

**A Tiger in Search of a New Path:
The Economic and Environmental Dynamics of Reform in Viet Nam**

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Abstract

Viet Nam's transition to a market-based economy has direct and indirect impacts on natural resource use and environmental quality. This paper examines the impacts of changes in two key areas, shifts in the allocation of capital and control over production decisions, brought about by the government's program of economic reform. We present in detail institutional changes and their consequences in three sectors: manufacturing, agriculture, and forestry. Finally, we discuss policies and institutional arrangements that would expand flexibility of production while more effectively satisfying environmental objectives.

1.0 Introduction

Viet Nam is at a critical juncture in its economic development. Reforms currently underway are transforming the institutional framework underlying economic activity. Since the early 1980's the Vietnamese government has liberalized economic production and exchange. Resource allocation has shifted toward market mechanisms with the goal of increasing flexibility and efficiency of economic activity. Economic reform has also strengthened the role of the private sector in Viet Nam's economy. State enterprise reform, the 1993 Land Law, and tax reforms have transferred assets from the public to the private sector. Finally, economic reform has liberalized international trade and investment through the Foreign Investment Law (1987) and more recent foreign trade reforms.² These institutional changes, while causing direct economic shifts, are exerting a profound influence on Viet Nam's environment.

This paper analyzes how two key changes – shifts in the allocation of capital and control

over production decisions – are altering human pressure on natural resources and environmental quality in Viet Nam. Privatization and internationalization of the economy are altering patterns of capital accumulation among sectors and sub-sectors as capital allocation shifts from administered to market allocation. Marketization is shifting control of production decisions from the state and cooperatives to the private sector. We examine how institutional changes affect manufacturing, agriculture, and forestry, and how these in turn affect natural resource use and environmental quality in these sectors.

Shifts in capital allocation and control of production decisions are transforming human pressure on natural resources and environmental quality. Economic reform is decreasing pressure for activities that mainly draw upon privately-controlled capital, that offer investment opportunities of only average or low profitability, and in which the consequences of resource use directly affect the user. Pressure is increasing in sectors that offer profitable opportunities for private investment, or that require either public access to capital or functioning mechanisms of public control over private production decisions for the maintenance of environmental assets. Consequently, strengthening the role of the public sector in capital accumulation and fostering mechanisms that safeguard environmental objectives against private interests of resource exploitation could mediate conflicts between the economic and environmental dynamics of economic reform.

2.0 Sectoral Cases

Reforms are having differentiated impacts among economic sectors. We compare responses in the manufacturing, agriculture, and forestry sectors. In general, the consequences of reform vary according to the degrees to which sectors depend on public access to capital, offer profitable opportunities for private investment, and require political mechanisms to balance short-term interests in resource exploitation with environmental and equity objectives.

2.1 Manufacturing Sector

Industrial development is at the heart of the Vietnamese government's program of economic growth and modernization. While industry has developed slowly over the last 40 years, it is now being rapidly transformed. Privatization and marketization are driving changes in the industrial sector, involving: 1) changing control over capital accumulation (increasingly carried out by private domestic and foreign investors); and, 2) changing forms and relations of government control over production.

The Vietnamese government formerly played a powerful and tightly linked role in resource use for the industrial sector. Line ministries were responsible for promoting capital accumulation and for determining access to natural resources. With recent reforms, the government is switching to a more complex role regarding industrial production and resource use. Line ministries are reorienting control over individual enterprises, shifting their efforts from long to short-term strategies and from production to profit targets. With the growth of private domestic firms and foreign direct investment (FDI) in manufacturing, government agencies are also assuming new regulatory roles.

2.1.1 Former System of Control over Industry

Over the last 30 years, government bodies, primarily line ministries, made almost all decisions regarding large-scale industrial activities. The government divided industrial output into two categories, Group A for producer goods (generally referred to as heavy industry), and Group B for consumer goods (generally thought of as light industry). Control over production was divided between state (central versus local) and non-state (private and cooperative) enterprises. Product mixes and quantities of outputs, as well as the specifics of technological and resource inputs into production were determined by the Ministries of Industry. Capital allocations were proposed by the Ministries of Industry and approved by the Ministry of Finance. The largest State

Owned Enterprises (SOEs), which primarily focused on heavy industry, were controlled from Hanoi. The state sector accounted for 74.4 percent of the value of industrial output in 1992, cooperatives accounted for only 2.4 percent, and the private sector contributed 23.2 percent of industrial value.³

Employing essentially a Soviet model of industrial development and modernization, from 1961 to the mid-1980's, government development plans focused primarily on heavy industry, which received the overwhelming majority of state funds.⁴ Key industries included: iron and steel, chemicals and fertilizers, cement, coal, vehicle manufacture, machinery production, as well as light industries such as foodstuffs and textiles. A breakdown of industrial output since 1980 is presented in Table 1.

Table 1 - Structure of Gross Production of State Enterprises (%)

	1980	1986	1990	1992
Electricity	7.3%	8.5%	9.2%	9.1%
Fuel industry (Oil & Gas)	3.0	2.8	9.5	23.2
Metallurgy	3.2	2.0	2.5	2.7
Production of equipment	8.3	8.8	6.9	2.6
Electric and Electronic technology	1.3	2.1	3.8	1.8
Chemicals and Fertilizers	11.9	11.6	12.0	8.0
Wood products	9.7	4.5	2.1	1.1
Foodstuffs	21.5	24.0	21.6	30.1
Textiles	15.0	16.7	15.3	8.5
Other	19.8	19.0	17.1	12.9

Source: Tran Hoang Kim (1994), *Economy of Vietnam - Review and Statistics 1994*, Statistical Publishing House, Hanoi, Table 57, p.153.

In the past, the structure of control over industry and the stated objectives of government planners created incentives for factory managers to focus their attention primarily on meeting production targets. Profits, in the capitalist sense, were not a critical factor in production decisions, although accumulation of surplus was a stated objective. In state run industrial enterprises individual interests, that is profits, were separated from production decisions, so that social objectives would drive decisions on what to produce and in what quantities. Resource

inputs were priced through planning decisions or considered “free” goods (such as water), resulting in a general atmosphere of inefficient use of resources and ineffective production methods.⁵ Environmental considerations were rarely included in production decisions.

The state’s primary method of extracting surplus from industrial firms involved a taxation system based on a target “contribution to the budget”.⁶ To the detriment of industrial enterprises capital was not regularly reinvested in production technologies. As a result, Vietnamese industry is now left employing very old, often obsolete manufacturing technologies. Wars and past technical assistance from Russia, China and the US, have created a network of factories that use technologies of drastically different vintages and qualities, many dating from the 1950’s and 1960’s.

Pollutant emissions from industry in Viet Nam are very high relative to state-of-the-art production technologies. Unfortunately, no comprehensive environmental data is available for industry in Viet Nam. The few available figures highlight pollution problems from existing industries such as high biochemical oxygen demand (BOD) and chemical oxygen demand (COD) emissions to rivers and canals.⁷ Worker health and safety conditions are also quite severe throughout Vietnamese industry. A recent survey of working conditions showed that approximately 60 percent of workers were exposed to polluted air, excessive noise, and high temperature conditions in the workplace.⁸

While very little capital was reinvested in the maintenance or upgrading of production equipment in factories, even less seems to have been invested in environmental or worker protection measures. As of the summer of 1994 only one secondary wastewater treatment system was operating in all of Viet Nam. The country currently has no hazardous waste management system and very little air pollution control equipment is in operation. However, non-technical measures have been employed to respond to environmental concerns from industry. For example, mechanisms existed for bringing public complaints and levying fines against polluting factories. It

appears that local demands for pollution abatement and compensation were quite successful in some provinces while national environmental controls were almost never exercised effectively.

2.1.2 Institutional Changes and Environmental Impacts

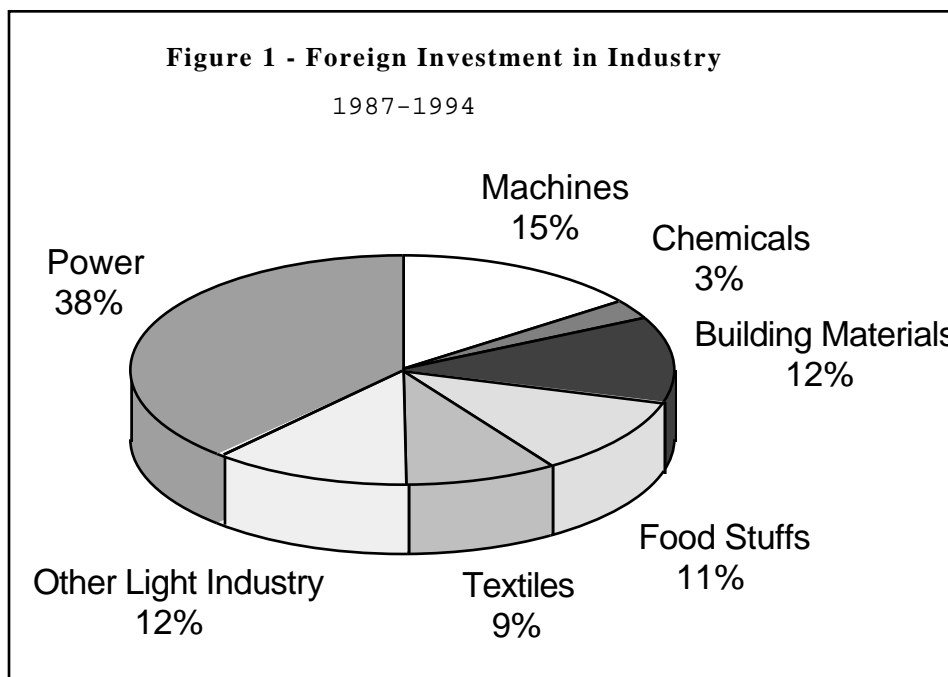
Institutional transformations in industry are causing three major changes which have impacts on resource use and environmental quality: 1) a shift in output among industrial sectors and an overall increase in production in certain sectors; 2) a shift in capital accumulation from state to private firms; and, 3) changes in mechanisms of control over industry through both direct management and control over access to resources and capital. Since the late 1980's the government has shifted its support of industrial sectors, and opened the way for the expansion of non-state industry through domestic investment and growth of foreign direct investment in manufacturing.

Rapid growth in industry is creating new stresses on uses of natural resources and the environment. Growth of 14 percent per year in industrial activities (with some sectors growing by 100 percent in the last 2 years) is requiring increased extraction of natural resources, increased production and use of energy, and more transportation and other infrastructure services, all of which result in more wastes and pollution. Put simply, increased material through-put in the economy has environmental ramifications.

There is also a shift in the structure of industry towards more polluting sectors, and from traditional pollutants (such as BOD) to complex toxic compounds (such as heavy metals and hazardous wastes). Extraction industries such as oil and gas production, and mining, which are targeted for expansion, will cause significant environmental impacts. Other resource-based industries such as food processing and aquaculture also result in increased pollution loads (BOD in particular) to rivers. In the future it is likely that highly polluting sectors such as petrochemical production will bring new hazards to Viet Nam.

The growth of private domestic and foreign manufacturing firms in Viet Nam is creating a whole range of other problems. Figure 1 shows the general breakdown of FDI in industry in Viet Nam. FDI made up more than 25 percent of overall investment in 1993.⁹ The composition of new industries – likely to constitute half of industrial capacity within 10 years – will have increasing impacts on resource use and environmental quality.

Access to capital is perhaps the most important issue facing factory managers. While SOEs still receive some special privileges on access to capital, competition for scarce funds has become intense. The cost of capital has risen rapidly (particularly compared to a previous situation of grants for factories). Capital, it seems, is now only available for investments that will increase productive output and sales in the short-term. Factories receive loans if they can demonstrate that investments will have strong short-term returns. A tacit constraint on capital thus exists to exclude investments in pollution control equipment or longer-term investments in pollution prevention technologies.



Source: Tran Hoang Kim (1994) , *Economy of Vietnam - Review and Statistics 1994*, Statistical Publishing House, Hanoi.

Internal firm incentives and goals are also changing. Ministerial and external pressures are driving a transition from focusing on output, to focusing more on profitability. Competition based on price and quality - the new bottom-line for industry - is creating pressure to lower costs and improve product quality standards. A new focus on export-oriented production is also driving demand for new production technologies. This is creating a positive pressure for the reduction of adverse impacts of specific industrial activities. The expansion of overall production levels, however, will likely result in increased pollution levels even using new production technologies. Rapid expansion of the scale of industry in Viet Nam will have adverse environmental impacts unless some means of environmental control are put in place.

Over the last several years, marketization of natural resources has increased prices of inputs for production. Price changes present new constraints on industrial production, creating incentives for more efficient use of natural resources, and reducing quantities of materials used per unit of output. Industries involved in the extraction of natural resources may also have increased incentives for faster extraction of raw materials as prices rise, as is the case in the mining sector.

Changes in capital accumulation and capital allocation are resulting in shifts in location and concentration of industry as well. More than half of foreign investment has been going to projects based in Ho Chi Minh City and Hanoi.¹⁰ The government obviously has less control over citing decisions under market reforms. Attempts at developing Export Processing Zones (EPZs) and implementing urban zoning measures are in their early stages, and there is currently little incentive for private firms to locate in EPZs.

State control over industrial activities has changed significantly since 1989. Along with changes in the roles of line ministries the Vietnamese government has established an institutional structure for environmental protection. The legislative and planning framework for environmental

protection in Vietnam operates at three primary levels: 1) the national Environmental Protection Law (EPL) administered by the Ministry of Science, Technology, and Environment (MOSTE); 2) sector-specific laws and regulations regarding natural resource use that predate the EPL; and, 3) provincial and city-level environmental regulations and standards. The EPL is an umbrella law establishing broad responsibility and directions for environmental policy. State responsibilities range from standards setting to public education, and from local inspections to international cooperation. At this point however, the EPL is much stronger in its mandate than in its implementation. For instance, while there is a requirement that all industrial enterprises (new and old alike) complete Environmental Impact Assessments (EIAs), the government does not have trained personnel to evaluate EIAs, nor is there a timeline for compliance or for decisions on how to respond to EIAs. The EPL has provisions for levying fines against polluters, but does not explain how fines will be determined nor who will enforce them. The EPL prohibits the “importation of technology and equipment not meeting environmental standards,” but provides no means to monitor importation of equipment.¹¹

MOSTE, established in 1992, and the National Environment Agency (NEA) established in 1993, are the central national bodies responsible for environmental protection. With decentralization of control over production, however, it is becoming increasingly difficult for the state to implement national environmental policies, which are based largely on a western model of environmental regulation. In some instances, economic goals are set in direct opposition to environmental goals. Resolving conflicting goals within state agencies remains a critical issue for future industrial development in Viet Nam.

2.2 Agriculture

Agriculture remains the dominant economic sector in Viet Nam. In 1991, agriculture accounted for roughly 40 percent of GDP and approximately 72 percent of the total labor force.

Agricultural reforms following the Sixth Party Congress in 1986 have fundamentally transformed rural institutions. Agricultural production has shifted from a cooperative system to household-based production.¹² Market pricing has replaced rice equivalents as a measure of the value of agricultural outputs.

2.2.1 Cooperatives and State Investment in Water Control

With a national objective of self-sufficiency in basic foodgrains, efforts to stabilize, intensify, and expand rice production were central to government policies under central planning. Water control projects, technological innovation, and cooperatives were to transform rural ecosystems and livelihood and secure stable food supplies as well as their equitable distribution. At the local level, direct intervention of the cooperative managed virtually all aspects of paddy production, from the ownership of capital equipment to the procurement of agricultural products. At the same time, cooperatives provided their members with guaranteed employment and free access to social services, such as schools and health clinics. Yet while these unified systems of control homogenized wet-rice production, resource use under relative household control, such as on family plots and ecosystems surrounding paddy fields, showed much more diversified patterns.

Central planning facilitated the development and operation of a highly interdependent system of wet-rice agriculture. Despite the absence of significant rural industrialization, this system sustained an average population density of more than 1000 persons/km² in the Red River Delta. Population density per cultivated area of land in the Red River Delta was comparable or exceeded levels found in other East Asian "rice bowls".¹³ Rice yields reached 10-15 tons per hectare per year (t/ha/year) on the best managed fields in the Red River Delta, thus achieving the feasible genetic potential of the available high yielding varieties under actual conditions.¹⁴

As rural development policy centered around the stabilization of paddy production, it discriminated against more diversified patterns of resource use that reflect differences in

agroecological characteristics. Land reclamation and irrigation development in the Long Xuyen Quadrangle and Plain of Reeds reduced agricultural yields in down-stream areas of the Mekong Delta. Water control and land reclamation for rice production also led to the reduction of fisheries, the acidification of household water supplies, and changing wildlife habitats in estuarine and coastal zones. The Hoa Binh reservoir, which supports crucial energy supplies for irrigation and drainage systems in the Red River Delta, displaced 58,000 upland cultivators and led to deforestation and soil degradation in the Da River watershed.

Paddy production became highly vulnerable to pest outbreaks. In 1991, 430,000 ha, or 50 percent of the winter-spring, and 300,000 ha of the summer-fall cropping area in the Mekong Delta were reportedly affected by the Brown Plant Hopper.¹⁵ Consequently, southern farmers in 1990-91 far exceeded pesticide usage in other Asian wet rice growing areas. Pesticide levels in surface water in the Mekong Delta exceeded the maximum permissible values given in guidelines issued by the World Health Organization (WHO) for drinking water quality.

Resource use in non-paddy agroecosystems was highly regulated by local constraints and needs, with different environmental consequences. The barren hills of the midlands surrounding the Red River Delta have become a widely-cited symbol of land degradation in Viet Nam.¹⁶ The hills were freely exploited by rice farmers for fuelwood collection, fodder supplies and grazing areas for livestock. Along the Central Coast, farmers cut trees that stabilized sand dunes, with negative consequences for agriculture, villages, and roads as sand intrusion increased. On the other hand, mangrove and wetland ecosystems have been exploited selectively for wood and peat extraction, hunting, honey, and fishing. In the highlands, swidden cultivators developed diverse, locally adapted responses to the problems of increasing population pressure and environmental variations.

Resource use under relative household control proved dynamic and diversified. Households developed highly productive systems of gardening, fish raising, and animal

husbandry on the "five percent plots", which each household received from the cooperative for private management. The products of this land accounted for a large share of household income and played an important role in the supply of essential nutrients. The houseplots displayed very diverse resource use patterns both in terms of inter-regional and inter-household variations as well as biological diversity on the plot.

Cooperatives and state investment in water control did not accomplish the goal of feeding the rapidly growing population. Between 1955 and 1980, per capita rice production in the north decreased. In the south, rice output per capita did not reach pre-war levels.¹⁷ At the same time, household production on the "five percent plots" flourished and vast areas of non-paddy land were not used productively for the national economy. By 1985, the government classified more than one third of the land as "barren", i.e. not meeting the government's perception of appropriate land use.¹⁸

2.2.2 The "Household Economy"

Beginning in 1981, decision-making authority and control over physical assets were gradually transferred from the cooperative to households. The issuance of long-term land use rights in particular have shifted control of production decisions to households. Lower taxes and the abolishment of state procurement are facilitating capital accumulation in the household sector, limiting government access to capital. The newly established banking system is unifying control over economic activity across sectors and agricultural sub-sectors. Rural resource use is forced to directly compete for scarce funds with high returns to investment in other areas, such as trade and real estate markets.

Competitive allocation of capital and household control over production decisions are increasing regional differences in land use, intensity, and productivity. Mekong Delta farmers for instance, almost single-handedly drove the 26 percent growth in rice yields between 1987 and

1989, which allowed Viet Nam to move from a position of a net importer to a net exporter of rice. Per capita production of rice has not grown significantly in other regions. Yet due to its limited potential to generate substantial surplus, rice production is losing out to other crops, such as fruit trees in the deltas and industrial crops in upland regions. According to data collected by the Vietnamese government, perennial agriculture in the Central Highlands increased by 86,000 ha and fruit orchards in the Mekong Delta grew from 91,600 ha to 143,500 ha between 1985 and 1991.

Household control over capital accumulation and the competitive allocation of capital across sectors is increasing the pressure for resource use strategies that yield sizable returns in the short-term, at the cost of long-term and public sector investment. Rapid output increases in rice have been facilitated by households applying increasing amounts of current inputs. Fertilizer use has gone up drastically since the early 1980s, from approximately 172,000 tons per year (in nutrient terms) in 1980-81 to about 500,000 tons in 1989-90, and is projected to exceed one million tons by 1995.¹⁹ Yet production growth is projected to decelerate in the absence of substantial new investments in irrigation and drainage. State investment outlays in irrigation decreased in real terms by about 30 percent between the mid-1980s and early 1990s, reducing their share in GDP by more than a half. About 80 water resources development projects in the Mekong Delta and other smaller projects in the central region, which were begun during the 1980s, have not been completed due to funding shortages.²⁰

Competitive capital allocation is homogenizing resource use on land that was previously under relative household control. The previously self-sustaining, highly diverse resource use systems developed by households are being expanded and transformed toward plantations of high-value fruit trees that require the use of additional fertilizer. Monocultural plantations of industrial crops or fast-growing tree species in the highlands and midlands are replacing the diversity of traditional resource use systems found previously.

Economic reform is fundamentally changing the opportunities for local governments to

control production decisions. Local governments are retaining significant discretion in the implementation of central government policy, and village authorities have revealed flexibility in the implementation of national policies on land allocation. While some villages emphasized food security aspects and distributed land on a fairly equal basis, other villages allocated land with a view to maximize the generation of surplus, giving resource-rich farmers favored access to land.²¹ Yet local governments have lost direct control of production decisions and the financial resources that the cooperatives formerly relied on. Previous safety nets, such as guaranteed employment and free provision of schooling and health services, have largely been dismantled. The reduced economic role of local government is thus contributing to increased differentiation and fragmentation of rural livelihood and resource use. It is also decreasing local opportunities of direct intervention to harmonize the production decisions of more autonomous households with equity and environmental goals.

The consequences of economic reform have been particularly stark in the case of mangrove forests.²² In Minh Hai province more than 100,000 ha of mangrove forests have been converted to extensive shrimp ponds since the early 1980s (see Table 2). The high cost of capital has favored shrimp farming techniques that require low levels of investment and produce quick financial gains, but which cannot sustain viable yields in the long run. As of 1992, 8,000 ha of shrimp ponds had already been abandoned, and abandonment rates can be expected to drastically increase during the coming years. In addition to land degradation and deforestation, shrimp farm development has caused increased coastal abrasion and decline in coastal fisheries.

**Table 2: Shrimp Pond Development in Minh Hai Province 1984-1992
(in 1,000 ha)**

Year	Mangrove Forest	Shrimp Farming	Abandoned Shrimp Ponds
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1985	100.0	22.1	0
1988	60.0	62.0	3.2
1992	50.0	106.5	8.0

2.3 Forestry

Though accounting for only a small share of economic output, Viet Nam's forests have received considerable attention by the government. Forests have been viewed as a crucial element in the utilization of highland and swamp areas. In 1989, the Ministry of Forestry claimed authority over 19 million hectares, almost 60 % of the total land designated as forest land, and thus to be used for forestry.

2.3.1 The Preserve System

Under central planning, forest management attempted to exclude access to forests for the national interest. Direct state management controlled forest resources through a preserve system. State forest enterprises were established to manage land with a slope above 25 degrees. Particularly in remote, sparsely populated areas, forestry was targeted as a leading economic activity and source of employment. In these areas, forest enterprises supported the build-up of social capital, including the construction of roads, development of water supplies, and the establishment and operation of schools. State enterprises were usually run at the district or provincial level of administration and supervised by the Ministry of Forestry.

In the presence of heavy demand for wood products to meet construction, energy, industrial, and international demands, forest enterprises faced difficulties in fulfilling their dual functions of sustainable management and production. The sale of wood products has been attractive as it helped local and provincial authorities generate revenues that were urgently needed

for local and regional development. Cutting beyond levels approved by the Ministry of Forestry has thus been widespread.²³ Furthermore, vast areas of forests have been destroyed to create hydrological reservoirs in support of lowland agriculture.

At the same time, state monopoly over capital accumulation facilitated substantial efforts to replant forests. State-sponsored programs planted trees on slightly more than one million hectares between 1975 and 1989, with annual planting reaching 125,000 ha at the end of the 1980s. However, only between 60 and 70 percent of concentrated forest plantations were considered successful, and successful plantations have not been successful enough to compensate for forest loss due to logging and cutting for fuelwood²⁴.

State control over forest resources could not be enforced against strong local needs of subsistence and income generation. Local needs and constraints shaped forest resource use in a much more diverse pattern than the unified system of state control could provide for. In some areas, essentially open access prohibited individual or collective action for forest preservation and sustainable management. In these areas, fuelwood was a free commodity. In other areas, locally observed rules regulated the use of forests and forest land, protecting local interests in sustainable management against interests in individual exploitation. For example, rotational swidden cultivation has been a persistent feature of forest land use. Though the government spent considerable effort to sedentarize shifting cultivators and stabilize their farming techniques, a large share of forest land in the highlands was still cultivated through swidden practices by the end of the 1980s. Yet rapid population growth and competition for land with migrants have made swidden cultivation one of the main causes of deforestation and land degradation in many areas.

The preserve system has not served well to manage Viet Nam's forests. Forest cover in Viet Nam has been drastically diminished over the past decades (see Table 3). Rates of forest loss have been particularly high in the Northern Mountains, where forest cover has been diminished from 95 percent in 1943 to 17 percent in 1991. At the same time, individual tree planting on

houseplots and along roads and dikes (which is supported by the government) actually exceeded plantations in numbers of trees planted. During 1986-1988, households planted more than 400 million trees annually.

Table 3 - Forest Cover

Region Name	Area	Forest Cover	
	(1000 ha)	(% of area)	
	1991	1943	1991
Total	33104	67	29
1) Northern Mountains	7645	95	17
2) Northern Midlands	3982	55	29
3) Red River Delta	1030	3	3
4) North Central Coast	4002	66	35
5) South Central Coast	4582	62	32
6) Central Highlands	5557	93	60
7) North East Mekong	2348	54	24
8) Mekong Delta	3957	23	9

Source: World Bank (1995), *Viet Nam: Environmental Program and Policy Priorities for a Socialist Economy in Transition*, Washington, DC.

Deforestation has caused concerns because of its consequences on wood supplies and downstream areas. According to Viet Nam's Forest Sector Review, declining forests and expected increases in demand will lead to demand for wood products surpassing potential sustainable supply in the near future. Watershed degradation has affected water flows in most upstream catchment areas with detrimental effects on hydrological reservoirs, down-stream agriculture, human settlements and ecosystems.²⁵ Loss of forest cover in the Da River watershed is estimated to have

accelerated the siltation of the Hoa Binh power station reservoir, reducing the lifetime of the dam from 250 years to 100 years or even less.²⁶

2.3.2 The "Household Economy"

The forest preserve system is being replaced by a system that attempts to align local needs of subsistence and income with national interests in wood production. Control over forest resources and production decisions is being shifted to households. By the end of 1990, out of 11 million ha of forest land designated for production purposes, about 5 million ha had been contracted out to management by individual households. State enterprises are being reorganized to provide self-financing technical services for households. Achieving financial self-sufficiency as units of technical support to forest managers however, has led to the termination of costly social service provision.

Economic reform has increased pressures on forests. Rapid economic growth is increasing domestic demand for forest products for construction, furniture making, and manufacturing. Construction activities increased annually by approximately 4 percent between 1989 and 1992. Forest enterprises, now administratively more independent, have been eager to increase logging in order to finance their operations. In response, the government found it necessary to significantly curtail official forest exploitation, employing increasingly drastic measures to stop uncontrolled logging. At the beginning of 1992, the government banned the export of raw cut and sawn wood and reduced quotas for official felling by 88 percent. In 1993, the government restricted logging by closing almost all forests in the north and banning the export of forest products.

The shift in control over forests from the public to the private sector is having mixed effects on household livelihood and forests. The transfer of forest land to households in the midlands has facilitated wide-spread replanting on the previously barren hills. Land allocation has, however, been slow in highland areas as the allocation of individual land use rights may conflict with locally

observed community-based land use regulations. Households are also reluctant to contract forest land as their rights of land use would prohibit the use of the land for the production of agricultural crops.

Competitive capital allocation puts sustained management practices and afforestation at a disadvantage relative to investments in other sectors generating more sizable surpluses, such as trade and services. Increased social uncertainty and the reduction of social safety nets drive resource use strategies that generate fast surplus, such as annual cash cropping and swidden cultivation. The national policy of tight credit discriminates against tree plantations, with the exception of fast-yielding, high commercial value species. Tree planting programs in the past few years have been successful only if tree planting was supported by subsidized credit and input supply. Forest extension programs have to a large extent been sustained by international support targeted specifically at tree-planting activities.

3.0 Conclusions and Policy Implications

As the sector studies indicate, economic reform is fundamentally transforming human pressure on natural resources and environmental quality. Institutional changes affect the allocation of capital and the mechanisms that secure larger societal objectives relative to private interests. Economic reform challenges Vietnamese policy-makers to find mechanisms which serve to mediate between the sometimes conflicting goals of economic growth, equity, and environmental protection in a way that prevents those forces from obstructing each other.

3.1 Impacts on Natural Resource Use and Environmental Quality

Changes in capital allocation and control of production decisions are having differential impacts on resource use and environmental quality among economic sectors and subsectors. Economic reforms are decreasing pressures on natural resources and the environment for activities

that mainly draw upon privately-controlled capital, that offer investment opportunities of only average or low profitability, and in which the consequences of resource use directly affect the user. Pressures on resource use and environmental quality are increasing in sectors that offer profitable opportunities for private investment, or that require either public access to capital or functioning mechanisms of political control over economic activity for the maintenance of environmental assets. The following section identifies operational issues related to the specifics of these changes.

The shift in access to capital to the private sector is improving the efficiency of use of privately-controlled capital, thus re-shaping resource use intensities and productivities. Industrial enterprises are being forced to employ more efficient technologies to survive within increasingly competitive markets. While some state enterprises have been closed down new industries are appearing scattered in and around urban areas. The transfer of land and productive assets to household management in rural areas is generally leading to more intensive land use, at the same time increasing regional and inter-household variations in the intensity and productivity of resource use. Expanding household access to productive inputs in paddy production is increasing regional differences in application rates of current inputs as well as in output levels.

As capital is flowing into the most profitable investment opportunities, the composition and consequences of resource use are becoming increasingly fragmented and diversified. Pressure on resources is increasing due to the expansion of certain types of activities and decreasing due to the contraction of others. Industrial activities are shifting from heavy industry toward food processing, textiles, and oil and gas production. In rural areas, competitive capital allocation is leading to the conversion of paddy land to other crops, the expansion of fruit orchards and other high-value crops, and the reduction of old forest stands. The national policy of tight credit which applies uniform interest rates across sectors directs flows of capital toward trade, services, and real estate, which offer higher returns to investment. Agricultural land is increasingly shifted toward urban and industrial uses.

The shift in access to capital to the private sector is decreasing the efficiency of resource use in sectors that depend on the availability of public capital. The efficiency of industrial uses of natural resources and the absorptive capacity of the environment is undermined by the lack of capital for investment into infrastructure and pollution abatement technologies. A lack of public investment funds hurts irrigated agriculture in particular as the deterioration of water control limits the efficiency of water use and productivity of paddy production. Afforestation activities that in the past have been made possible with public sector support are becoming more difficult to sustain.

As economic reform is transferring decision-making powers to the private sector, it is reducing mechanisms of central control over economic activity. Industrial enterprises are largely disobeying environmental laws. Vast stretches of mangrove and upland forests are being converted by households to uses that produce private benefits but do not provide important services to societal and future interests. Forest enterprises are exploiting their privileged access to natural assets, circumventing national logging quotas and export bans.

Similarly, increasing private control of production decisions is weakening national mechanisms that serve to redistribute the differential benefits of economic reform across regions. Differences among provincial living standards are increasing, making poverty more concentrated in economically marginal regions, such as the Central Coast and Northern Mountains.²⁷ In these regions, poverty adds further pressure for the short-term exploitation of resources. Migration toward areas that offer economic opportunities is aggravating pressure on the fragile ecosystems of Viet Nam's coasts and highlands as well as urban environments.

As mechanisms of central control over economic activity weaken, local-level institutions are becoming more important for harmonizing the objectives of growth, equity, and environmental protection. Local governments have lost direct control over some economic decision-making, in effect weakening their ability to directly influence the distribution of economic opportunities between households and generations. Yet they seem to have retained significant autonomy in the

implementation of national policies. Particularly in rural areas, local governments are using land and tax policy in diverse ways to shift the balance between the goals of economic growth, equity, and environmental protection. In urban areas, some local environmental councils have gone beyond national policies to implement locally specific environmental standards.

3.2 Policy Implications

As Viet Nam continues its process of economic reform, Vietnamese policy-makers are challenged by the need to design new institutional mechanisms that mediate conflicts between the economic and environmental dynamics of economic reform. Our analysis stresses the importance of strengthening the role of the public sector in capital accumulation and fostering mechanisms that safeguard environmental objectives against private interests of resource exploitation.

Mobilizing capital for the supply of public goods, providing capital at adequate terms to shift private initiative toward national objectives, and taxing highly profitable private activities that threaten social and future interests, will help to reduce pressures on natural resources. In the industrial sector, if the Vietnamese government maintains its commitment to active industrial policy it may prevent potential adverse impacts of natural resource-based industrial development driven by domestic and foreign private capital. Industrial policy and foreign investment promotion can emphasize the build-up of more efficient resource and energy consuming sectors, as well as less resource-intensive sectors, such as textiles and information technologies. Provision of credit to existing industries can be used specifically to increase process efficiencies and improve environmental performance.

In the rural sector, government investment into public goods, such as water control, infrastructure, and research would facilitate sustained growth of agricultural production. Tax increases on high-value crops may facilitate public capital accumulation without obstructing the private generation of surplus. Credit provision to farmers and forest managers at adequate duration

and interest rates would favor long-term investment and the protection of public interest in resource protection, such as watershed protection. The Barren Land Development Program, initiated by the government in 1992 through Decree 327, presents an important step in this direction, as it designates 60 percent of its funds for subsidized credit for farmers.

Strengthening existing mechanisms of control over economic activity or developing new mechanisms can safeguard environmental objectives against private interests of resource exploitation. Depending on the problem to be addressed, solutions may be found at the national or the local level. At the national level, the NEA could be built up to monitor and enforce environmental objectives as well as give technical support to local-level agencies. Emphasis on environmental aspects in the screening process of Foreign Direct Investment is another opportunity for environmental protection. Though current screening procedures already include environmental standards their enforcement can be strengthened.

Central government policy that leaves opportunities for local variation will facilitate institutional mechanisms at the local level which balance the goal of economic growth with local interests in environmental protection. In the industrial sector, strengthening the existing Environmental Committees at provincial and municipal levels will concentrate resources and build upon political authority at the local level. The relative success of the public complaint system in the past indicates that significant local autonomy and concerns for equity can facilitate informal environmental regulation. Urban planning procedures could also be used to designate and enforce zoning policies for industrial location.

In rural areas, land policy has emerged as the primary instrument for local government to balance growth, equity and environmental concerns. The newly created national land management system could be directed toward supporting local diversity in land use arrangements. Local flexibility in the designation of land use could allow for variations in land use that strikes different balances between the goals of food security and income generation as well as shared and individual

interests. The retention of direct public control over some land could generate local funds to finance local infrastructure, schools, and health services. A flexible tax and fee regime may further facilitate local solutions to conflicts between the goals of economic growth, equity and environmental protection.

As a final point, the key to environmentally friendly development will be rural development that provides sustainable livelihoods for the majority of the population, thus curbing rural-urban migration and preventing environmental degradation associated with poverty. Rural development policy can foment the competitiveness of a family labor-based system of production, by guaranteeing access to assets for agricultural production, investing in the provision of public goods such as irrigation and rural infrastructure, generating employment opportunities, and establishing welfare programs. This would above all require the development of institutional mechanisms that link capital generation in rural areas with the means to use the capital for sustained rural development.

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²¹ The conclusions of this paragraph are based on field research by a joint team from the University of Hanoi, the East-West Center, and the University of California, Berkeley in August 1994, in which both authors participated.

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