 percent in 2004. Vietnam was one of the few countries in the world that achieved high economic growth and poverty reduction in such a short period of time.

In its economic plan 2006–2010, Vietnam aimed, among others, to increase income per capita to USD 1050 to USD 1100 in 2010. The target annual economic growth rate for the period was 7.5 to 8 percent, with annual inflation set at less than 10 percent. Average

**Table 1. Main economic and agricultural growth targets, 2006–2010**

Targets	2001–2005		Plans (2006–2010)	
	Plans	Achievements	Growth	Values
Gross domestic product (GDP)	7.5%/yr	7.5%/yr	7.5–8%/yr	
Inflation	<10%/yr	<10%/yr	<10%/yr	
Agricultural GDP			3–3.2%/yr	
GDP per capita		USD 621 (2005)		USD 1050–1100*
Agricultural production value	4.8%/yr	5.5%/yr	4–4.5%/yr	
Cultivation production value			2.7%/yr	
Agricultural export			16%/yr	USD 10.8 billion*
Total paddy production				39 million tons*
Total foreign direct investment (FDI)	USD 20 billion**	USD 14.3 billion**		USD 17.5–19.5 billion***
Total official development aid (ODA)	USD 15 billion**	USD 7.7 billion**		USD 10***
Total gov't bonds selling abroad				USD 4.3 billion***

Source: CIS (2012)

Note: \* in 2010; \*\* 2001–2005 period; \*\*\* 2006–2010 period

agricultural GDP growth rate was set at 3 to 3.2 percent per year, with agricultural production value targeted to grow annually at 4.5 percent. Cultivation production value was expected to grow at an annual rate of 2.7 percent.

Similar to past economic plans, the 2006–2010 plan aimed to stimulate exports and increase the country's investment. The average growth rate of agriculture exports was targeted at 16 percent per year, amounting to USD 10.8 billion in 2010. Paddy output was targeted at 39 million tons in 2010. The total FDI value and ODA were set at USD 17.5 to USD 19.5 billion and about USD 10 billion, respectively. The GoV also aimed to sell its bonds abroad, amounting to about USD 4.3 billion.

It is noted that none of the official documents on the above targets presented any mathematical economics models or scientific methods used to calculate the quantitative goals in the 2006–2010 plan.

### Change in the Economic and Labor Force Structures

From 1986 to 2005, Vietnam had gradually shifted its economic structure into an industrialized one. To do this, it targeted to reduce the agriculture sector's contribution to GDP from about 46.3 percent in 1988 to 20.9 percent in 2005, and further to 15 to 16 percent only by 2010. The share of the industry and construction sector was set at 43 to 44 percent, and the service sector at 40 to 41 percent (Table 2).

However, the shift in economic structure had been quite slow, especially between 2003 and 2005 when the share of the cultivation subsector was relatively constant at about 78 percent of the agricultural GDP (GSO 2008). Food crops, especially rice, remained to be the main GDP contributors (Ministry of Agriculture and Rural Development [MARD] 2010). MARD (2007) reported that the annual growth rate of the forestry subsector was very low, declining from 4.9 percent in 2000 to only 1 to 1.9 percent in the 2001–2005 period. In 2005, the forestry industry accounted for only about 1.2 percent of

**Table 2. Planned targets and outcomes for agriculture and rural development (2006–2010)**

Targets	Average Growth or Percentage	Target	Planned Value for 2010	Average Growth or Percentage	Outcome
		Planned Value for 2010			Value for 2010
GDP (% per year)	7.5–8	7.5	6.3	6.3	
Inflation (% per year)	<10	<10		>20	>20
Agricultural GDP (% per year)	3–3.2			3.36	
Agricultural output value (%)	4.5			4.93	
Cultivation output value (%)	2.7			4.29	
Agricultural export	16%	USD 10.8 billion	17% per yr	USD 19.15 billion	
Total paddy output		39 million tons		40 million tons	
Foreign direct investment (billion USD)		17.5–19.5			
Official development assistance		USD 10 billion			
Government bonds selling abroad		USD 4.3 billion			
Share of GDP by sector (%)		Agriculture (15–16); Construction & industry (43–44); Service (40–41)			
Share of agricultural labor force (%)			<50	57.5	
Unemployment rate in urban areas (%)			< 5		
Forest cover rate (%)				42–43	

Source: CIS (2012)

Vietnam's total GDP and 4 percent of the total agricultural GDP (MARD 2007). Therefore, the GoV set qualitative targets to improve the above situation in the 2006–2010 period. For example, it aimed to reduce the share of the cultivation subsector while increasing that of fishery, livestock, and forestry subsectors. It is noted that no specific quantitative targets accompanied these qualitative goals.

Regarding the country's labor force, at the end of the 2001–2005 economic plan, the GoV assessed that the high economic growth and economic structural changes in the past had not resulted in structural changes in the country's labor force. The rural labor force continued to increase annually by about 1.5 million people. Thus, although the agriculture sector's contribution to GDP declined from about 46.3 percent in 1988 to 20.9 percent in 2005 and, consequently, its share of the total labor force from more than 80 percent to 55.7 percent, most rural employed labor was still underemployed, with actual working time of only about 83 percent of the contract working time (MARD 2010). The GoV addressed the situation through the 2006–2010 plan, targeting to reduce the share of the agriculture labor force to less than 50 percent by 2010 and less than 30 percent by 2020 (Table 2).

### **Investment in the Agriculture Sector and Rural Areas**

In early 2006, the GoV assessed that investment in agriculture and rural areas had been relatively low since Vietnam started economic reform policies in 1986. State investment in the agriculture sector accounted for only 5 to 6 percent of total investment, much lower than the average levels of Asian

countries (e.g., South Korea, Malaysia, and the Philippines), which were more than 20 percent. In terms of GDP share, Vietnam's total investment in the agriculture sector was only 1.4 percent, much lower than the average levels of China and India (8%–16% in 1990–1993) and the other Southeast Asian countries, including Thailand (8%–9% in 1990–1993) (Table 3).

Although the agriculture sector accounted for 20 to 40 percent of GDP in the 1990 to 2005 period, the total social investment in this sector amounted to only about 7.5 percent; of the new annual investment, private investment accounted for only about 15 percent and FDI, less than 5 percent (MARD 2010). As a result, the economic plan for 2006–2010 aimed to encourage investment in the agriculture sector. Besides the traditional areas of annual investments in rural areas (e.g., electricity, roads, schools, and healthcare system), the GoV determined to increase investment through a large-scale program called New Rural Areas or New Rural Communes. This program started in 2008 and will end in 2020. However, the program does not indicate specific quantitative figures as regard the expected investments.<sup>1</sup>

### **Income Gap among Various Population Groups**

Vietnam's high economic growth in the 1986–2005 period did not contribute as much as expected to social progress. Although per capita incomes of most population groups increased, their growths differed from each other. Consequently, income inequality increased between urban and rural areas. Incomes in urban areas were higher (180% and 230%) than in rural areas in 1993 and 2002 respectively. Incomes of the rich were higher (410%, 420%, and 860%)

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<sup>1</sup> It is estimated that on the average each commune needs about USD 600,000 to meet all 19 indicators set by the manager board of the New Rural Communes program.

**Table 3. Investment targets for the agriculture sector and rural areas, 2006–2010**

Targets	Average Values (%), 2001–2005	Planned Values (2006–2010)	Reference Numbers of Selected Countries
Share of investment in agriculture in total GDP	1.4	Not published	8–16% in China, India and Thailand in years 1990–1993. 8–9% for Southeast Asian countries in years 1990–1993
Share of social investment in agriculture	7.5	Not published	
Share of state investment in agriculture	5–6	Not published	>20%/year in South Korea, Malaysia, and the Philippines
Share of private investment in agriculture	15	Not published	
Share of FDI in agriculture	5	Not published	

Source: MARD (2010)

than that of the poor in 1990, 1991 and 2006 respectively. Incomes of the 20 percent richest group were higher (430% and 814%) than that of the 20 percent poorest group in 1993 and 2002 respectively. Incomes of the 10 percent richest group were higher (1250% and 1350%) than that of the 10 percent poorest group in 1993 and 2004 respectively. The national poverty share of ethnic minorities increased from 21 percent in 1992 to 36 percent in 2005.

While the GoV planned to reduce these income inequalities, no quantitative targets were indicated in the 2006–2010 plan. The New Rural Communes program was started in 2008, with the following quantitative targets (MARD 2010): (1) increase rural income per capita by 150 percent between 2009 and 2015 and by 250 percent between 2009 and 2020, and (2) reduce the national poverty rate to below 8 percent by 2015 and below 3 percent by 2010. The targets for the rural areas are higher than those for urban areas in order to reduce the income gap between the two areas by 2015 and 2020. No quantitative targets had been set for the ethnic groups.

## A REVIEW OF KEY ECONOMIC AND DEVELOPMENT POLICIES

This section reviews the key policies that the GoV implemented to achieve its plans since 1986. These policies are classified into four groups: macro-price policies, commodity quality policies, production and trade policies, and rural development policies.

### Main Characteristics of Vietnam's Macroeconomic Policies since 1986

In the 1980s, Vietnam's economy could be described as follows: high inflation (usually hyperinflation of over 100% per year), low economic growth (lower than population growth) or recession (negative growth<sup>2</sup>), lack of food, and high rate of poverty (more than 80% of the total population). During this period, commodities had two kinds of prices—the official state price and the black market price. To get the country out of the crisis, the GoV has reformed economic policies in four key fields (Hieu 2004): macro-price market-oriented regulation, diversified means of production (e.g., agricultural land use rights policy), domestic and foreign trade integrations, and

2 In some Economics books, a country which has economic growth of below 3 percent per year is seen as in the recession period.

ODA and FDI. These policies are intended to stimulate and sustain economic growth.

To stabilize macro-prices, the GoV has put in place policies such as those concerning inflation, exchange, and interest rates. Before 1989, the GoV pursued a fixed exchange rate regime (e.g., USD 1 was equal to VND 1). In the 1990–2005 period, it applied a market-oriented exchange rate regime, although it controlled the exchange rate, especially against the US dollar, up to a certain extent (Nguyen 2008). It did not allow the annual depreciation to be higher than certain levels. For example, in 2004–2006, the State Bank of Vietnam announced that the annual depreciation of the Vietnamese dong against the US dollar must be less than 1 percent only. Only in some special cases did the GoV permit the depreciation of the domestic currency to be higher, such as when it realized that a strong domestic currency could harm its economy, and by increasing import expenditures and decreasing export revenues. During the Asian financial crisis in 1997 and 1998, the GoV depreciated the domestic currency by about 25 percent, from VND 12,000 to VND 15,000 per USD.

In the 2006–2010 period, the exchange rate was regulated basically in a similar manner as in the previous period but with more state intervention. Between 2008 and 2010, the global economy went through its greatest crisis since the 1930s. This crisis' negative impacts on the Vietnamese economy were much higher than those of the 1997–1998 Asian financial crisis. The GoV had to devalue its currency by more than 30 percent, from VND 16,000 per USD in 2006 to VND 20,000 per USD in 2008 to VND 21,000 per USD in 2010 (VCBS 2011). When the exchange rate became too high or out of control in 2010 and 2011, the GoV decided to use its administrative power to restrict residents' foreign currency transactions during certain months.

State expenditure increased in 2008 and 2009 due to the world crisis and price increases of import commodities. This resulted in domestic prices quickly rising. In response, the State Bank of Vietnam reduced the domestic currency supply by raising the base annual interest rate applied to all commercial banks by 1 percent (from 8% to 9%) in 2010 (Nguyen 2008; VCBS 2011).

On the other hand, the increase in state expenditure, especially for large-scale state enterprises and large-scale state programs, was one of the main factors that stimulated economic growth in the 1990–2005 period. However, while the high spending did not result in high inflation, some viewed the efficiency of the spending as controversial. Several large-scale state agricultural projects and programs were implemented during this period, such as the *VND 50 Million/Hectare* program, the *One Million Tons/Year Sugar* program, and the *Building Canals for All Rice Fields* program. Due to the global financial crisis, the annual inflation rate increased sharply in 2008 and 2009—at more than 20 percent, the highest since 1986. Like many other countries in the world, when its economy went into recession, the GoV put in place an economic stimulus package of about USD 2 billion for 2008 and 2009. In 2010, with the country's economic growth remaining low and inflation continuing to rise despite adjustments in the exchange and interest rates, the GoV adopted a tight fiscal policy, which included cuts in state expenditure. It decided not to pursue high economic growth as planned; instead it lowered the economic growth target to about 6 percent (compared with the original target of 7.5% to 8%) in order to lower the inflation rate. It reduced spending in most state programs. For example, it allocated VND 45,000 billion (USD 2.1 billion) only for large-scale construction projects in 2011, equal to only 40.9 percent of that in 2010 (VCBS 2011).

The 1990–2005 period also saw the GoV promoting exports, especially agriculture exports; export limits were rarely applied. In the 2006–2010 period, however, rice exports were banned for the first time in April to June 2008 because the GoV worried about food insecurity and high inflation that was occurring in the country. After June 2008, the ban was lifted (Table 4).

Generally, all policies implemented since 1986 to stabilize macro-prices have been successful. In the 2006–2010 period, the GoV applied various policies and administrative orders to lower the economic growth targets and to put inflation under control (Duong Ngoc 2009). However, a significant observation is that the GoV has not indicated any large-scale mathematical economics models<sup>3</sup> (e.g., input-output [I-O] table analysis, spatial equilibrium model, or general equilibrium model) used to calculate the macroeconomic targets. Consequently, concerns have been raised that the degree of state intervention has been either too strong or too weak in some specific industries and population groups. For example, a study covering 2004–2006 using an econometric model of the International Monetary Fund (IMF) found that the exchange rate has not made a significant impact on inflation in Vietnam (Nguyen 2008). If this model's implication is correct, Vietnam's exchange rate policy aimed at restricting inflation has not been useful. The lower inflation rates in 2010 and 2011

mainly resulted from the tight fiscal policy, especially applied on state enterprises and state investment programs. On the other hand, the exchange rate policy created a negative impact on many effective enterprises, including small and medium private enterprises. In addition, the equal application of state expenditure reduction to all sectors/subsectors/industries had been ineffective.

### **Policies to Stimulate Agricultural Growth and Rural Development**

Since 1986, the GoV has been pursuing policies to encourage domestic production and exports. These policies focused on major export commodities, including rice, pepper, cashew, coffee, rubber, tea, meat, vegetables, wood, and wood processing products. Moreover, the GoV has set policies to increase investment in physical and social infrastructure, such as irrigation systems, transportation networks, and cultural diversification.

### ***Improvement of the Quality of Agricultural Products***

In the 2006–2010 period, the GoV encouraged the application of various international standards to agricultural commodities (Table 5). These standards were adjusted to suit the specific conditions of Vietnam. Good Agriculture Practice (GAP/VietGap/GLOBALGAP) standards are

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<sup>3</sup> Mathematical models applied for economics in general and agricultural economics in particular were started much earlier in other countries than in Vietnam. The first agricultural economics model was applied in the 19th century about farm management in the United States of America (Just 2007). When mathematical programming became practical in the 1950s with the growth of computer power, many economic models were developed and applied by governments and international organizations. Scales of economics models have been larger and larger. Notable examples are the Central American Model in 1978 about inter-country trade linkages; a programming model in 1973 for Mexican agriculture containing supply and demand specifications for about 33 crops, organized spatially in four major regions and 20 sub-regions. There were also programming models for the Egyptian Ministry of Irrigation in 1978 containing about 25 crops and 15 canal command groupings and its revised version in 1980 for investment analysis; the Turkish Models (TASM) developed over time, TASM I in 1982 on comparative advantage and pricing policy in Turkish agriculture and TASM II in 1985 with about 1000 equations including many additional variables (i.e., marketing-processing activities and international shipment activities for many products (Hazell and Norton 1986).

**Table 4. Vietnam's international trade policies: tariffs and nontariff barriers (2001–2010)**

Commodity	2001–2005			2006–2010		
	Import Tax	Import Quota	Export Tax	Export Quota	Import Tax	Import Quota
Rice	40%	0%	Not applied since 2000	Reduced from 40% to 5%	0%	0%
Tea		Reduced from 30% to 15%		75%	Not applied	Reduced from 15% to 0%
Pepper					0%	
Cashew					0%	
Coffee					5%	
Pork		Applied			5%	Applied
Chicken meat					5%	
Rubber					3%	
Sugar	Increased from 10% to 60%	Applied			Reduced annually from 40% to 5%	Applied
Timber	5%				5% and 0%	
Paper	40%				Reduced annually from 40% to 5%	0%

*Note:* Government banned rice export in April to June 2008.

*Source:* CIS (2012)

**Table 5. Recommended quality standards for agriculture, forestry, and fishery production in Vietnam**

Standards	Publisher	Commodity	Notes
1 Gap/Vietgap/ Globalgap		Rice, fruits and vegetables, white pepper, tea, and meat	Only standards with quantitative plan—at least 25% of the tea area and 40% of the tea output will meet VietGap standard by 2015; 70% of new varieties applicable to rice
2 TCVN 4850 (1998)	Vietnam Ministry of Science and Technology		Similar to ISO 6477-1988
3 HACCP			Food safety sanitation
4 TCVN 7036 (2002)	Vietnam General Department of Standards, Measurements and Quality (GDSMQ) and Vietnam Pepper Association	Cashew Cashew Black pepper	
5 TCVN 7037 (2002)	GDSMQ and Vietnam Pepper Association		
6 FAQ		Black and white pepper	
7 ASTA	Standards of the USA Trade Association	Black and white pepper	
8 TCVN 2843-79		Fresh sprout tea	Technical requirements
9 10TCN-155-92		Primarily processed green tea	Technical requirements
10 10TCN-458 (2001)		Primarily processed black tea	Technical requirements
11 TCVN 1454 (1993)		Isolated black tea	Technical requirements
12 TCVN 1455 (1993)		Green tea	Technical requirements
13 10TCN 605 (2004)		Foods	Applied for processed teas
14 FSC	Forest Certification Council (International)	Timber and non-timber forest products	
15 CoC	Chain of Commodity	Timber and non-timber forest products	
15 QCVN 01-14 (2010)	Vietnam Ministry of Agriculture and Rural Development	Meat products	Technical requirements
17 QCVN 01-10 (2009)	Vietnam Ministry of Agriculture and Rural Development	Feed, vaccines for animals, meat products packaging and preservation	Requirement about chemical limits
18 TCVN 4378 (2001)		Processing fishery products	Food safety sanitation
19 TCVN 4380 (1992)		Frozen shrimp	Technical requirements
TCVN 4381 (1992)			
TCVN 4545 (1994)			
TCVN 4546 (1994)			

Source: CIS (2012)

recognized internationally. They specify technical requirements for agricultural commodities and ensure that the commercial products are of good quality, clean, and safe. During this period, the government did not force but just recommended the application of these standards to agricultural products, particularly fruits and vegetables, tea, pepper, rice, and meat. Quantitative targets with clear time frames were published for tea and rice commodities only.

#### *Cashew products*

The government encouraged the application of the national standard (TCVN 4850-1998) on cashew products. This standard, which replaced TCVN 4850-1989, was developed based on ISO 6477-1988, the international standards for cashew nut. It was prepared by the Standards Technical Committee and issued by the Ministry of Science, Technology, and Environment.

#### *Pepper products*

Vietnam used to apply TCVN 5837-1994 as standard for pepper products. In 2002, the Directorate for Standards and Quality, in cooperation with the Vietnam Pepper Association, prepared and issued Vietnam Pepper Quality Standards, including TCVN 7036-2002 for black pepper and TCVN 7037-2002 for white pepper.

#### *Timber and non-timber products*

The two most common standards for these commodities are forest certifications published by Forest Stewardship Council (FSC) and Chain of Commodity (CoC). Established in 1993, the FSC promotes forest management for economic, social, and environmental effectiveness. Products it certifies have higher prices and wider markets. Some markets/countries do not allow the import and export of wood and non-timber forest products without FSC certification. A CoC certificate, on the other hand, guarantees that products are actually

derived from a forest that has been certified. However, the practical implementation and effectiveness of these certificates on wood production in Vietnam have been unclear.

#### *Meat products*

Realizing that the country's meat products, especially pork, have very low quality, the GoV, through MARD, encouraged model livestock producers to produce "clean" meat products in the 2006–2010 period. This included the publication of technical guides for farmers and enterprises (e.g., QCVN 01-14:2010/BNNPTNT on national technical indicators for safe pig farms); VIETGAP or "livestock standards" (published under MARD Decision 121/2008/QD-BNN for dairy cow, pig, and chicken); and QCVN 01 to 10:2009/BNNPTNT (requirements for feeds, vaccines for animals, packaging, and preservation of meat products).

#### *Fishery products*

The GoV has published a wide range of quality standards for fishery products. Examples are TCVN 4378:2001 (food safety and sanitation in processing fishery products), TCVN 4380:1992, TCVN 4381:1992, TCVN 4545:1994, and TCVN 4546:1994 (technical requirements for frozen shrimp products).

Generally, the proportion of agricultural products that apply international and national quality standards is unclear but likely low. These quality standards are seen to be easier to apply to major export commodities like coffee, pepper, rubber, fishery, and rice rather than on commodities consumed mainly in the domestic market like meat, fruits and vegetables, sugar, and tea.

#### *Promotion of Cultivation, Forestry, Fishery, Livestock Production, and Trade*

The GoV has been flexible in applying national agricultural policies to various industries at different times and places. The

provinces have issued policies at their level and specific to their conditions. In general, while policy implementation has been flexible, it must comply with Vietnam's commitments to international organizations. These policies include land use tax, interest rate, income tax, import and export taxes, and special incentives such as compensation for large-scale sugar state enterprises when the exchange rate significantly depreciated (Table 6). These policies have not been consistently applied to industries and enterprises.

In the 2006–2010 period, the national policies on land tax, interest rate, and transport fees were applied to industries, especially forestry and sugar processing industries, to encourage investments in remote areas where infrastructure was not favorable for agricultural production and business. The GoV also applied special policies to promote agricultural production in selected provinces. For example, in Lam Dong province, where the natural conditions are favorable to tea production, the GoV supported 35 percent of the transport cost of tea export enterprises (Table 6).

To encourage large-scale livestock production, the GoV instituted major policies, including reducing by 50 percent the land use tax of large-scale pork production by farmers and enterprises; and zero percent land use tax, low income tax, and low value-added tax for enterprises that invest on pork production in remote areas.

In provinces with favorable natural conditions for coffee production, the GoV has permitted coffee enterprises to borrow money at amounts equal to the total value of their coffee output without interest within the first two years. These coffee enterprises are given a 50 percent discount on interest rates starting on the third year for loans intended to buy some machines and equipment produced domestically. Moreover, if coffee prices are much lower than coffee production costs, the

farmers may borrow money without interest to purchase materials and fertilizer to recover their coffee production (Table 6).

Before 2010, Vietnam's trade policies were usually aimed at promoting export and protecting commodities, which were not internationally competitive. The trade protection policies had also been applied to selected industries when they faced high risks, including epidemics and floods. Since 2010, the country's international trade policies have generally integrated almost fully with regional and world trade organizations. Export and import tariff barriers were reduced from various levels in 2006 to below 5 percent in 2010. Nontariff barriers have been applied to some uncompetitive commodities only, including meat, sugar, and paper. Rice export was banned in April to June 2008 via an administrative order when the GoV worried that food insecurity would occur. However, the order was criticized by many private rice exporters because it did not help reduce inflation; instead, it decreased rice export revenues at a time when world rice prices were at their highest in the last 20 years.

Depending on their natural conditions, some provinces issued additional policies to encourage agricultural production. Provinces suitable for tea production like Son La and Tuyen Quang reduced land use taxes for households growing and expanding tea plantations within 6–13 years. In 2010, Nghe An province increased investments in transportation networks and irrigation system for tea production. The provinces of Lam Dong, Nghe An, Lao Cai, Phu Tho, Lang Son, Son La, Tuyen Quang, and Thai Nguyen encouraged farmers to plant new high-yielding tea varieties by subsidizing about 20 to 25 percent of the total new variety cost (Table 6).

Although the GoV emphasizes that central, regional, and provincial plans/policies must be in harmony, none of the official documents indicate the use of a mathematical economics

**Table 6. Main policies to encourage domestic agricultural production in Vietnam (2006–2010)**

Commodity	Interest Rate	Land-use Tax	Income Tax	Value Added Tax	Other Policies
Rice	Farmers: Access to loans of VND 5–10 million (USD 250–500) without collateral				Floor prices applied to guarantee that farmers' profit from paddy production constitutes about 30% of the production cost, especially in the Mekong River Delta region
Tea	Farmers: Low annual interest rate of 9% for a loan of VND 5–29 million/ha (USD 250–1400/ha) to plant, replant, and restore tea hills	Farmers: Low or zero land-use taxes for 6–13 years to expand tea areas			High investments on transportation and irrigation for tea production in Nghe An
Pepper	Farmers: 15% discount for investments in mountainous areas, islands, and new economic zones	Enterprises: Tax incentives for enterprises having direct contracts with farmers	Farmers: Low land-use tax on new land, barren hills, and wild land		Support of about 35% of transport costs in Lam Dong for tea export enterprises.
Cashew	Enterprises: Preferential annual interest rates of 3%–9% for export products			Support of about 20%–25% of total new variety costs in Lam Dong, Nghe An, Lao Cai, Phu Tho, Lang Son, Son La, Tuyen Quang, and Thai Nguyen provinces	Subsidy for seedling cost in remote areas
Pig	Farmers and enterprises: Discount of 50% on land-use tax for large-scale production	Enterprises: Low income tax for enterprises in the process of modernizing and investing in remote areas	Zero land-use tax to invest in remote areas	Low or zero income taxes for processors and farmers in remote areas	Low value added tax for enterprises in the process of modernizing and investing in remote areas

**Table 6. Continued**

Commodity	Interest Rate	Land-use Tax	Income Tax	Value Added Tax	Other Policies
Coffee	Farmers and enterprises: Access to loans equal to 100% of the final product value  Low interest rates if they buy machines produced domestically and build storages	Farmers: Discount of 50% on land-use tax to plant coffee  Enterprises: Zero land-use tax within 5 years to build coffee storages	Enterprises: Zero income tax for the first 3 years to build coffee storages  Discount of 50% on income taxes in the 4th and 5th years		
Rubber	Farmers: Low annual interest rate of 9%	Farmers: Zero land-use tax to invest in remote areas	Enterprises: 20% for general enterprises; 15% for enterprises investing in remote areas  Enterprises: Zero or 50% discount on land-use taxes within 7 years or more, depending on regional conditions  (The national enterprise income tax is 25%–28%)	Enterprises: Reduction in VAT taxes applied widely by years	Enterprises: Financial support to import machine and equipment if the exchange rate is highly fluctuating
Sugar	Farmers: Loans of up to VND 10 million (USD 500) without mortgage  Low interest rates for poor households  Enterprises: Low interest rates for 5–15 years and high amount of loans for enterprises	Farmers: Zero land-use tax to invest on un-fertilized land  Enterprises: Zero or 50% discount on land-use taxes within 7 years or more, depending on regional conditions			
Timber	Farmers and enterprises: Loans at low interest rate to plant forest trees and export wood-processing products				

Source: CIS (2012)

model to support the government's various targets. Therefore, the general impact of the policies implemented on specific industries—for instance, tea products—cannot be analyzed.

### **Development of “New Rural Communes”**

Since 1986, the GoV has been focusing on developing rural areas and rural people, especially those considered poor. In the mid-1990s, it implemented the Program for Poor Communes (the so-called Program 135). The program provided international funds to the poorest communes in the early 2000s. However, by 2008, after more than 20 years of the country's innovation, weaknesses were observed that impacted negatively the country's sustainable growth, such as the unbalanced growths between sectors and regions (e.g., rural and urban), income inequalities between population groups (e.g., rich and poor), and the increasing ecological degradation.

The GoV thus put in place a new comprehensive program to develop agriculture, rural areas, and farmers by 2020. Called New Rural Communes, this program has been implemented in 11 selected communes since early 2009. Its funds mainly come from the central government, local governments, and farmers, as well as private enterprises, international donors, among others. Its overall goal is “Building new rural economic infrastructure—modern society, modern economic structures, and production organizations—associated with the fast-growing agricultural sector (including the service subsector); more stable rural society, rich culture and ethnic identity; enhanced intellectual, ecological, and environmental protection; and strengthened rural political system under the leadership of the Communist Party.” (DoIC 2010) It is similar to the New Villages Program or Saemul Undong implemented in South Korea in the 1970s (Hieu and Dang 1999).

The program uses 19 criteria to determine which communes can become New Rural Communes. These criteria, classified into five (Hung 2010) are:

1. Planning and implementation
2. Economic infrastructure (social communication, irrigation, electricity, schools, cultural facilities, rural markets, post offices, and residential houses)
3. Economic and production organization (income, poverty, labor structure, and forms of production organization)
4. Cultural and social (education, health, culture, and environment)
5. Political system (strong political and social security and social order)

The Steering Committee discussed the outcomes of the pilot program in order to glean insights from the experience for use as inputs in scaling up the program throughout the country. However, the success of the program has been controversial mainly due to the methodology of its implementation. The central office designed the qualitative and quantitative indicators of success of the communes. On the other hand, the communes and their local people have their own characteristics, which are highly diversified. The gap between the indicators and the actual situation at the communes cannot be easily narrowed down in only about 3–4 years. The central office usually set high targets that require high state investment. High state investment targets in 2010–2020 are not realistic because the state budget has been reduced yearly since 2008. Vietnam's economic growth rate is expected to speed up only after 2015.

## AN ASSESSMENT OF THE OUTCOMES OF VIETNAM'S ECONOMIC PLAN, 2006–2010

Due to the lack of statistical data (Hieu et al. 2010) and reliable quantitative economic research, this section assesses qualitatively the relationship between planned levels, implemented policies, and outcomes of Vietnam's economic plan for the 2006–2010 period.

### **Economic and Agricultural Growth of Vietnam, 2006–2010**

When Vietnam began to implement its economic plan for 2006–2010, it encountered a lot of unexpected factors that affected the GoV's plans. In December 2006, the country became an official member of the World Trade Organisation (WTO). Being a new and inexperienced WTO member, Vietnam experienced severe disadvantages in its import and export activities between 2007 and 2010 due to 13 cases involving lawsuits on trade remedies as well as anti-dumping lawsuits related to countervailing at the national level (Huyen 2011). In addition, the economic plan for 2006–2010 coincided with the global financial crisis (VCBS 2011). No quantitative empirical research on how the global financial crisis affected the economy of Vietnam is known, however.

Vietnam is an open and export-oriented economy; its total exports account for about 50 percent of GDP, resulting in two opposite impacts. The negative impact is high inflation rate. Because Vietnam relies much on imported inputs (e.g., high-yielding varieties and agricultural machines), its inflation rate gets pushed up when the prices of these commodities increase. In 2008 and 2009,

annual inflation reached over 20 percent, the highest level since the country's economic crisis in 1984–1986. Vietnam was one of the countries whose unemployment rate increased noticeably, from 4.6 percent in 2007 to 10.2 percent in 2009 (Table 7). The positive impact is revenues from exports. Vietnam has benefited from the escalation of world agricultural prices because it has been a major exporter of crude oil, rice, coffee, pepper, and cashew in the last 20 years (Figure 1). The increase in export of these commodities contributed to the overall economic growth of Vietnam during this period.

On the other hand, the global financial crisis hindered Vietnam from achieving three key plans. The country's average inflation rate ( $>20\%$ ) was much higher than its target growth rate ( $<10\%$ ). The actual average economic growth rate (6.3%) was lower than the target (7.5%). Moreover, the agriculture sector's actual growth was higher than the target; thus, the plan to reduce to 15–16 percent the share of this sector in the total GDP was not achieved (Table 2). Given that many other countries also went into recession and had slow recovery due to the global financial crisis, Vietnam's economic performance has been relatively successful.

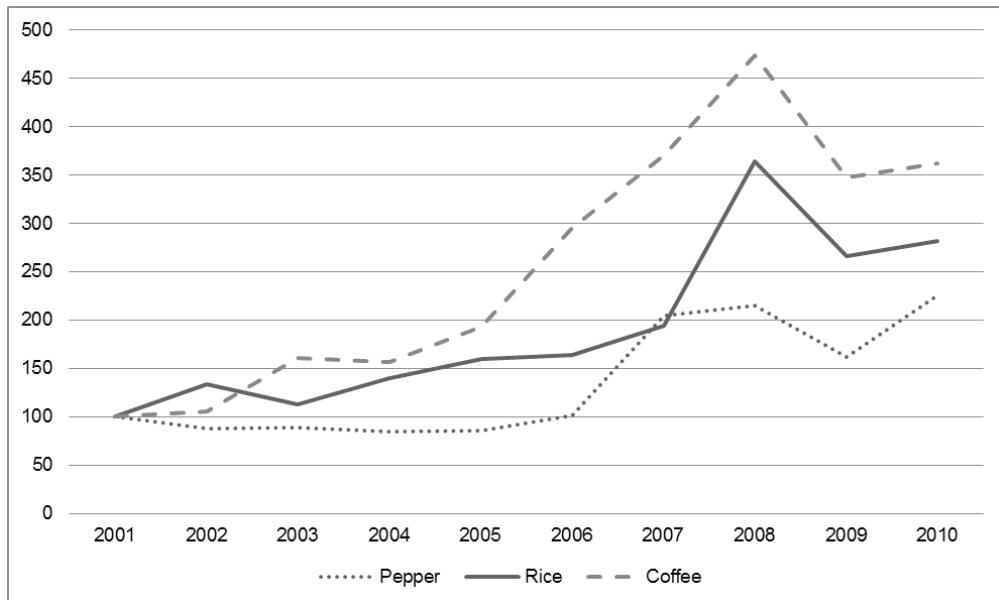
In contrast to the macro outcomes, Vietnam's plans for its agriculture sector were mostly achieved. The average growth of the agricultural GDP reached 3.36 percent per year, exceeding the target of 3 to 3.2 percent. The average growth of the total agriculture output value was 4.93 percent per year, exceeding the target of about 4.5 percent. The average annual growth of the cultivation subsector was 4.29 percent, greater than the target of 2.7 percent. Moreover, the average growth of the total forestry output value was 3.1 percent per year; that of the fishery output value was 8 percent per year (Table 2).

**Table 7. GDP growth, inflation, and the unemployment rate by country (2006–2010)**

Country	2007			2008			2009			2010		
	GDP	Inflation	Unemployment									
Australia	3.6	2.3	4.4	3.8	4.4	4.2	1.4	1.8	5.6	2.3	2.8	5.7
Brazil	6.1	3.6	9.3	5.2	5.7	7.9	-0.6	4.9	8.1	7.5	5	7.4
Cambodia	10.2	7.7	9.3	6.7	25	7.9	0.1	-0.7	8.1	6	4	7.4
China	14.2	4.8	4	9.6	5.9	4.2	9.2	-0.7		10.4	3.3	
Finland	5.3	2.5	6.8	0.3	4.1	6.4	-8.4		8.2	3.7	1.2	9.2
France	2.3	1.5	7.9	-0.1	2.8	7.4	-2.7	0.1	9.5	1.5	1.5	10.5
Germany	3.3	2.3	8.6	1.1	2.6	7.5	-5.1	0.3	7.5	3.7	1.1	7.9
Greece	3	2.9	8.3	-0.2	4.2	7.7	-3.3	1.2	9.5	-3.5	4.7	
Hong Kong	6.4	2.9	4	2.3	4.2	3.5	-2.7	1.2	5.2	7	4.7	4.3
India	9.8	6.4	4	4.9	8.4	3.5	9.1	10.9	5.2	8.8	12	4.3
Indonesia	6.3	6.4	9.1	6	9.8	8.4	4.6	4.8	8	6.1	5.1	
Italy	1.7	1.8	6.1	-1.2	3.4	6.7	-5.1	0.8	7.8	1.5	1.5	9.3
Japan	2.4	0.1	3.9	-1.2	1.4	4	-6.3	-1.3	5	4	-0.7	5
North Korea	5.1	2.5	3.2	2.3	4.7	3.2	0.3	2.8	3.7	6.2	2.9	4.1
Laos	7.5	4.5	3.2	7.5	7.6	3.2	7.6		3.7	9.4	6	4.1
Latvia	10	4.5	3.2	-4.2	7.6	3.2	-18		3.7	-0.3	6	4.1
Malaysia	6.5	2	3.2	4.8	5.4	3.3	-1.6	0.6	3.7	7.2	1.7	
Myanmar	12	2	3.2	10.3	5.4	3.3	10.6	0.6	3.7	10.4	1.7	
Netherlands	3.9	2	3.6	1.8	5.4	2.8	-3.5	0.6	3.4	1.7	1.7	4.4
Norway	2.7	2	2.5	5.4	2.6	-1.7	0.6	3.1	0.7	1.7	1.7	3.2
Philippines	6.6	2.8	6.3	4.2	9.3	7.4	1.1	3.2	7.5	7.6	3.8	7.3
Portugal	2.4	2.8	6.3	2.6	7.4	-2.9	-0.8	7.5	1.4	1.4	7.3	
Russia	8.5	9	6.1	5.2	14.1	6.2	-7.8	11.7	8.4	4	6.9	8.6
Singapore	8.8	2.1	4	1.5	6.5	3.2	-0.8	0.6	4.3	14.5	2.8	
South Africa	5.6	7.1	4	3.6	11.5	3.2	-1.7	7.1	4.3	2.8	4.3	
Spain	3.6	2.8	8.3	0.9	4.1	11.3	-3.7	-0.4	18	-0.1	1.9	
Sweden	3.3	2.2	6.1	-0.6	3.4	6.2	-5.2	-0.5	8.3	5.6	1.2	9.3
Switzerland	3.6	0.7	3.6	2.1	2.4	3.4	-1.9	-0.5	3.7	2.7	0.7	4.4
Thailand	5	2.3	1.2	2.5	5.4	1.4	-2.3	-0.9	1.5	7.8	3.3	
USA	1.9	2.9	4.6	3.8	5.8	-3.5	-0.4	10.2	3	1.6		
Vietnam	8.5	8.3	4.6	6.3	23.1	5.8	5.3	7.1	10.2	6.8	8.9	

Source: CIS (2012)

**Figure 1. Export price indices of coffee, pepper, and rice in Vietnam  
(price levels in 2001 = 100) (2001–2010)**



Source: MARD (2011)

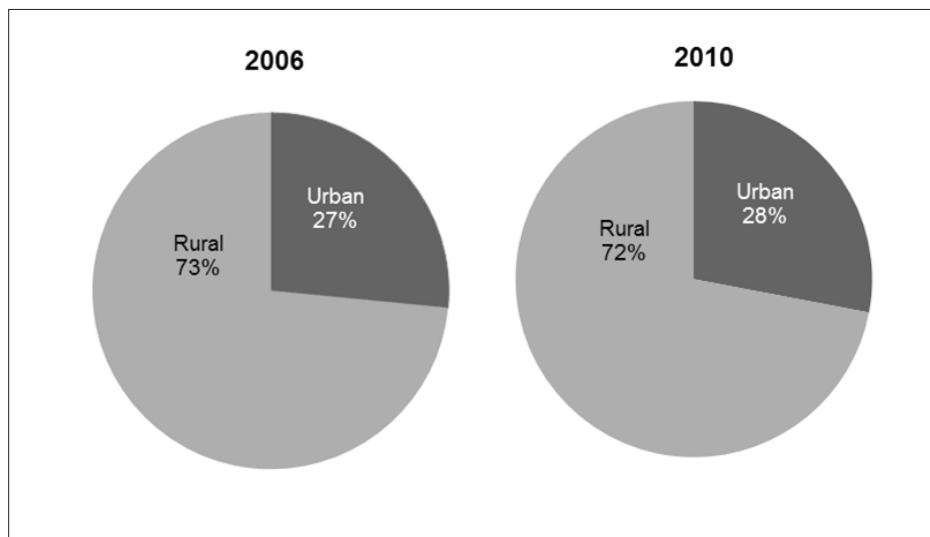
Like the past economic plans, most “relative” plans/targets<sup>4</sup> of the GoV were not achieved in the 2006–2010 economic plan. In terms of contributions to the agricultural GDP, the livestock sector accounted for a small (unchanged) proportion of 24.5 percent in 2010; the cultivation subsector still accounted for a large (slightly changed) share of about 74 percent. In terms of labor force, the rural share in the country’s labor force decreased by only 1 percent, from 73 percent in 2006 to 72 percent in 2010 (Figure 2). Only one “relative” plan had been successful: the share of the rural labor force in rural industry increased—that is, non-agricultural labor increased from 28 percent in 2006 to 34 percent in 2010 (Figure 3).

### Qualitative Assessment of Factors Affecting Agricultural Growth and Rural Development

Due to the lack of statistical data and reliable quantitative economic research, this section summarizes the experts’ qualitative arguments on the key factors affecting the growth of Vietnam’s main commodities by comparing two five-year economic plans, 2000–2005 and 2006–2010, in order to draw policy implications to facilitate sustaining the growth of these commodities and the development of rural areas (DoC 2010; DoP 2011; MARD 2010; CIS 2012).

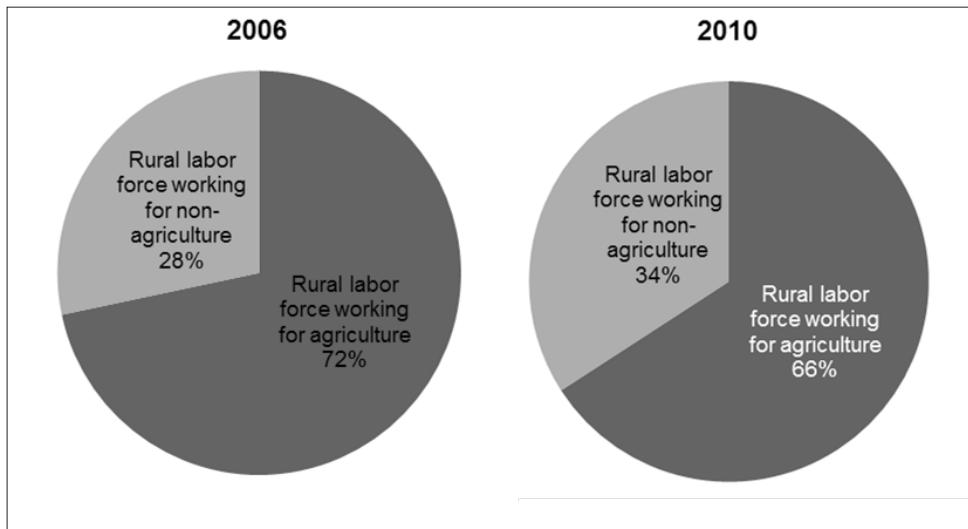
<sup>4</sup> Relative plan/target means the GoV aims to achieve a comparative objective but does not announce any quantitative figure. For example, Vietnam wants to reduce the income gap between urban and rural areas, the government usually releases a statement “In the 2011–2015 period, the income of rural people will be basically increased.” For this statement, people will not know how much the increase is; and if the increase is high, people still do not know whether this increase is higher or lower than the income growth of the urban population.

**Figure 2. Share of labor force by urban and rural area, 2006 and 2010**



Source: MARD (2011)

**Figure 3. Proportion of rural labor force by type of job, 2006 and 2010**



Source: MARD (2011)

Vietnam's agriculture sector has 11 major products: rice, pepper, cashew, coffee, tea, sugar, meat, fruits and vegetables, timber and wood-processing, fish, and salt (Table 8). In the 2006–2010 period, most factors changed positively. The quality of seeds, varieties, seedlings, and breeds improved, especially for rice, coffee, tea, seafood and wood. The quality outcome was unclear though for cashew, vegetables, and meat products. The share of high-quality final products was very low, except for fishery products.

The cultivation areas of most agricultural commodities increased or decreased only slightly, but that of rice increased much due to the increase in the incidence of third cropping between winter and spring. That of sugarcane decreased noticeably due to low farm-gate prices.

The productivity of most agricultural commodities increased, causing increases in their outputs. Tea and sugarcane registered the lowest levels of productivity in the world.

In terms of agricultural processing factories, their numbers and production design capacities were usually too high, and there were not enough raw materials to supply the factories. For example, raw materials of tea and sugarcane met only about 40 percent and 80 percent, respectively, of the capacity of their processing factories. In the livestock subsector, the value share of processed products had been small, about 20 to 25 percent. Generally, the factories/processing technologies are old and obsolete, especially those for cashew and salt.

The number of irrigation systems that were constructed increased annually, contributing to the expansion of agricultural areas, especially for rice production. Many irrigation constructions are already degraded due to lack of funds for maintenance and operation.

In terms of markets, similar to past economic plans, farmers continued to sell at low prices due to market imperfection. Export prices were mostly higher, except for tea products.

In terms of rural development, a comprehensive review cannot be done because the New Rural Communes program had been implemented for only three years in 11 communes across the country since 2009. The Steering Committee has been reviewing the program in 2013 and 2014 to draw experiences and is developing realistic methods and theories for application throughout the country in support of targets set for rural areas by 2015 and 2020 (Table 8).

Contrary to the intention of the GoV, credit policies have been seen as unfair and unfavorable to the private sector and farmers. They were perceived to favor the wood, wood-processing, sugar-processing, and salt industries. In terms of trade protection policies, most agricultural products are not protected, except sugar and livestock.

The above qualitative assessment indicates that unlike in the past, the growth of the agriculture sector does not depend on physical inputs like expansion of the cultivated land area but on soft factors like market transparency, certified quality products, and higher state investment in rural areas.

**Table 8. Qualitative assessment and comparison of factors affecting the growth of main agricultural products between 2006–2010 and 2000–2005**

Field	Rice	Coffee	Pepper	Cashew	Tea	Fruits and Vegetables
1 Seed/variety used	Improved	Improved	Improved	Unknown	Improved	Unknown
2 Area/number of head/ amount of work	Increased 3rd crop of rice	Stable at about 500,000 ha	Stable	Reduced	Kept at 135,000-150,000 ha	
3 Productivity	Increased	Sharply increased	Sharply increased	Reduced	Increased	Unknown
4 Production	Increased	Increased	Sharply increased	Reduced	Increased	
5 Farm-gate price	Low	Low	Harmony w/ enterprises	Unstable	Low	Low
6 Export price	Higher	High	High	Unstable	Low	
7 Import price						
8 Technology	Improved but still backward, large loss rates		Advanced processing technology	Less application in processing, preservation		Improved but still backward, large loss rates (20–25%)
9 Amount and quality of raw material inputs				Lack of raw materials for processing	Low	Low
10 Quality of products	Low, not GLOBAL GAP yet	Low, not standard of ICO yet; rate of rejection is the world's largest	Improved		Lowest in the world	Low
11 Household production scale	Small	Small, 2-5 ha/household			Small	Small
12 Processing factory production scale	Most are old and backward	Small	Large and modern	Larger than material areas	Small	Larger than material areas
13 Credit policy	Incentive for state enterprises	No incentive	No incentive	No incentive	No incentive	No incentive
14 Trade protection policies		None	None	None	None	None
15 Number of irrigation water						
16 Number of channels and dikes						

Source: CIS (2012)

Table 8. *Continued*

	<b>Field</b>	<b>Fishery</b>	<b>Timber</b>	<b>Livestock</b>	<b>Sugar</b>	<b>Salt</b>	<b>Irrigation</b>
1	Seed/variety used	Improved	Improved	Unknown	Unknown		
2	Area/number of head/ amount of work	Increased	Increased	Increased	Reduced	Increased	Irrigated rice area increased
3	Productivity	Increased	Increased	Increased slightly	Low vs. with world	Increased	
4	Production	Increased	Increased	Increased	Increased	Increased	
5	Farm-gate price		Increased	Increased	Low		
6	Export price	High					
7	Import price	Increased				Mainly have to import	
8	Technology	Increased	Unknown		Medium	Backward	Backward, degradation works
9	Amount and quality of raw material inputs	Increased	Increased	Animal feed is not guaranteed; high prices, mostly have to import	Lack of materials		
10	Quality of products	Increased	Unchanged	Very low, uncontrolled		Low	
11	Household production scale	Unchanged	Unchanged	Mostly small		Small	
12	Processing factory production scale	Increased	Increased	Small	Larger than material areas	Small	
13	Credit policy	No incentive	Has incentive	Unfair	Has incentive	Has incentive	
14	Trade protection policies	None		None	Strong	Strong	None
15	Number of irrigation water						Increased
16	Number of channels and dikes						Increased

Source: CIS (2012)

## CONCLUSION

Vietnam's national, regional, and industrial objectives usually have qualitative and quantitative targets for given periods of time. In the 1986–2005 period, Vietnam carried out economic reforms to gradually move from a centrally planned economy to a market-oriented one. Most key plans were achieved, including high economic growth, low inflation, and decreasing poverty rate. There are four main reasons for these achievements. First, the GoV gave more autonomy (rights) to producers, enterprises, and businesses, especially the private sector. Second, international trade policies were integrated deeper into the regional and international economies. Third, in the state sector, financial enterprises were restructured to be more adaptive to a market-based economy. Fourth, the GoV had used policies and administrative orders to stabilize macro-prices, including inflation, exchange rates, and interest rates to stimulate and sustain economic growth. The weak points in Vietnam's economy during this period were the very slow structural changes in the labor force (agriculture sector versus other sectors), environmental degradation, and widened income inequality.

In its economic plan for 2006–2010, the GoV aimed to sustain economic growth and address the weak points observed in the previous economic plans. However, Vietnam's economy met many difficulties during this period due to the global financial crisis, the worst since the 1930s. As a result, Vietnam's average inflation rate (>20%) was higher than expected (10%). The average GDP growth rate (6.3%) was lower than the target (7.5%). However, globally, the country's economic growth and inflation control were seen as successful vis-à-vis other countries. In addition, the share of labor force by industries in rural areas had increased rapidly. While the impact of the New Rural Communes program cannot be assessed at this

time, the program's investments in agricultural production and rural areas have been observed to bring about positive changes.

The qualitative review indicates that many key "relative" plans of the GoV had not been successful across several economic plans. The change in the economic structure and share of the labor force by sector has been slow. Moreover, the shares of the agriculture subsectors in the total agricultural GDP are nearly unchanged. The value share of high-quality products (high value-added products) has increased slowly. Income inequalities between areas, rich and poor, and ethnic groups have been widening. Failure to achieve the objectives of the above "qualitative" plans will restrain the development of Vietnam's economy, specifically its goal of being a modern industrialized country by 2020. The growth of the agriculture sector in the future relies on soft factors including market transparency, more certified quality products, and higher state investment in rural areas.

To sustain the development of the country in general and the agriculture sector in particular, the GoV should invest more in economic research that apply large-scale models, such as I-O analysis, spatial equilibrium model (including multiple products, multiple sectors, multiple spaces), and general equilibrium model (including multiple products, multiple sectors). Such models can help the GoV in managing macro-prices, inflation, exchange rate, and interest rate, and in bringing about structural changes in the economy, labor force, and products. Finally, the outputs of large-scale mathematical economics research can provide harmonized quantitative targets to the provincial, regional, and national plans. Consequently, the economy will become more transparent, resource allocation will be more effective, and the impact of each policy can be measured. The GoV can adjust its policies if external factors change; it can draw from its experience in order to craft more effective

policies. In addition, outputs of these models can suggest quantitative targets for the following important areas:

- Increase in investment in the agriculture sector and rural areas
- Application of national and international quality standards for primary and processed agricultural products
- Application of high-quality and high-yielding varieties of agricultural commodities, especially cashew, vegetables, meat, tea, and sugarcane
- Balances between factories' production capacities and level of raw material supplies, especially for cashew, wood-processing products, vegetables, and sugar
- Increase in investment in maintenance and repair of irrigation facilities

State authorities need to address the following:

- quality of processing technologies used in most agricultural processing factories, especially state enterprises;
- clearer market transactions for farmers who usually sell their products at prices lower than their shadow prices; and
- limited protection for ineffective large-scale state enterprises.

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