UNITED NATIONS DEVELOPMENT PROGRAMME

STRENGTHENING CAPACITY FOR THE RENEWAL OF RURAL DEVELOPMENT IN VIET NAM (PHASE 1)

VIET NAM AGRICULTURE:
A REVIEW OF TRENDS AND ISSUES

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Abbreviations

CEMMA Committee on Ethnic Minorities and Mountainous Areas
CH Central Highlands
cwe carcass weight equivalents
1. THE AGRICULTURAL SECTOR IN VIET NAM

1.1 An Economy in Transition

Viet Nam turns to a new stage of its socioeconomic development with a rapidly growing economy, albeit from a low base, and a good track record of macroeconomic management. The economy has been transformed into a market-oriented system since the introduction of doi moi, an economic reform process started in the agricultural sector in early 1980s and accelerated since 1989. Annual GDP over the last 5 years has averaged 8.4%. Inflation has dropped from 487% in 1986 to 4.5% in 1995. National savings increased from 7.45 in 1990 to 17.1% in 1995. On the expenditure side, growth continues to be driven by investment, primarily foreign direct investment (FDI) which totalled US$8.5 billion in 1996 alone (up by 29% compared with 1995). Public investment, including those funded by overseas direct assistance (ODA), also rose. These trends signal that Viet Nam can sustain its high growth as long as doi moi is further fostered and expanded.

However, there are a number of threats to sustained economic growth such as large trade deficit and foreign debt, investment constraints, inefficient business environment, especially the banking system and infrastructure. In addition to the demand for continued prudent fiscal and monetary policies, there are a number of essential structural reforms to be urgently addressed, of which the most important are: i) trade reform to phase out the remaining administrative restrictions (especially export restrictions) and further lower maximum
tariffs; ii) enterprise reform to remove existing discrimination between state and non-state enterprises and simplify business regulations; and iii) financial sector reform to improve the supervision and regulatory environment and clearing system, and further liberalize interest rates.

These aspects are particularly applicable to the rural sector which continues to play an important role in Viet Nam's socioeconomic development. The sector is home to 80% of the population, generates 25% of GDP and supplies about 60% of exports. However, the national economic performance masks a significant urban/rural imbalance. With growth largely driven by the 14% per annum expansion in the town-based industrial sector, urban dwellers are the primary beneficiaries of this economic prosperity. Although the rural economy has also prospered in recent years, with an estimated overall 4% growth per annum, benefits of the country's rapid growth have been inequitably distributed. To a degree they are also eroded by the diminishing terms of trade. Unemployment figures emphasize this disparity. While urban unemployment is about 7-8%, the underemployment rate of the rural workforce, which represents 73% of the national work force, is up to 35% due to lack of opportunities. The sector suffers from two inter-related fundamental problems: low productivity and still lagging social development. An underlying cause of this situation has been the comparatively low attention given by the State to rural development and the slow reformation of rural economic structures. The Government is aware of this problem and has recently increased investment in rural infrastructure and services. However, this investment lacks a cohesive strategy and comprehensive approach and therefore remains insufficient to ensure rural equity in economic development.

1.2 Population and Nutrition

Viet Nam, with a population of about 71.5 million in 1996 and comprising 54 ethnic groups, is amongst the most densely populated countries in the world. Population growth, though now reduced to 2.1%, is nonetheless high, particularly so in environmentally challenged rural upland areas, where often massive informal migration further burdens the natural resource base. Population density averages 192 persons/km² nationally, though this differs greatly between regions and in relation to available crop land. The 920m² of rice paddy per capita in Ha Nam, a poorer province in the Red River delta, contrasts sharply with the 2,166m² available in Kien Giang, a wealthier province in the Mekong River Delta. The country is characterized by a great diversity in natural conditions and levels of socioeconomic development.

National food productions has increased from 21.5 million tons in 1990 to about 29.1 million tons in 1996, in which paddy production rose from 19 to 27 million tons. While this translates into an increase in per capita production from 332 kg to 398 kg and has allowed the country's 3-million-tons-of-rice export in 1996, malnutrition remains as a persistent and in some instances a growing problem. Though food availability has improved and poverty has been reduced since the establishment of doi moi, average weight of new-born children and the height: weight ratio of adolescents have been reported to be falling in recent years. Nutrition related disease, including protein-energy malnutrition, goitre and mineral and vitamin deficiencies are endemic. Malnutrition is particularly severe in the interior, where infrastructure/market constraints have led to over-emphasis on self-sufficiency through rice production, often at the expense of other crop and livestock products, leading to reduced dietary diversity and loss of comparative production advantage.

1.3 Rural Poverty and Ethnic Minority Areas

Numerous analyses have been undertaken of the sources and incidence of poverty in Viet Nam. The first Viet Nam Living Standard Measurement Survey executed in 1992-94 concludes that one fifth of Vietnamese households live under an internationally comparative poverty line based on basic food and non-food needs. Based on a lower food poverty line established by the Government, around 22% of households are poor of which 3-4% is affected by chronic hunger.

With nine out of ten of those in poverty living in the rural areas, poverty is essentially rural in nature and is the worst in the Central Highlands, Northern Uplands and North Central Coast regions. Farmers as a group have the highest incidence of poverty (60%), and within the farming community, the ethnic minorities have the highest incidence (66-100%). The underlying causes of poverty may be summarized as being due to:

- isolation - as characterized by inaccessibility to markets and inaccessibility to improved social and production services;
- natural disaster and risks - flooding, typhoon and drought which destroy or damage production and
makes for production and marketing uncertainty;
- illness or poor health for both humans and livestock - poor nutrition, lack of clean water and health services - which leads to loss of labour and productivity;
- poor/inadequate resources or productive capacity, limited or low quality land, limited inputs and financing, and inadequate support services for production improvement;
- lack of a sustainable resource base, mainly from shrinking forests;
- inadequate participation of the people in planning and implementing government programmes.

The UN Poverty Report has also found that households in areas of diversified economies (including diversified agriculture) have higher living standards than those relying exclusively on traditional rice or any other subsistence crops. Another finding on the location of the poor is that even the "rich" regions have significant segments of poor. Also, areas with higher agricultural productivity generally have more opportunities off the farm. However, commercial logging, agricultural expansion and the coping strategies for the poor often lead to the destruction of forests and fisheries or migration to other areas which thus contribute to the rise in social tension and lead to the destruction of the livelihood of the poor and exacerbates their lack of sustainability.

Ethnic minorities, which include more than 13% of the population, comprise special groups of the poor. Most of them live in mountainous and remote areas. While there is a large degree of diversity among the 53 ethnic groups with regard to language, agricultural practices, kinship systems, lifestyles and beliefs, most of them are commonly affected by the following important problems:

- Isolation: Most of the ethnic minorities are isolated geographically, living in remote upland areas with poor roads and communications. Such groups are also isolated in a wider sense through different languages, cultural systems and beliefs. Both types of isolation limit their access to markets, and hence economic opportunities, as well as basic services in health, education, extension and rural finance.
- Poverty: Ethnic minority households generally have a greater incidence of poverty than Kinh households. They are more vulnerable to problems such as diminishing food security and poor health. Such problems are complex and the result of numerous inter-related factors including: population pressure, related access to forest and other land, a deteriorating natural resource base and increasing production risks.
- Such problems are exacerbated by constraints affecting service delivery, most notable poor targeting and coordination of activities, as well as a general failure to secure participation by ethnic minorities in development programmes.

1.4 Viet Nam's Rural Development Strategy

In its strategy for socioeconomic development in 1996-2000 and towards the year 2010, the Government strongly commits itself to achieving rapid and sustainable growth, socioeconomic stability and equity. In particular, it has established an objective of doubling GDP by the year 2000.

The Government recognizes that widespread poverty is one of the most pressing socioeconomic problems of the country. In the Country report for the World Summit for Social Development (WSSD) in Copenhagen in March 1995 and in its Plan for Socio-economic Development in 1997-2000, the Government has established the following target: 'by the year 2000 to eradicate hunger in all households, improve living standards and gradually reduce the number of poor households in absolute terms. By the year 2010, there should be no poor households according to current standards'. The report also elaborated the Government's policies for hunger eradication and poverty reduction (HEPR) which are aimed at creating an enabling environment and providing the poor with initial support to enable them to utilize their own energy and resources to improve their living standards.

Viet Nam's Strategy for Socio-Economic Stabilization and Development to the year 2000 has established a general strategy for agriculture and rural development. In particular, the Government recognizes the close relationship between the rural development and hunger eradication and poverty reduction (HEPR) programmes. The Government recognizes the problems facing the rural sector and considers a rapid and well-balanced development of the sector as a top priority of the country's overall socioeconomic development goal.

To achieve the above targets, the Government is committed to widen and deepen the doi moi process. As stated in documents of the recent 8th Party Congress, the Party has set up the task 'to effect the process of industrialization and modernization of agriculture and rural areas' as the first priority of the country's socioeconomic development and structural reform in 1997-2000. The Party has also reasserted its policy to ensure a more equitable and balanced development of rural areas, 'particularly mountainous areas, borders,
islands, regions of ethnic minorities, remote areas,' and 'gradually reduce excessive disparity in socioeconomic development standard among regions'. For the purpose, the Government will continue implementing the socialist orientation in building a multi-sector economy, renewing the economic policies and management, developing science, technology, education and training, building an advanced culture with its own profound national identity and equitable policies on certain social issues.

Taking into account lessons learnt from the recent 10 years of doi moi, the Party has reaffirmed the policy "to closely combine economic renewal with gradual political renewal". The Party emphasizes the importance of starting the renewal process by " renewing its political thinking" and "focusing first on successfully undertaking economic renewal and overcoming the socioeconomic crisis, thus creating the necessary material and intellectual premises for firmly maintaining political stability, building up and consolidating the people's confidence and creating favourable conditions for the renewal of other aspects of social life". As mentioned above, it is vital that the same level of pragmatism and discipline be applied to their economic policy of the rural sector as at previous benchmarks in 1986 and 1991.

However, substantive issues covering the roles of the State and the private sector in the economy and of the very nature of the future Viet Nam's society must be resolved in order to maintain confidence in the economy and ensure future growth, of particular importance in this equation will be the economic prosperity and well-being of the rural sector, and especially its poorer members.

The Government has decided to establish 11 top-priority national programme to address the most urgent socioeconomic development needs, three of which are directly related to rural development. These are:

National Programmes for Hunger eradication and Poverty Reduction and for Ethnic minority and Mountainous Area Development

Based on local initiatives started in early 1990s and following the World Summit on Social Development in 1995, the Government has made plans to establish a National Programme for Hunger Eradication and Poverty Reduction (HERP) which aims to ensure a more equitable and sustainable development for the poorest people in the country. In preparing its 8th Five Year Plan, government has elaborated their approach to HERP as follows:

- poverty alleviation should be a fully integrated process;
- poverty alleviation planning and investment must be a decentralized, grass-roots programme, wherein mass organizations and NGOs would play an important role;
- investment in skill upgrading, employment generation, and the development of an enabling environment for the poor should parallel investment in a social security network;
- particular attention should be given to access to credit.

This has now been enunciated in a programme prepared by the Ministry of Labour, Invalids and Social Affairs (MOLISA) and Ministry of Agriculture and Rural Development (MARD) and other line ministries for the period 1996-2000. The objective of the programme is to eradicate hunger in the first five years of the plan and halve the poverty levels from 22% down to 10% by the year 2000. Strategies for the achievement of this goal include (a) an improvement in policy planning an coordination to ensure that related socioeconomic development policies and programmes would better target the poor and (b) a broad participation of the poor and population in the planning, the implementation, monitoring and evaluation of HERP effort. Specific measures include the participatory and communities-based identification of poor households, a review of related policies and programmes, the delivery of credit to the poor, sufficient access by the poor to land and other productive assets, specialized technology transfer and vocational training for poor households, the improved delivery of basic social services for poor families, targeted infrastructure development programmes for 1300 identified poor communities and strengthening the capacity of local authorities to implement the national programme.

Ethnic minorities and ethnic minority areas are special HEPR target groups which are often affected be the highest incidence of poverty. The development of ethnic minorities has always been seen as a critical factor in the country's overall development. From 1968 the main government policy was to settle migratory ethnic minorities and reduce their shifting cultivation by introducing them to wet-rice cultivation and cash crops. Important programmes in support of this policy are the Fixed Cultivation and Permanent Settlement Programme, the New Economic Zones programme, the establishment of the co-operatives and Programme 327 for Re-greening of the Barren Hills. Recognizing that these programmes have had little effect the Government has decided to establish a National Programme for Development of Ethnic Minorities and Mountainous Areas which is one of the 11 top-priority national programmes in 1997-2000. In 1995 the Committee on Ethnic Minorities and Mountainous Areas (CEMMA) the Government focal point for policy formulation and implementation in this sector the UNDP developed a Coordinated Framework of External
Assistance for Ethnic Ministry Development in Viet Nam. This Framework assessed the situation of ethnic minorities and proposed strategies for improving their living standards.

Clearly, these important targeted initiatives should be coordinated with and supported by other socio-economic development efforts both the national and local levels. For example, HEPR would be enhanced by further detailed investigation of agro-ecological opportunities, and conditionalities to growth in poverty affected areas and the classification of growth potential in poor communities using remote sensing data. This information is anticipated output of the planned National Programme for Rural Development.

1.5 National Programme for Rural Development

The Government has requested MARD to prepare a National Programme for Rural Development in Viet Nam (RDP) over the period 1996-2000 with long-term projections through to the year 2010. It is expected that the programme will be a cross-sectoral policy framework addressing needs of the general rural population in critical areas including agricultural production, rural industrialization, rural infrastructure, natural resource management, rural education and training, rural health, rural housing, communications markets and marketing, rural electrification. In short the RDP, currently under preparation, will set the framework for a rural development agenda that is expect to be the Government's largest single investment in coming years. Once completed, the Rural Development Programme will be integrated by MPI into a cohesive investment and development programme under the auspices of the 8th Five Year Plan.

The draft RDF, prepared by MARD in mid-1996, defines rural development as the "forces that aim to increase the productive capacity, incomes, material and spiritual living standards of the population living in the rural areas". It further espouses that "rural development should not only concentrated upon increasing production, output and the efficiency with which agricultural output is achieved, but also provide a greater focus upon institutional issues, and upon organization and social factors in the rural areas ". It also promotes the "need for a preserved natural environment", and the need "for rural development to stem in the main from the efforts of the population rather than the state". The draft RDP focuses primarily on programme and project identification and does not effectively tackle the difficult issues of long-term development strategy and prioritization by time and regions. There is also insufficient attention give it to institutional development, which has been the main driving force for changes in the rural sector in recent years, and to the implement ability of policy. To its credit, the proposed programme does break away from the present service-oriented government policy with a shift towards a policy of institutional facilitation. It also adopts a holistic approach across the rural environment at the national level while focusing on community participation in planning at local level. Thus the proposed RDP will address general development needs of the rural population in a renewed and comprehensive manner while the National Programme for HEPR will resolve specific needs of the poorest through targeted and integrated interventions.

1.6 External Development Assistance

Given its importance, the agricultural sector of Viet Nam has successfully attracted a considerable amount of external development assistance. Commitments of grants and loan funds over the period 1985-19965 amount to a total of $898 million for 408 projects, allocated between sub-sectors as follows: agricultural support services 42%, industrial crops 21 %, food crops 12%, forestry 11%, fisheries 9%. Allocations for research and development, livestock, and policy and planning amounted to 3%, 1% and 1% respectively. Half of the committed funds ($443 million) had been disbursed up to December 1996.

Almost 60% of the committed funds were in the form of free-standing technical assistance (i.e. not related to agricultural investment projects) and 30% for agricultural project assistance. The remainder was allocated for investment related technical assistance, programme or budget support or emergency relief.

Thirty six per cent of total commitments (US$ 325 million) were made by the USSR between 1986 and 1988, half of which were for agricultural support services. However, disbursements which ceased in 1990 amounted to less than a quarter of the funds committed. Of the remaining commitments the largest contributor was World Bank (19%), followed by WFP (7%) and Asian Development Bank (6%).

Viet Nam has also benefited from a number of agricultural sector reviews and analyses. Five principal works were the Agriculture Sector reviews of 1989 and 1993 and 1996 (report in draft), the Mekong Delta Master Plan in 1993 and the Red River Masterplan in 1995. Other reports such as the World Bank's Agricultural Marketing
Study 1994 and Water Resources Sector Review 1996 and also contributed to the discussion on agricultural policy.

The Government/Donor meeting on “Technical Assistance for Effective Use of External Support to Integrated Agriculture and Rural Development in Viet Nam” held in January 1997 undertook an initial review and assessment of donor assistance to the sector. A comprehensive list of major donor interventions was compiled for this purpose. Some of the most critical interventions can be listed as follows:

### 1.6.1 Bilateral Donors
- Australia: water resources, agriculture;
- Belgium: natural resource management and ethnic minority development;
- Denmark: post-harvest processing, forestry, primary health care, Sreepok water development plan;
- Germany: agriculture, forestry, family planning, employment, generation, poverty elimination;
- Japan: agriculture and reforestation, integrated rural development;
- Kuwait: irrigation;
- Netherlands: agriculture, forestry, public administration reform;
- Sweden: forestry, agriculture, water resources, health;
- New Zealand: agriculture, forestry.

### 1.6.2 Multilateral Donors
- ASDB: agriculture, water resources, forestry; rural finance, rural infrastructure, vocational training;
- EC: off-farm employment creation;
- FAO: nutrition, agricultural, services (especially pest management, reforestation);
- IFAD: participatory natural resource management, microfinance;
- UNDCP: drug control master plan, integrated rural development;
- UNICEF: basic social services, primary education, health care and clean water supply;
- World Bank: primary education, agricultural education, agricultural services, rubber tree cultivation and credit for rural development, reforestation and natural resource management, irrigation rehabilitation, rural finance, population and family planning, infrastructure development;
- WFP: water resources (sea dykes), reforestation.

### 1.6.3 NGOs
- ActionAid: agriculture; forestry; health care;
- AFSC: native language instruction and materials; agriculture; health;
- APHEDA: technical and vocational education;
- CARE: agro-forestry; income generation;
- Church World Service: boarding schools in ethnic minority areas;
- CIDS: agriculture; primary health care;
- Helvetas: agro-forestry and integrated rural development;
- OXFAM/Belgium: agriculture;
- OXFAM/Hong Kong: agriculture; water and sanitation;
- OXFAM/UK: primary education and teacher training; agriculture and integrated rural development;
- Radda Barnen: native language instruction ad materials for ethnic minorities;
- SCF/UK: agriculture;
- WINROCK: environment in rural areas;
- World neighbours: agriculture;
- World Vision: native language research and materials for ethnic minorities.

### 1.7 Economic Reforms
Pressures for sweeping reforms to the socialist system built up during the early 1980’s culminating in adoption by the Sixth Party Congress in December 1986 of a comprehensive package for economic reform, including macroeconomic and sectoral policy reform. Once implementing resolutions and arrangements were in place from mid-1988, implementation proceeded rapidly, leading to:

- **Rural Reforms.** The collective system was largely dismantled, and agriculture returned to family farming on the basis of long-term leases;
- **Decontrol of Prices and Domestic Trade.** Administered pricing and most restraints on inter-provincial
trade were abandoned;
- **Devaluation.** The exchange rate was unified and sharply devalued, and a managed float has since kept the official rate close to the informal market rate;
- **Interest Rate Reforms.** Positive real interest rates were introduced to keep inflation under control;
- **Fiscal Reforms.** Government reduced the size of public sector employment, including 500,000 soldier reduction in military size, and largely eliminated direct subsidies to state enterprises. This plus increases in tax revenues (including new oil revenues) reduced the state deficit from 8.6% of GDP in 1989 to 3.5% in 1992;
- **Private Sector Promotion.** The sector was given formal recognition and legal status, and encourage to develop;
- **Opening to Foreign Investment.** A new investment law and subsequent revisions opened the economy to participation by the foreign private sector; and
- **Reform of Foreign Trade.** The trade regime has been partially reformed to create strong incentives to export and allow easier access to imports.

These reforms have had a dramatic impact on the performance of the economy as a whole and on the growth of the agricultural sector. During the past eight years, Viet Nam's agricultural GDP grew at an average annual rate of 4.2% and is an important contributor to merchandise exports (60%). Though impressive by world standards, and substantially above the rate of population growth of 2.1%, this is significantly lower than growth rate for total GDP of 7.5%. The implications of such disparity in sectoral growth rates are further discussed below.

### 1.8 The Pattern of Agricultural Growth

#### 1.8.1 Agricultural GDP and Production Growth

Despite a strong positive trend in agricultural GDP growth during the 1990s, the rate fluctuated from year to year reflecting the importance of the role played by changes in weather (e.g. from 4.6% in 1990 to 2.2% in 1991 and to 7.2% in 1992).

Between 1989 and 1994 the production of major agricultural products grew sharply. Production of paddy (Viet Nam's most important product) expanded at an average annual rate of 5.3%. Com production, also used as feed for livestock, increased at 6.7%. However, these rates were not matched by the production of less favoured subsistence crops which grew at slower rates such as sweet potato (average annual rate of 0.9%) or declined (e.g. cassava -1.8%). Because of increasing income levels, vegetable production grew at more than 4% annually.

The production of annual industrial crops increased substantially over the same period. Average annual growth rates for these crops were significantly higher than for food crops. With growth rates above 20% annually, the expansion of cotton and mulberry production were the most dynamic; but the slower growth rates of sugarcane, groundnut and soybean were still higher than those for food products. The production of perennial industrial crops also increased significantly between 1989 and 1994. Orange and coffee production expanded with annual growth rates over 20%: the growth rates amounted to 17% for rubber and 5.4% for tea. These results largely reflect pre-1988 initiated investments under the Soviet era (especially for rubber, tea and to a lesser extent, coffee) or adjustments to the cessation of CMEA trade after 1990 (cotton and oilseeds).

The annual growth rates for animal husbandry (as reflected in numbers of livestock) were lower than those for other agricultural products. Average annual growth rates were 6% for poultry, 5.3% for pigs and 2 percent for cattle. However, productivity especially of pigs has increased with a change to leaner more productive breeds and improved husbandry in urban and peri-urban production unit.

#### 1.8.2 Changes in Land Use

For 1985 until 1994, the area of agriculture and forestry land increased by 6.1% and 2.8% respectively: considerably slower than the 20% achieved in the previous decade. Agricultural land for non-rice food crops and industrial crops (especially perennials) expanded sharply. Despite the significant increase in rice production, the cultivated area under rice declined slightly (1.2%) confirming the overall diversification trend in land use. Agricultural land use expansion was at the expense of "other use land" which declined by 3.9% but still accounts for the largest share of Viet Nam's land area (48%). Though a portion of this "other use land" is estimated to be suitable for agricultural use, the remaining potential area is considered to be either less accessible or already under some use (pasture or swidden rotation) so that most future production gains will
need to come from more intensive use of existing agricultural land.

1.8.3 intensification

Analysis of area and yield trends indicates that growth in rice, corn and groundnut production since 1988 has arisen more from yield than area improvement. For all other products, however, sown area expansion remains the important contributor to production growth, especially for perennial industrial crops, mulberry, sugarcane and sweet potatoes.

In the northern provinces e.g. the Red River Delta (RRD) and the Northern Central Coast (NCC), the sown area of paddy declined and the entire production growth was driven by yield improvements. This indicates the shortage of land and pressure of other land use on paddy production. Although yield increases took place in the southern regions, the production boom was driven as much by increase in cropping intensity (cropped or sown are per unit cultivated area) as by increase in yield per unit sown area. For the whole country, the cropping intensity of paddy production increased by about 21% from 1.33 in 1985 to 1.61 in 1994. The greatest increase in intensity of 44% occurred in the Mekong River Delta (MKRD) with an increase of only 3.8% in the NCC.

1.8.4 Diversification from Rice

In parallel with the growth and intensification of rice agriculture after 1988, diversification of agricultural production away from rice also occurred. However, this diversification trend varied among different regions. Exploiting the favourable climate and growing conditions, a remarkable expansion of tree crops took place in the Central Highlands (CH), for coffee and rubber, and the Northeast South (NES) for rubber. In the Northern Mountain and Northern Midlands (NMNM) region feed grain production for both the food and livestock sector expanded significantly, the latter mainly to cater for the need of the neighbouring RRD region. NMNM showed the greatest growth in corn, soybean and sweet potatoes. The MKRD, the most important rice growing area, also ranks in first place for oranges, sugarcane and vegetables.

1.9 Sources of Agricultural Growth

1.9.1 Favourable Reform Policies

The "doi moi" or renovation policies described above allowed households to take responsibility for production and marketing decisions, created favourable macro-economic conditions, liberalized prices and markets, expanded supply of rural credit and introduced the potential for secure tenure of land. These measures provided farmers with the incentive to apply more inputs and enabled the diversification of annual cropping according to market requirements. However, it is notable that the growth of private enterprises outside of individual farming and small businesses has been slow. Agro-processing is still dominated by national or provincial state-owned enterprises (SOEs) which operate under various degrees of state support (direct and indirect).

1.9.2 Investment Policies and Programmes

Much of the strong performance of the agricultural sector in the late 1980s through the early 1990s was the result of investments made in the late 1970s through the mid-1980s. These included large infrastructure investments prior to 1990 in irrigation and long gestation tree crops and, between 1976-86, land reclamation and resettlement programmes which increased cultivated area by nearly 20%.

However, it is of concern that gross fixed investment for agriculture which accounted for nearly 23% of the total in 1986-88, has declined to about 13% in 1993-94. The agriculture and rural sector have tended to be ignored by public investment programmes since 1988.

Though Government investment in resettlement programmes declined after 1990, the Decree 327 "regreening programme" provided ongoing investment into the rural sector and provides investment credit for individual farmers to expand their planting of tree crops (coffee, rubber, tea, fruit trees) and quick gestation forest species for pulp and paper. It also financed social infrastructure such as potable water Supply, classroom extensions and health post supplies. The annual allocation from the Government budget is about $50-60 million.

1.9.3 Support Services for Agriculture
Renovation policies enabled the importation and adoption of genetic material and technology, provided for a reorganization of credit delivery to support smallholder farmers and the private sector, though improvements to the agricultural extension system have been slow to materialize.

**Credit.** With the re-emergence of private farming, a credit system directed at individual farmers rather than cooperatives became necessary. The Viet Nam Bank of Agriculture (VBA) was established in 1990 and rapidly expanded its operations to the point where it now serves about 35% of the farming population. Most lending to farmers is through joint liability groups in the form of short-term credit more suited to working capital than investment needs. People's Credit Funds were introduced in 1993 to assist farmers and other members to mobilize savings and provide micro-credit following the cooperative model. The Funds have also expanded rapidly with around 200,000 members by 1995. The Viet Nam Bank for the Poor (VBP) was established in December 1995 to provide credit funds for the poor on preferential terms to alleviate rural poverty.

Though formal credit services have expanded rapidly, transaction costs tend to be high for eligible farmers, and many are ineligible to borrow under normal banking criteria (because of a lack of suitable collateral). The Viet Nam Standard of Living Standards Survey indicated that only 30% of rural households taking loans borrow from formal sources, primarily government banks, while a majority (72%) borrow from informal sources at interest rates two to three times higher than those charged by formal financial institutions.

Poor access to financial services stands out as a severe limitation to increasing agricultural productivity and diversifying rural enterprises as a means of poverty reduction. Key constraints to reaching the rural poor with quality services are: i) poor accessibility and communications; ii) shortcomings in group formation and development; and iii) lack of adequate savings mobilization incentives.

**Agricultural Technology:** Agricultural production has benefited considerably in the recent past from genetic improvements to the major crops and livestock populations. Introduced and locally bred rice and maize varieties have contributed to significant yield increases during this period. Rice yields have increased from 2 mt/ha to 3.5 mt/ha over the past decade while maize yields have increased from 1.6 mt/ha in 1990 to 2.1 mt/ha in 1995. Similarly, improved varieties of industrial crops have also contributed to better yields and quality, especially for sugarcane, soybean, groundnut, mulberry, coffee, tea and cotton. Improved varieties have been introduced for vegetable crops such as cabbage, tomato, legumes, orange, litchi, logan and flowers. Introduced animal breeds and cross-breeds, together with better nutrition, have improved the productivity of cattle, buffalo, pigs and poultry.

**Agricultural Extension Services** when provided were usually tied to a particular programme of technology transfer. The provision of extension was only one of the many functions of the provincial and district agricultural services. Specialist commodity organizations provided planting material and technical support for perennial crops such rubber, tea and mulberry (for sericulture). Most effective technical services for annual crops were provided by informal programmes jointly supported by special institutes (e.g. Rice Research Institute, Cotton Research Institute) or universities (e.g. Can Tho University). These programmes were usually associated with a new variety package (e.g. for paddy or corn) or special techniques (integrated pest management). In 1993 the Government reorganized is agricultural services and established and extension network with formal Extension Centers at district level which work with commune extension groups. The performance of these centers has been variable since they lack resources and relevant experience.

**Supply of Inputs:** There has been a rapid uptake of mechanization since 1990 as farmers seek to improve efficiency and reduce the need for heavy manual labour. Average annual increases in mechanized units have approached 30% between 1990 and 1995 for tractors, pumping units, rice millers and animal feed mills. Except in the Mekong Delta where land holdings are larger there is a marked trend towards smaller sized tractors, more suited to small land holdings.

Farmers have rapidly adopted new crop varieties as they have become available and their benefits apparent. Fertilizer use continues to rise steadily and, when combined with new varieties which make better use of available nutrients and more efficient cropping patterns, contributes to increasing yields and overall production.

**1.10 Water Resources for Agricultural**

Irrigation, drainage and flood protection infrastructure considerably influence agricultural productivity, and are critical in many locales. A total of 3 million ha are served by irrigation, although only 2 million ha are actually irrigated (mostly rice) because water is sometimes scarce, the facilities have not been completed or the design was deficient, and systems have deteriorated.
Because of multiple cropping, a total of 6.5 million ha of paddy are planted each year, of which 5.4 million ha are irrigated. Thus in spite of the high levels of annual rainfall, irrigated production is the backbone of the rice economy. Cropping intensity on irrigated land is high, estimated to be around 2.0. On non-irrigated land the figure is just 0.5. About half the irrigated area is managed by provincial irrigation and drainage management companies (IDMC), the other half is managed by farmers.

Cropped irrigated land expanded by 2.9% per year from 1980-87, and rose to 4.6% annually from 1998-94, which was due to increasing area cultivated. In the Mekong Delta, the growth was almost entirely due to expanded irrigation.

If Viet Nam wishes to meet the demands of the expanding population and export targets for rice, annual paddy production will need to double over the next 30 years. This will require either an increase in yields or the area irrigated, or more likely a combination of both.

There is scope to further increase yields on existing land by further improvements in rice varieties, irrigation and use of inputs. Yields of up to 8 mt/ha have been achieved in China through these methods in recent years - compared to present yields of 3.5 mt/ha in Viet Nam. However, in the medium term there are limits to the extent of intensification that is possible on existing irrigated areas as land and water constraints are already experienced in some catchment basins.

Cropped irrigated areas could expand if the irrigation and drainage infrastructure were rehabilitated and completed on the 1 million ha within the area included in the irrigation design that presently do not receive water. However, expansion must be approached cautiously since water is scarce and the original design may have been faulty. Still if this were possible, yields would need to reach about 6.7 mt/ha to achieve the target. Though ambitious by comparison with present rice production technology such yields are considered feasible in the longer term.

Effective water management is an important issue for Viet Nam. Rapidly expanding urban and industrial demand will place tremendous pressure on water resources, which will in turn introduce conflicts with agricultural uses. An effective water resources policy and improved water management is crucial. The experience of Indonesia and Thailand suggests that inadequate attention to water management issues can result in water shortages, severe water pollution in major urban areas, groundwater overdrafts, and other water-related problems can undermine economic growth and adversely affect the quality of life.

Substantial investment in irrigation rehabilitation, expansion and maintenance will be needed in areas where water resources for agriculture can be assured.

### 1.11 Agricultural Marketing

Reform in 1988-89 of the state trading system broke it into many pieces and subjected state trading organizations to a considerable degree of competition, partly from within the state system but largely from the private sector within the domestic market. The Government forbid regional “blockades” which would have maintained local parastatal monopolies, allowed cross-provincial and cross-market competition for supplies or sales, and cut the budgetary subsidies of enterprise working capital and revenue losses. This stimulated considerable competition among parastatals and forced them to shed equipment, staff, and even the entire district-level operation to the private sector. The Viet Nam Living Standards Survey confirmed that the small-scale and highly competitive private trading overwhelmingly dominates the market at farm and retail level, but indicated growing private activity at wholesale level as well.

As a result of these reforms the real farm price of paddy rice increased by about 25% in the MKRD, 17% in the Central Highlands and fell slightly in the RRD. Overall, the transition to market pricing tended to equalize prices, north and south, with each other and with their border price equivalents; most of the adjustments occurred in the north. The ratio of farm gate paddy prices to retail rice prices in the main urban markets has settled at similar levels to those in Thailand and Philippines which suggests that marketing margins/processing conversions in Viet Nam are not excessive.

The increase in prices together with improved varieties and enhanced availability of inputs provided incentive for a 26% growth of paddy production in 1987-89, which in turn permitted Viet Nam to move from a net importer of 700-800,000 mt of rice in 1986-88 to a net exporter of around 2 million mt per year in 1989-92. Geographically the production increases came mainly from the MKRD.
The effects of reforms on the prices of other commodities are less easy to analyze but the World Bank\textsuperscript{10} assessed that incentives to farmers (prices of outputs relative to cost of inputs) improved only in the MKDR, whereas the processing and marketing system faced new competitive pressures which squeezed profits but encouraged greater efficiency.

The liberalization of the domestic product and farm inputs markets is largely complete and farmers can count on relatively competitive market prices for their crops and inputs relative to border prices. Prime Ministerial decrees in March 1997 removed residual administrative restrictions on the domestic trading of rice (which were highlighted by a recent study of the rice industry\textsuperscript{11}) and changed the method of allocating quotas on rice exports which reduced the control of parastatal trading firms over rice exports. The IFPRI study concluded that any insulation of the domestic economy from the vagaries of international trade provided by quotas was achieved at a considerable cost to the national economy. A substantial increase in rice exports was forecast from a removal of quotas.

\subsection*{1.12 The Changing Structure of the Agricultural Sector}

With population increasing at around 2\% per year and GDP projected to rise at 7-8\% per year for the foreseeable future, there will be both challenges and opportunities ahead for the agricultural sector. Vietnam already has one of the highest ratios of population to arable land in the world and the growing population will place increasing pressure on scarce land resources for production of food as well as cash crops. At the same time projections by NIAPP indicate a dramatic change food consumption patterns as a result of rising incomes and changing preferences.

The National Institute for Agricultural Planning and Projections (NIAPP) projects that per capita cereal consumption (largely rice) will decline from 174 kg in 1995 to 144 kg per year in 2010\textsuperscript{12}. However, consumption of higher value crops is expected to rise rapidly. Over the same period, per capita consumption of pulses is expected to increase 620\%, meat 243\%, eggs 220\%, milk 2300\%, oil and fat 260\%, sugar 471\% and vegetables 84\% and fruits 31\%.

In view of scarce land resources with limited scope for expansion of the total cultivated area, production increases for crops will need to be achieved by either substitution of one crop for another (diversification), through more intensive land use (multiple cropping) or through yield increases (improved planting material or greater use of inputs). Some of these issues were discussed above. Additional aspects are discussed below.

The process of crop diversification is already evident in the discussion on the pattern of agricultural growth. This includes a decline in areas sown to rice in the Red River Delta (RRD) and North Central Coast (NCC) in favour of expansion in other food crops (including maize also used for livestock feed) and fruit trees. Concerned about the risk to food self sufficiency goals, the government enacted laws to limit the extent of conversion of rice land to other production. However, diversification is an important mechanism for increasing rural incomes and it is likely that restraints on conversion of rice land to other forms or production will not be workable (or desirable) in the new economic environment as long as incomes from rice production are much lower than the incomes which can be generated from other production activities.

\subsubsection*{1.12.1 Rice Production}

Most scenarios\textsuperscript{13} suggest that, provided irrigation infrastructure is rehabilitated or expanded to cover remaining irrigable areas and serious attention is paid to continuing genetic improvement to rice varieties, it will be possible to achieve targeted production requirements.

This would involve rehabilitation of up to 1 million ha of irrigation infrastructure plus productivity gains (from improved genetic capability, intensification of crop rotations and increased use of inputs) of 3 to 8\% annually depending on assumptions about per capita consumption. Productivity increases at the upper end of this range would be difficult to achieve over a long term. These forecasts emphasize the importance of building effective agricultural research and extension capability.

Exportable surpluses of rice are likely to continue come from the MKRD where opportunities for intensification are greatest.

\subsubsection*{1.12.2 Non-rice Food Crops}
Maize and a several relatively high value annual food crops (such as peanuts and soybean) and fruit provide good prospects for continuing expansion since these tend to have a positive income elasticity of demand. Maize is increasingly in demand for livestock feed as livestock populations rise and the use of improved animal feeds expands. Growing demand for tropical and temperate fruits will encourage diversification into high value horticulture production. Fruit trees can provide a financially as well as environmentally attractive alternative to arable cultivation of marginal lands and thus promote better use of these fragile soils.

The area planted to sugarcane is expected to expand rapidly to meet the demand though the current heavy investment by state enterprises in sugar processing facilities is likely to result in over-capacity and oversupply. Since the domestic price for sugar is substantially higher than world prices there is little hope of viable exports.

1.12.3 Industrial Crops

Viet Nam has good conditions, especially in the Central Highlands, for the production of industrial crops such as coffee, tea, rubber, cashew nut and cotton. While international prices are attractive expansion of these crops will proceed to the limits of suitable land - and place increasing pressure on remaining forests and marginal lands. Appropriate monitoring and environmental management methods will be essential to ensure that critical watersheds are protected.

Over-exploitation of underground water resources for irrigation of coffee plantations is already a problem especially in Dak Lac province.

Maintaining international competitiveness for these crops will require continuing research on crop varieties and crop husbandry as well as attention to quality requirements.

1.12.4 Livestock and Meat Production

Meat production is estimated to have increased by 55% between 1984 and 1994. Seventy seven percent of meat produced is pork, 16% poultry (including duck), and 7% red meat, predominantly from cattle and buffalo. Domestic demand accounts for almost 100% of meat produced.

Production increases have come mainly from increased productivity of animals, especially pigs, through introduction of improved breeds and cross breeds. In addition to internal resources, external assistance to the subsector amounting to $10.5 million has been implemented between 1985 and 1996 mainly by FAO. External assistance projects focused on animal breeding (especially for pigs), animal health and nutrition, dairy, beef and poultry production.

Per capita meat consumption of 10.1 kg is low by comparison with nearby Asian countries. However, experience of these neighbouring countries suggests that demand for livestock products can be expected to expand rapidly in parallel with rising incomes, especially in rapidly growing urban centers. This is likely to result in aggregate meat production expanding at around 6-7% annually. Most growth is likely to be in pork and poultry production, which over time will be increasingly concentrated in large scale commercial units in and around the major population centers. However, expanding rural will provide opportunities for rural producers to increase livestock production, which is already an important source of household incomes.

The expanding demand for better quality animal feeds, especially maize, will result in diversification of farming systems: a phenomenon which is already evident. However, the availability of feed supplies may become a constraint on expansion of livestock production which would increase pressure to import feedstuffs.

Improved forage and fodder technology exists to significantly increase productivity of ruminant animals under conditions which exist in Viet Nam. The main constraint to adoption of this technology appears to the lack of a price differential for better quality meat in traditional markets which would justify the additional costs involved. As a result the widespread adoption of relatively expensive technology such as feed supplements and animal health remedies is slow. Difficulty in managing forage production on land used for communal grazing is an further constraint.

Growth in ruminant animal production tends to be driven by the emergence of a relatively small but rapidly growing demand in urban centers for quality animal products such as milk and quality beef cuts. This demand is generally met by a small number of specialist producers, a trend which is already emerging in Viet Nam.

Export prospects for meat from Viet Nam are limited because of the unfavourable disease status of the livestock populations and competition from strong domestic demand. Development of export markets would require the negotiation of quarantine protocols with target countries, upgrading of meat processing facilities and
the establishment and maintenance of animal health and quality standards acceptable to the target market. Prospects do exist for specialist products such as suckling pigs, ducks tongues and chicken feet in highly developed markets like Hong Kong but competition from mainland China is likely to be intense.

Government programmes should focus on promoting improved animal health and nutrition, increasing public awareness of the benefits of meat hygiene, and promoting and monitoring quality control standards for livestock products.

1.13 Key Issues Affecting Rural Development

Several issues affecting rural development are outlined below.

1.13.1 Ensuring Best long-term Land Use

Factors affecting efficient and sustainable agricultural land use include preventing the overexploitation of valuable land resources and encouraging productive investment in agriculture. Growing population pressure on limited land resources increases the risk of over-cultivation of marginal lands leading to land degradation. Apart from biodiversity concerns, there are severe environmental costs associated with the degradation of crucial watershed areas. Appropriate measures required the effective protection and regeneration of vegetation on designated watershed areas and the adoption of appropriate land use practices on marginal lands, involving the introduction of sustainable farming systems which may include agro-forestry and sloping agricultural land technologies. Diversification into higher value perennial crops such as fruit trees, coffee or even fast growing timber species on marginal land ran provide sustainable levels of income in excess of the meagre returns possible from unsustainable arable cropping.

However, poverty is a frequently the driving force behind inappropriate land use and the issues of food security must be addressed at the same time if a sustainable solution is to be found.

Security of land tenure on land used for agriculture has largely been addressed on land designated for agricultural use through formal registration of land tenure, though the process is still to be completed in some areas. Security of tenure provides the farmer with the confidence to invest in land improvements and enables the use of land holdings as collateral for obtaining credit. Of greater concern is the lack of recognized tenure for households cultivating land presently designated as forestry land even though it may no longer have forest cover and may be well suited to agricultural use. Such farmers are not eligible for credit or entitled to receive agricultural extension services, even if they are available.

1.13.2 Support Services for Agriculture

Of primary concern is the availability to farmers of appropriate technology, extension and rural credit.

**Technology:** Rapid gains in agricultural productivity that have been achieved over the past fifteen years have enabled Viet Nam to "catch up" with international developments through the importation of foreign technology and genetic material. Future progress can only be maintained if imported technology is supplemented by a much increased domestic research effort. South and Southeast Asian country expenditures on research and extension as a percentage of agricultural gross domestic product are approximately one-third that of developed countries. However, Vietnam's expenditure is only half that of neighbouring Asian countries.

In addition to a much increased allocation of resources, an improved domestic research effort will require a rationalization of staff and facilities among the multitude of largely ineffective research institutions in Viet Nam and prioritization of research efforts.

**Extension staff** that are in post are generally well qualified but lack experience in extension methods and access to appropriate technology for a range of agro-ecological conditions. Additional resources will be needed to provide a minimum complement of trained staff and facilities and it will be necessary to develop more effective procedures for the delivery of technology especially where this involves the introduction of new farming systems interventions (such as agro-forestry concepts) rather than simply distributing improved planting material.

There is a need to more clearly define the role of respective government agencies (and the private sector) in
the delivery of extension and other services and inputs to farmers. In particular, the role of state enterprises as an intermediary in the delivery of services compared to the role of provincial and district Agriculture and Rural Development Services requires clarification.

Availability of rural credit has improved considerably in the past five years through the efforts of VBA, People's Credit Funds and Viet Nam Bank for the Poor. However, the coverage of these institutions and their accessibility to the majority of farmers remains limited. There is a need to broaden the range of financial institutions eligible to serve rural areas, and develop policies which can more effectively mobilize rural savings.

1.13.3 Rural Infrastructure

The most effective means of stimulating agricultural and rural development is likely to be the overall improvement of rural infrastructure, including especially rural roads and communications networks. Reduced transport costs and improved access to markets will provide the opportunity for farmers to diversify and specialize in higher value agricultural products.

2. THE FORESTRY SECTOR IN VIET NAM

Forest cover in Viet Nam decreased from 67% to 29% between 1943 and 1991. This includes at least 12.6 million ha of forest, of which 8.0 million ha were in northern Viet Nam and 4.6 million ha were in southern Viet Nam. This period has also seen major decline in forest cover in Viet Nam. The greatest rate of forest loss occurred between 1975 and 1983 with particularly high rates of forest loss occurring in the Red River Delta, Northern Midlands, Northern Mountains and the area northeast of the Mekong Delta. An important result of this deforestation has been the creation of large areas of unproductive barren land especially in the northern areas of the country.

The principal causes of forest depletion are:

- expansion of agriculture into forest land as a result of increasing land pressure from growing rural populations and migration of poor and landless from overpopulated areas in northern Viet Nam to the relatively resource rich central and southern regions of the country;
- excessive and destructive logging by state forest enterprises especially from 1975 to 1990, encouraged by government policies to promote timber trade, support industry and earn foreign exchange.
- fuelwood consumption by communities living in and around forests continues to be a major source of forest degradation;
- shifting cultivation. In areas where growing population pressure has reduced the length of the rotation cycle to unsustainable levels, or where sedentarisation programmes have forced shifting cultivators to intensify cultivation of infertile upland areas, severe land degradation has resulted.

The above changes have occurred over the past fifty years which has been a particularly turbulent period in the history of Viet Nam. Major political, economic and social changes have had a strong influence on the forestry sector in the country. This period covers the ending of one hundred years of colonial rule in 1953, the establishment of a socialist government structure, nationwide armed conflict leading to political reunification of the country, economic depression and subsequent drastic reorientation of political and economic policies toward a market based economy. Unsustainable forest logging, war and migration have disrupted the former agro-ecological balance resulting in the degradation of large areas of forest into "barren land" of low productivity. Social factors have also been an important influence on the impact of the human-population on forest resources and management.

Since the early 1960s the Government has implemented a policy of organized migration. In the northern part of the country, people of Kinh origin living in the densely populated Red River delta were mobilized to settle in the hilly and mountainous regions north and northwest of Hanoi. These people became engaged either as new farmers to open up new land, usually in New Economic Zones, or as workers for State Forest Enterprises and State Farms. From 1987 Government made little effort to control migration. Low population density and the valuable timber resources and agricultural potential of the Highlands for non-traditional industrial crops have attracted large numbers of settlers over the last ten years and this has put extreme pressure on land resources. Spontaneous migrants present a greater threat to forests as they clear forested land for cultivation or displace local populations which move into forested areas to seek arable land. Low yields of traditional food crops on upland. soils do not support high population densities, and the continuing expansion of subsistence agriculture onto increasingly marginal land has fuelled the cycle of land degradation of which barren land and rural poverty are the most obvious symptoms.
Changes in the political system and institutional structure of government during the twentieth century have had a profound impact on all aspects of social and economic development in Viet Nam. Change continues during the present transition from command to market-oriented economic development policies. The nature and responsibilities of the institutions concerned with the agricultural and forestry sectors have changed to reflect the prevailing conditions of war and peace, and under policies which have varied widely in their degree of centralization and in promotion of self reliance. In addition, there have been many locally designed solutions to various problems. The result has been a multitude of institutions and practices, some of which are redundant under prevailing policies and conditions. Indicative of this climate of change was the reorganization, in 1995, of three Ministries with responsibility for forestry, agriculture and food industries, and water resources management into a single Ministry of Agriculture and Rural Development (MARD).

2.1 Plantation Forestry

In Viet Nam, as in many Asian countries, demand for forest products has been rapidly increasing while production from natural forests is decreasing. With expected continuing high levels of economic growth this trend is likely to continue or accelerate. Forecasts made by the FAO STRAP Project\(^1\) indicate that annual wood consumption for industrial purposes will increase from an estimated 4.5 million m\(^3\) in 1993 to 8.3 million m\(^3\) in 2010. The government proposes to reduce the allowable harvesting of natural forests from around 0.6 million m\(^3\) roundwood at present to 0.3 million m\(^3\) by 2000 and to zero by 2010. This compares with an annual harvest of 2-3 million m\(^3\) during the 1970s and 1980s and over 1 million m\(^3\) during the early 1990s. Illegal logging is estimated to have contributed a similar volume to the legal harvest.

The balance of industrial wood demand is therefore expected to be made up of greatly expanded plantations and imports which will now be encouraged.

With some 40 years of accumulated experience in forestry planting Viet Nam has gained significant material and environmental benefits over the period. With improved planting material and technical inputs, survival rates have increased substantially from less than 50 percent prior to 1975 to around 70 percent in the 1990s - though still low by international standards.

Over the past five years the area planted has just kept up with annual rate of forest loss due to harvesting and clearing for cultivation.

Some 913,000 ha of Industrial plantations were established over the period 1986-1992 and planting continues at a rate of 120,000 to 140,000 ha per year: the predominant species being, *Eucalytus camaldunensis* and *Pinus merkusii*. These industrial plantations are established in forest material supply regions to supply i) wood chip and paper material, ii) industrial timber for construction, as pit props and for manufacturing furniture and iii) species suitable for extraction of essential oils. Planting of industrial trees will need to expand substantially if plantation forests are to make a meaningful contribution toward meeting national timber demands in the medium term.

The main technical problems affecting plantation forestry include:

- relatively, low forest plantation yields - nationwide mean annual increment of 7-8 m\(^3\) per year (highest 10-15 m\(^3\)) compared to up to 30 m\(^3\) per year in Brazil,
- need for further research to assess value of exotic plantations species and the compare benefits of mono-culture versus mixed plantation;
- lack of attention to protection from insects, diseases, fires and illegal cutting;
- insufficient volume of improved planting material.

2.2 Foreign Investment

Up to the end of 1995, foreign investments had been implemented in 52 forestry projects with a total investment of $68 million for a reported establishment of 23,000 ha. Fifteen countries were involved in these investments with Taiwan and Japan being the major investors ($47 million and $22 million respectively). Investments focussed on plantation establishment and timber processing and created employment for about 7,300 people. Up to 1994, all projects involved joint ventures with local investors contributing on average 30%
of the value of investment. Two projects in 1995 were 100% foreign owned.

2.3 Non Government Organizations

A number of foreign funded NGOs are also active in afforestation and agro-forestry usually in association with community development programmes. Forest management activities in NGO programmes are usually implemented as one component of an integrated programme which may address social, economic and environmental objectives. Forestry activities are often linked with community based land use planning and land allocation.

2.4 Government Policy and Programmes

Government policy for management of the forest sector is described in the National Plan for Environmental and Sustainable Development (NPESD) published in 1991 and formally endorsed by the Prime Minister in 1995. Through specific programmes.

Government aims to reduce both legal and illegal harvesting of natural forests, restore natural forests where required for essential watershed protection, and replace the harvesting of natural forests with production from plantation forests. During the period 1991 to 2000 a broad programme of forestry development and protection is being conducted to restore 5 million ha of forest, including about 2 million ha of plantation and 1 million ha of household forest farms. The remaining 2 million ha has been gazetted for forest protection or rehabilitation wherever natural restoration is possible.

Government policy regarding the agriculture and forestry sectors is expressed in the form of laws enacted through regulations and directives issued from time to time by various agencies of government. Changing government policy has resulted in a series of decisions in recent years which have changed the role of various State bodies concerned with the management of the agriculture and forestry sectors. These decisions have steadily increased the importance of individual households in the management of agricultural and forestry resources and required greater commercial accountability for state enterprises operating in the sector. These changes have contributed to a transition from centralized forestry to social and mixed forestry and encouraged the allocation of land to smallholders for agroforestry purposes and the contracting of forest protection to smallholders as an alternative to shifting cultivation. The role of State Forest Enterprises (SFEs) has changed from one whose original function was to harvest the forest resources allocated to them. They are now required to entrust the management of forests to farmers (former employees or others) on a contract basis.

The main Government programmes which impact on the forest and barren land degradation problem are for i) plantation reforestation and ii) "regreening" of barren lands.

2.4.1 Reforestation Programmes

Foreign assistance for forest development began in the late 1970s with the construction of the large Vinh Phu Pulp and Paper mill at Bai Bang, northern Viet Nam with SIDA assistance. During the 1990s more than 20 forestry projects have been implemented with assistance from foreign governments and multi-lateral agencies. Ongoing projects valued at almost $170 million include technical assistance for planning and policy development, training and conservation activities as well as reforestation. Many of these projects are relatively new. Experience from the longer running projects such as the SIDA funded Bai Bang project and the World Food Programme Hill Area Reforestation Projects indicate that successful reforestation programmes must take into account the interests and priorities of local populations, especially in relation to food security and the value of common access rights to barren land.

Government has identified the allocation of forest land to an "owner" as a necessary step toward sustainable forest management and several projects have developed participatory methods which involve affected communities in the process of land allocation to reduce cost and ensure equitable allocation of forest land.

For government sponsored forestry programmes the following issues are identified:

- delayed delivery of funds through government programmes with adverse impact on technical efficiency;
- weak interagency coordination of the land allocation process means that necessary complementary
activities are not performed in an timely manner;
- lack of capital and access to credit by smallholder farmers inhibits investment on their allocated land.

2.4.2 The "Barren Lands" Regreening (Decree 327) Programme

Decree 327 of the Council of Ministers in 1992 sets out "Major Guidelines and Policies to Utilize Unoccupied, Barren Hilly Areas, Forests, Denuded Beaches and Waterways" for a ten year programme commencing in 1993. Government indicated the high priority accorded to the development of barren lands by allocating $68 million of its own funds in the first year. For 1997 the budget allocation to this programme remains at $45 million. The primary goals of the highland portion of this programme were to "stabilize" settlement villages and sedentarize the itinerant shifting agriculture population by developing the underutilized barren uplands throughout the country with emphasis on linking agriculture, livestock and forestry and on increasing the protection of reserved forests and head watersheds. The focus would be on households as the basic units with particular emphasis given to production technologies or products for manufacturing industries; and on environmental protection. Guidelines were given for targets, size of projects, and plots to be allocate to households by subsector (e.g. industrial tree crops; agro-forestry enterprises; livestock enterprises); investment funding; and organization all structure, including the role of key agencies to plan, approve, and implement the projects to be supported.

The programme was mainly implemented by State Forest Enterprises (SFE) and became for many SFEs the principal source of their revenue.

The programme achieved mixed results: although substantial areas of reforestation were achieved there were problems with accountability for funds expended and a relatively high cost of administration and operating expenses (23% of the total allocation in the early years). Funds were spread over too many projects to be fully effective, did not accord with the real needs of the affected communities and many projects lacked adequate justification on the basis of land use and economic returns.

Decree 556/TTg of September 1995 renamed Programme 327 as the "National Programme to Create and Protect Watershed Protection and Special Use Forests" and redirected its activities toward the preservation and restoration of natural forests in upland areas through agro-forestry projects implemented by the people living there. No longer included in the programme are the establishment and management of production plantation forests, the planting of barren land with industrial crops, fruit trees and pastures, or activities related to "fixed cultivation and sedentarization" projects which are separately funded. From 1996 to 2010 an annual average of 250,000 ha of bare hills designated as watershed protection and special use forests are expected to be planted and regenerated under the programme.

It is significant that government intends to channel all financial support to the forestry sector, both domestic and foreign funded, through the 327/556 funding mechanism. Foreign funding agencies are likely to insist on greater transparency and accountability in the implementing mechanisms for these programmes.

2.5 Issues

The following issues emerge from the above review:

2.5.1 Ensuring Best long-term Use of Land Resources

A number of policy and institutional factors affect the efficient use of forest land.

Land for subsistence: The allocation of land to rural households to has been a feature of Government social and land policy. This programme of "land reform" has provided an important safety net which has enabled a large proportion of the population to support themselves through semi-subsistence agricultural production, especially during periods when self-reliance was important for survival. However, the process also has the effect of fragmenting land ownership and reinforcing a subsistence economy in rural areas. Rapidly growing rural populations and static or declining productivity of relatively infertile upland soils will mean that these communities will be less able to support themselves in the medium to long term. Continuing allocation of dwindling reserves of marginally suitable land in small holdings for semi-subsistence production will not solve the problem.

Subsistence cultivation tends to perpetuate inefficient land use. Land which is better suited to perennial crops (forest, tree crops, horticulture and forage) may be inappropriately used for arable cultivation to feed the
household, with adverse impact on soil fertility, and possible permanent damage due to erosion or breakdown of soil structure. Alternatively, fertile land may be underutilized as a result of application of less efficient technology due to lack of knowledge or over riding food security concerns.

It is vital that present policies which encourage semi-subsistence agricultural settlement are replaced by a successful strategy to create of non-farm and off-farm employment opportunities if widespread rural poverty is to be reduced.

**Land classification:** Rural land is classified as either agricultural or forest land with distinct division of institutional responsibilities for the management of each land category. However, on the ground, the demarcation of agricultural and forest land is often unclear. Extensive areas of "forest land" are without forest cover or are being cultivated on an intermittent or continuous basis. Since "forest land" cannot officially be cultivated, households farming these areas have not been entitled to receive support from extension services.

**Land allocation:** The allocation of agricultural land has proceeded rapidly, mostly confirming existing informal land allocation understandings. However, allocation of forest land has proceeded much more slowly, mainly because of uncertainties at provincial level regarding the application of government policy. In some areas, land certification has been granted to a SFE rather than to the households who may be cultivating the land. Without formal certification of land use rights, households are ineligible for formal credit and the SFEs are reluctant to bear the risk involved in acting as a financial intermediary between financial institutions and the farmer.

The continued presence of many non-viable state forestry and agricultural enterprises which control substantial land and forestry resources hinders effective utilization of these resources.

**Appropriate technology:** Though efficient and sustainable upland agriculture and agro-forestry methods have been developed under similar conditions to Viet Nam and tested in some parts of Viet Nam, these are not widely known within the country. There is a need to test and demonstrate appropriate technology on a wide scale. Improved delivery of extension services and inputs, including credit, is vital.

There is a lack of inter-agency communication which results in institutional mind-sets being perpetuated; for example, a perception that forestry plantations are the only appropriate use of forest land when the affected communities would prefer tree cover which provides regular benefits (such as fruit trees or non-wood forest products)

**Monitoring:** Effective monitoring and management of inappropriate land use activities, such as illegal logging and the unsustainable cultivation of marginal land, is also a prerequisite to the adoption of sustainable practices.

### 2.6 Barren Land

Barren land accounts for 12 million ha, more than one third of the area of Viet Nam. Almost all of this is found in upland areas and may range from bare and eroded soil to the early stages of forest regeneration with up to 100% ground cover.

The formation of barren land formation is closely linked with natural forest patterns because agricultural activity on forest soils following clear felling is responsible for the depletion of soil nutrients, decline in soil organic matter and structure, weed invasion, and hydrological changes that can result in serious downstream impacts.

Such land is outwardly available for reforestation or plantation forestry. However, barren land is also related to the practice of shifting cultivation, and a substantial portion of barren or idle land may be considered to be utilized within traditional, extensive agricultural production systems and may have existing claims for traditional land use rights. In addition, the diverse characteristics of barren land including fertility, susceptibility to erosion, topography and climatic conditions mean that economically viable forestry or agriculture solutions may not be available and uniform prescriptions are not appropriate. Interventions must to be flexible. Successful solutions need to be site specific to accommodate prevailing social, physical, economic, technical and environmental factors.

### 2.7 The Role of State Forest Enterprises
Over 400 State Forest Enterprises, each responsible for about 15,000-25,000 ha of forest, were established to exploit natural forests as a means of generating export revenues. Much of the natural forest under their control has now been harvested almost. Rapid policy change over the past four years aimed at watershed protection and stabilization of land degradation has resulted in a change in function of SFEs from being natural resource harvesting enterprises to forest protection and plantation forestry enterprises. They are also unable to divest themselves of many redundant employees and their families for whom they are expected to provide at least a subsistence livelihood.

These rapid and radical policy changes have raised a number of issues:

- in spite of these radically altered functions, the technical and managerial capability of the SFEs and their staff has not been amended;
- increasing policy pressure to "corporatize" operations of state enterprises in a commercially accountable manner;
- conflict between social, conservation and commercial "survival" objectives;
- duplication of functions between SFE and other government agencies (such as with the Forest Protection Department which has responsibility for forest protection, and the extension and commodity development agencies which are responsible for agricultural technology transfer);
- SFEs control large areas of land which under present policy should be allocated to households.

### 2.8 The Potential for Investment

The main issues raised by commercial investors in industrial forestry include concerns about the security of long term investments in forestry operations in a situation where land use rights are unclear and the legal framework is incomplete. Unilateral Government decisions regarding export of wood products, export levies and setting of land rents for forestry purposes increase risks and costs while the means by which investors can disengage from an investment are complex and unclear. Concern about assured access to raw materials inhibits investment in large scale processing operations. In addition, investment procedures are time consuming.

The Government places considerable importance on smallholder agro-forestry as a means of protecting upland hill areas and generating income. Previous studies suggest that forestry is a marginal proposition for smallholders as a result of moderate productivity but especially because of low market returns due mainly to apparently high marketing costs from harvest to factory-gate or wholesale market.

To stimulate investment in forestry (both large scale and smallholder) it is important to provide a stable institutional framework. The legal and financial parameters should be clear and consistent and, as far as possible, the trading environment should be transparent and competitive. The opportunity for bureaucratic rent seeking should be minimized by simplifying administrative and regulatory processes.

#### 2.8.1 Environmental Issues in Viet Nam

Viet Nam's geography is characterized by a very long coastline (3,260 km), a preponderance of hill areas (accounting for three quarters of total land area) and a cultivated area of about seven million ha (21% of total land area). Cultivated area per capita is only 0.13 ha - among the lowest in the world.

Viet Nam's management of its natural resources has been mixed. Positive aspects include early measures to control migration and reduce damage caused by shifting cultivation and recent policy measures to halt the loss of natural forests to uncontrolled harvesting and settlement. However, increasing population pressure has resulted in increasing stress on the nation's land and forests which has the potential to cause serious deterioration.

In the 19 million ha of land classified as "forest land" in 1990, only 8.7 million ha were natural forest cover; while "barren land" (largely degraded former forests) accounted for about 13.4 million ha or nearly twice the area of land under cultivation. The main factor in the evolution of "barren land" is sedentary shifting cultivation, often linked to forest fires. Once the forest is cleared, over-cultivation of soils which are susceptible to deterioration can result in severe erosion. The only solution in the worst affected areas is to reduce population pressure by finding alternative income sources. In the worst affected area, the Da watershed, where about 500,000 ha of forest land are devoted to annual crops, the cost of erosion is estimated to be US 140 million\(^{19}\).

Because of their fishery breeding and nurturing functions, the loss of wetland forests (mangrove and back
mangrove) is in many ways more serious than that of the upland forests or watersheds. Present wetland forests represent about 30 percent (approximately 1.2 million ha) of the cover existing in the 1940s. Although large areas of mangrove were replanted in the Mekong Delta following reunification, much was subsequently destroyed by expansion of largely unsustainable shrimp aquaculture in acid sulphate soil. Under typical conditions of improper dyking and poor management which characterize these farms, acidification has led to pond abandonment. A similar trend applies to the back mangrove or *Melaleuca* forests which are typically richer in biodiversity and forest by-products than the coastal mangroves.

Environmental impacts from expansion of agricultural land are not considered to be particularly wide ranging or critical as those mentioned above. However, agricultural holdings and coastal communities, particularly in the Central Coastal regions, have become more vulnerable to beach erosion and storm damage as a result of breakdown of coastal protection dykes, the loss of mangroves and, to a lesser extent, coral reefs. The Mekong and Red River delta and estuary systems are increasingly threatened by urban/industrial waste discharge. Other coastal areas, particularly in the central regions, face losses from destructive exploitation techniques and corals.

Viet Nam will have to be more environmentally conscious to enable a more sustainable growth for the economy. The World Bank recommends a range of actions at the policy, programme/project and institutional level to improve natural resource management and environmental protection. The Bank highlights the cost of delay in attending to existing "danger points" and indicates that in some instances the level of damage is approaching the point where it may be irreparable.

The following principles are suggested as basis for dealing with environmental issues:

- there is a general failure of all sectors of society to take into consideration, as a matter of course, the impacts of their actions on the environment. An important remedial step is an attempt to build environmental concerns and awareness into choices and decision making, both collectively and individually. This can be done if: i) the polluter is made to pay, ii) realistic standards on what constitutes pollution are established; iii) environment mitigating actions that are cost effective are promoted to existing firms or producers; iv) mechanisms are established to monitor and enforce serious transgressions of realistic pollution standards; and v) political will and strong institutions exist (or can be created) to permit administration of the system.
- well planned and directed programmes or projects are necessary to ensure that the increasing destruction of the environment is contained through the process of better design and screening for environmental impacts; and priorities are determined.
- economic growth and a sound environment can be compatible, and even reinforcing goals if appropriate policies are followed. In a number of instances, appropriate (higher) pricing (e.g. by removing subsidies) can reduce environmental over-exploitation. This applies both to natural resources like forest, soil and water (which are usually undervalued), and to the provision of environment related support services (waste-management, potable water supply) which are often priced substantially below actual costs.

### Table 2.1: External Assistance to the Forestry Sector

<table>
<thead>
<tr>
<th>Funding Agency</th>
<th>Project Name</th>
<th>Amount ($1000)</th>
<th>Period Covered</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b) Renovation of Strategies for Forestry Development</td>
<td>1,000</td>
<td>1993-1996</td>
</tr>
<tr>
<td></td>
<td>c) Regional Support to Forestry (continuation of Item a) above</td>
<td>20,000</td>
<td>1996-2000</td>
</tr>
<tr>
<td>2. World Food Programme</td>
<td>a) Project 4304 in 13 Coastal Provinces (WFP)</td>
<td>20,300</td>
<td>1992-1997</td>
</tr>
<tr>
<td>3. UNDP</td>
<td>a) technical Support to WFP 4304</td>
<td>700</td>
<td>1993-1995</td>
</tr>
</tbody>
</table>
3. DEVELOPMENT OF LIVESTOCK EXPORT SECTOR

3.1 Summary

This review provides an initial evaluation of the export potential of selected livestock products. The following broad conclusions are therefore made:

- The growth of the pig herd in the Red River Delta region is the most significant factor contributing to the development of an exportable surplus.
- The pork deficit in the south will continue while production lags behind growth in consumption. To the extent that improved communications and freight rates permit the southern deficit will compete for exportable northern surpluses.
- Subject to animal health assurances and suitable freight rates, pork products and edible offals may compete with internationally traded product.
- Subject to suitable freight rates, animal health and quality assurances, beef edible offals sourced from the Northern Mountains/Midlands and Central Highlands may compete with internationally traded product.
- Subject to suitable freight rates, animal health and quality assurances frozen poultry carcasses sourced from the Central Highlands may compete with internationally traded product.
- Subject to suitable freight rates, animal health and quality assurances frozen pork carcasses sourced from the Central Coast if marginally costed, may compete with internationally traded product.

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| 4. Germany/GTZ | a) Social Forestry Development in Song Da | 1,100 (Phase I) | 1993-1995 |
|  | b) Support for the reform of the Forestry Administration in Viet Nam (under preparation) | 3,000 |  |
| 5. Germany/KfW | a) Conservation and Development of Forestry Resources in Ha Bac and Lang Son | 7,000 | 1995-1998 |
|  | b) Reforestation through local Credit Schemes in Ha Tinh, Quang Binh and Quang Tri | 7,000 | 1996-1998 |
|  | b) Rehabilitation of Mangrove Forests in the Mekong Delta | 4,166 | 1996-1998 |
|  | c) Conservation of Cat Tien National Park | 5,800 | 1996-2000 |
| 7. Japan/JICA | a) Reforestation through Agro-forestry in Dac Lac Province | 3,000 | 1993-1998 |
|  | b) Forest Rehabilitation through Agro-forestry in Northwest Viet Nam | 16,000 | 1996-2000 |
| 8. Switzerland | Establishment of Social Forestry Center at Xuan Mai Forestry College in Ha Tay Province | 1,500 | 1994-1996 |
| 11. World Bank | Technical support to Upland Hill Area Protection and Development (TA) | 1,000 | 1995-1996 |
| 12. ADB | Forestry Sector and Watershed Management (TA) | 870 | 1995-1996 |

Source: ADB
from the Central Highlands, if marginally costed, may compete with internationally traded product.

The markets that should be pursued include:

- Hong Kong and southern China for specialty, but price volatile, pork products
- Taiwan for quality pork carcass cuts.
- the Russian market for manufacturing grade pork product
- the northern Thailand pork and possibly beef market under the ASEAN Agreement

The review has identified specific areas for future investigation namely:

- A detailed analysis of the retail value of edible offals with emphasis on red offals
- Freight rates ex Viet Nam coast and western borders
- Veterinary Certification and quality standards applicable to edible offals, pig and poultry carcass meats. The investment cost involved to meet these standards must be assessed.

3.2 Background

3.2.1 The Economy

The economic reform process started in the agricultural sector in early 1980s has had a dramatic impact on the performance of the economy as a whole. Annual GDP over the last 5 years has averaged 8.4%. Inflation has dropped from 487% in 1986 to 4.5% in 1995. National savings increased from 7.45 in 1990 to 17.1% in 1995. Expenditure continues to be driven by investment, primarily foreign direct investment (FDI) which totalled US$8.5 billion in 1996 alone (up by 29% compared with 1995). Public investment, including those funded by overseas direct assistance (ODA), also rose.

3.2.2 Agricultural GDP and Production Growth

The rural sector which continues to play an important role in Vietnam's socioeconomic development. The sector accounts for 80% of the population, generates 25% of GDP and supplies about 60% of exports. However, the national economic performance masks a significant urban/rural imbalance. With growth largely driven by the 14% per annum expansion in the town-based industrial sector, urban dwellers are the primary beneficiaries of this economic prosperity. Although the rural economy has also prospered in recent years, with an estimated overall 4% growth per annum, benefits of the country's rapid growth have been inequitably distributed. Unemployment figures emphasize this disparity. While urban unemployment is about 7-8%, the underemployment rate of the rural workforce, which represents 73% of the national work force, is estimated at around 35%.

Between 1989 and 1994 the production of major agricultural products grew sharply. Production of paddy (Vietnam's most important product) expanded at an average annual rate of 5.3%. Corn production, also used as feed for livestock, increased at 6.7% pa. However, these rates were not matched by the production of less favoured subsistence crops which grew at slower rates such as sweet potato (average annual rate of 0.9% pa) or declined (e.g. cassava -1.8% pa). Because of increasing income levels, vegetable production grew at more than 4 % annually.

The production of annual industrial crops increased substantially over the same period. Average annual growth rates for these crops were significantly higher than for food crops. With growth rates above 20% annually, the expansion of cotton and mulberry production were the most dynamic; but the slower growth rates of sugarcane, groundnut and soybean were still higher than those for food products. The production of perennial industrial crops also increased significantly between 1989 and 1994. Orange and coffee production expanded with annual growth rates over 20%; the growth rates amounted to 17% for rubber pa and 5.4% pa for tea. These results largely reflect pre-1988 initiate d investments under the Soviet era (especially for rubber, tea and to a lesser extent, coffee) or adjustments to the cessation of CMEA trade after 1990 (cotton and oilseeds).

Projectons by NIAPP indicate a dramatic change in food consumption patterns as a result of rising incomes and changing preferences. The National Institute for Agricultural Planning and Projections (NIAPP) projects that per capita cereal consumption (largely rice) will decline from 174 kg in 1995 to 144 kg per year in 2010. However, consumption of higher value crops is expected to rise rapidly. Over the same period, per capita consumption of pulses is expected to increase 620%, meat 243%, eggs 220%, milk 2300%, oil and fat 260%, sugar 471% and vegetables 84% and fruits 31%.
3.3 Livestock Sub-sector

3.3.1 Livestock Production

The annual growth rates for animal husbandry (as reflected in numbers of livestock) were lower than those for other agricultural products. Average annual growth rates were 6% for poultry, 5.3% for pigs and 2 percent for cattle. However, productivity especially of pigs has increased with a change to leaner more productive breeds and improved husbandry in urban and peri-urban production units.

The increase in livestock numbers has resulted in an increase in meat production. Between 1990 and 1997, pork production increased by 6.8% per annum to 1.15 million tonnes LW, poultry by 3.8% per annum to 0.22 million tonnes LW and beef/buffalo by 1.48% per annum to 0.12 million tonnes LW. Over the same period egg production increased by 7.7% per annum to 3168 million units and milk production by 19.3% per annum to 31,275 tonnes. Seventy seven percent of meat produced is pork. 16% poultry (including duck), and 7% red meat, predominantly from cattle and buffalo. Growth in ruminant animal production tends to be driven by the emergence of a relatively small but rapidly growing demand in urban centres for animal products such as milk and quality beef cuts. This demand is generally met by a small number of specialist producers.

3.3.2 Livestock Resource Base

Reference to Table 3.1 would indicate that, on a national basis, the increased production outlined above are sustainable. Production increases are within the incremental feed grain and crop by-products generated from an increase in crop production. Given that not all incremental livestock feed and by-products are utilised the analysis would indicate that, given current technology, further increases in livestock production are still achievable.

Based on 1990 data the Viet Nam Livestock Sector Review and Project Identification Mission (FAO/World Bank Feb 1992) evaluated both the livestock feed resource and domestic meat consumption on a regional basis. The mission made indicative projections for 1995. This data indicated that feed surpluses, especially of quality feeds, exist in the south and that livestock, surplus to regional demand, exist in the northern and central coastal regions. This regional balance remains consistent in 1998. Given the upgrading of the national road network it would appear reasonable to assume regional imbalances would adjust in accordance with the demand for meat and quality livestock feeds.

3.3.3 Meat Consumption

Domestic consumption accounts for almost 100% of meat produced. Per capita meat consumption of 10.1 kg is low by comparison with nearby Asian countries. However, experience of these neighbouring countries suggests that demand for livestock products can be expected to expand rapidly in parallel with rising incomes, especially in rapidly growing urban centres. This is likely to result in aggregate meat production expanding at around 6-7% annually. Most growth is likely to be in pork and poultry production, which over time will be increasingly concentrated in large scale commercial units in and around the major population centres. However, expanding rural will provide opportunities for rural producers to increase livestock production, which is already an important source of household incomes.

3.3.4 Domestic Trade

The analysis of domestic trade is based on 1996 data since this relates to the latest fob/cif prices for meat domestic sales and product exported. Discussions with relevant parties at mid-1998 would indicate that while domestic prices have increased the relationship remains consistent. Regional wholesale price differences (1996) tend to reflect consumer demand and the distances for marginal product (most product is sourced within a 200 lan radius) from the major areas of consumption.

- Hanoi (surplus regional pig production) and HCMC (deficit regional pig production) set the consumer price for pork prime cuts at around VND19,000 per kg i.e. higher than the export parity value for pork. The wholesale price for pork in the Northern Mountain region of VND 17,250 per kg, reflects the cost of transshipping pork the 1750km to the south. The wholesale price of pork in the Southern Central Coastal region of VND18,500 per kg, reflects the cost of transshipping pork the 500 km to HCMC.
- The regional prices for pigs are also influenced by breeds. Local pig breeds dominate northern production. The relatively high prices for local pigs is being driven by the demand for pigs to supply light weight frozen carcasses into southern China and Hong Kong. This trade does not exist from HCMC.
were prices reflect the dominance of improved lean meat pig production. Lower pork prices in the Central Highlands region (a marginal surplus region for pork production) reflect lower regional per capita incomes compounded by poorer quality local pig breeds i.e. high fat content.

- Hanoi and HCMC (both deficit regional beef production) set the consumer price for prime beef cuts at around VND23,200 per kg i.e. higher than the export parity value for beef. The wholesale price for beef in the Northern Mountain region of VND20,250 per kg reflects the transhipment cost of beef to offset any deficit on the Hanoi market with surplus stocks being shifted the 1750 km to HCMC. The wholesale price of beef in the Southern Coastal region of VND22,300 per kg reflects the cost of transhipping beef the 500 km to HCMC. Lower beef prices in the Central Highlands region (marginal surplus regional beef production) reflects not only lower regional per capita incomes but also the cost of moving relatively small volumes of lower quality product to HCMC.

- The retail price structure for poultry meat would suggest a more complex market structure. The south at VND27,400 to VND28,500 per kg carcass weight is significantly higher than Hanoi and the central coast at VND25,000 per kg carcass weight. The Central Highlands at VND21,700 per kg carcass weight represents a price differential considerably greater than the cost of moving the end product. It is suggested that production is (a) more closely situated to the centres of consumption and that price differentials reflect the movement of feed grains rather than carcass meat and (b) southern production is based on improved meat breeds while northern production is based on local breeds with poorer carcass composition.

3.3.5 Livestock Supply and Demand Projections

Pork production dominates domestic production and hence the livestock sector. Table 3.2 is based on supply and demand data presented by Goletti and Rich in their Agricultural Policy Stimulation Paper January 1998. This data, adjusted for carcass quality by regions, assesses the regional trend in pork production. The analysis would suggest that:

- pork production will continue to exceed demand through to 2005 creating a net surplus with possible export potential
- should the net surplus not be exported then this amount would have to be absorbed on the domestic market placing domestic prices under increasing pressure.
- the production deficit around HCMC will continue while demand will exceed supply in the Mekong Region increasing the South's net deficit in pig meat
- the deficit in the Northern Mountains and Midlands will be reduced
- the Red River Delta remains as Viet Nam's major area of surplus production

The projections are based on the key assumptions that:

- increased pig production is related to economic growth. A 1 percent increase in GDP equates to around a 1 percent growth in pork production. For the purpose of this analysis it has been assumed that GDP will continue to grow at 8 percent per annum.
- increased consumption assumes a net 2 percent population growth and a 4 to 4.5 percent increase in per capital consumption per annum.

The Red River Delta and the Central Highlands are the areas of perceived expansion. Should the expected development of maize in the Central Highlands be restrained as tariff barriers on imported maize are removed then the rate of pig production would decline. The impact, other than on the ability to develop trade into northern Thailand, would not be significant since the regional herd is relatively small. Should however the rate of expansion in the Red River Delta be reduced by a third the national growth rate for pork production would decline by 1 percent to 7.5 percent and the estimated exportable surplus would be reduced by 50 percent.

3.4 Export Potential

3.4.1 World Production and Consumption

World meat production and consumption increased by 5 percent in 1995 to 208 million tonnes carcass weight equivalents (cwe). High feed costs reduced the rate of growth in 1996 to 4 percent or nearly 216 million tonnes. Poultry (58.3 mt cwe) replaced bovine meat (56.5 mt cwe) as the second most important meat to pork (86.4 mt cwe).

The international trade in poultry meat (5.03 mt cwe) increased by 11 percent in 1996. This significant increase
reflected increased demand in the CIS countries, especially the Russian Federation. Rising production costs in Thailand resulted in the major share of the increase being covered by the United States (2.4 mt cwe total exports at US$2380 per tonne fob US frozen/chilled and US$950 per tonne parts/by products), which now accounts for around 50 percent of internationally traded product, Brazil (0.54 mt cwe total exports) and China. Higher international feed prices constrained the growth in the volume of pig meat traded (2.30 mt cwe) to 3 percent in 1996. Increased demand from Japan which accounts for around one third of traded product, offset depressed purchases by the CIS countries and lower demand reflecting increased domestic production in Poland. The increase in exports was met by United States (0.43 mt cwe total exports at US$261 0 per tonne fob), Brazil and Republic of Korea.

Trade in bovine meat increased by 2 percent in 1996 through increased purchases by Japan, Indonesia, Republic of Korea, Philippines, Chile and Mexico. The demand was met by the United States and Canada. The falling international price (Aust. Cow US$ 1947 cif US$1995, US$1784 cif US$1996), which reflected increased stocks in the major producing countries, and strengthening of the currency constrained the ability of Australia and New Zealand to meet increased market demand.

3.4.2 CIS Countries

Russia A lack of a coherent agricultural policy, uncertainty over land tenure, high input costs, poor distribution network and crippling taxation has resulted in a 56 percent decline in total agricultural output between 1990 and 1996. Over the same period meat production declined by 82 percent. In the five years to January 1997 Cattle numbers fell by 31 percent pig numbers by 38 percent and sheep numbers by 54 percent. Increased feed costs, substitution by poorer quality feeds and reduced veterinary services have reduced the live weight, increased the disease incidence and hence reduced the reproductive rate of the remaining animals.

Under the centralised system meat processing plants handled 700,000 tonnes of meat of which 85 to 90 percent was imported. The collapse of the centralised supply system compounded by an inefficient distribution network has contributed to the decline of the domestic livestock sector and increased dependence on imported product. Subsidised consumer prices and a lack of alternative fresh food items over the winter period has resulted in relatively high per capita consumption. The lifting of State controls over meat prices in 1992 resulted in per capita meat consumption falling from 65 kg in 1991 to 46 kg in 1994. Consumption has now stabilised at a per capita consumption figure of around 52 kg.

A declining livestock sector, a meat processing sector reliant on imported product and a significant per capita consumption has resulted in Russia becoming a significant importer of meat and meat products. Similar trends in other CIS countries has resulted in 79 percent of Russia's US$ 1.70 billion spent on meat imports being sourced from non CIS countries. The major market is for price sensitive, manufacturing grade meat equivalent to the Aust/NZ manufacturing grade beef for the US fast food (hamburger) industry, and edible offals. The grade of product imported is reflected in the average cif unit price compared with the average price received by the major exporters. In 1996 Russia imported from non CIS countries 470,000 tonnes beef (US$1302 per tonne cif) 570,300 tonnes pork (US$1427 per tonne cif), nearly 752,357 tonnes poultry/ poultry by products (US$871 per tonne cif), 90,600 tonnes edible by products (US$826 per tonne cif) and 10,000 tonnes sheep and goat meat (US$765 per tonne cif). The average cif price for poultry meat would suggest that parts/by products rather than frozen/chilled carcasses are the preferred imported product.

Geographical proximity, the provision of food aid immediately after the collapse of the USSR, the use of subsidies to reduce overall market prices and government guaranteed trade credit has resulted in the EU and United States becoming established as the dominant suppliers to the market. The phasing down of subsidies for EU exporters, health restrictions placed on EU offals especially beef livers and greater cooperation between fragmented Russian importers will increase the opportunity for non EU/US exporters to penetrate the market.

Other CIS Countries

Table 3.3 details production and consumption trends in selected CIS countries. Between 1993 and 1996 livestock production in the Ukraine, Belarus, Moldova, Kazakhstan, Kyrgyzstan and Azerbaijan declined. Livestock production was sustained in Tajikistan, Uzbekistan and Armenia and increased in Turkmenistan and Georgia. Declining levels of meat consumption at levels comparable to the trend in Russia are apparent in the Uluaune, Belarus and Kazakhstan. Per capita consumption from a lower level has declined in Moldova, Tajikistan, Turllonistan, Armenia and Georgia. Per capita consumption at lower levels is stable in Kyrgyzstan and Azerbaijan but increased inuzberkistan. The underlying factors contributing to these trends is notknown but is assumed as being similar to those in Russia. It must be assumed therefore that other CIS countries will not become major exporters in the short term.
3.4.3 Viet Nam

This paper will consider the alternative policy of exporting surplus product from the north and central coastal regions based on the assumption that the under utilised feed resource in the Mekong delta would be developed in order to supply the HCMC market.

The phasing down of subsidies and increased health restrictions will reduce the dominance of the EU/US in the Russian market. Viet Nam therefore has the opportunity to re-establish its traditional export market for livestock products in the price sensitive CIS market. This opportunity is reviewed in Tables 3.4 to 3.6. The analysis compares the fob value of beef, pork and poultry products with the average value of meat products imported by the CIS countries for 1996. A Nominal Protection Coefficient (NPC) of less than one would indicate that product sourced from Viet Nam would, subject to animal health and sea freight considerations compete on the CIS market. The analysis is based on regional wholesale data for 1996 and the following assumptions:

- The value of edible offals are 30 percent of prime carcass cuts
- Internal freight costs for refrigerated product are assumed to be VND1.0 per kg per km.
- Wharfage costs are assumed to be 7% of the value of the product along side the ship
- Based on the Livestock Sector Review (WB/IC 1992) fixed costs for export slaughterhouses of US$ 42 per tonne.

Export prospects for meat from Viet Nam are limited due to (a) high production costs compounded by (b) high duties on imported feed grains (c) the unfavourable disease status of the livestock populations and (d) competition from strong domestic demand. Development of export markets would require the negotiation of quarantine protocols with target countries, upgrading of meat processing facilities and the establishment and maintenance of animal health and quality standards acceptable to the target market. Prospects do exist for specialist products such as suckling pigs, ducks tongues and chicken feet in highly developed markets like Hong Kong but competition from mainland China is likely to be intense. The re-establishment of the carcass meat trade with CIS countries is considered an alternative export option.

**Beef**

Currently Viet Nam imports some 400 to 500 tonnes of beef from Australia and New Zealand for the hotel/restaurant trade while an unknown number of buffalo from northern Viet Nam are trucked South into Central Viet Nam and then across into Laos and then into northern Thailand.

Table 3.4 evaluates the regional export value for beef. It is apparent that the domestic prices for carcass beef is well in excess of manufacturing grade beef and relates more closely to international traded quality frozen cuts. Given the internal demand for carcass meat it is considered unlikely beef carcasses could compete on the CIS market. Edible offals would appear to relate more closely to internationally traded product and, given a favourable freight rate, may compete on the CIS market.

**Pork**

It was reported that some 3000 to 4000 tonnes of light weight pig carcasses (under 10 kg CW) are sourced out of northern Viet Nam and exported to southern China and Hong Kong. This market is very volatile with cif prices falling from US$3.20 per kg in 1997 to US$1.60 per kg in 1998. It was reported that up to 10,000 tonnes of pork was exported to Russia in 1997 (Vinalvesco Hanoi). Product for the Russian market was sourced from the Red River Delta region at prices of around US$1.10 per kg f.o.b. but increased trading opportunities are constrained through lack of client credit. This trade would influence the domestic farm gate price for pigs in the Red River Delta and Northern Coastal areas of Viet Nam through the removal from the domestic market of product that could not be economically transhipped to deficit areas in the south.

Table 3.5 evaluates the regional export value for pork. Domestic wholesale pork prices equate more closely than beef to internationally traded manufacturing grade pork prices. However the internal demand would appear to be such that only product sourced from the Central Highlands could have any opportunity of competing on the CIS market. The ability to compete would depend on the assumption that export product was costed to cover direct processing costs only and that domestically consumed product covered all fixed processing costs. A favourable freight rate would also have to be obtained before pork could compete with EU/US sourced cuts. The analysis would however suggest that edible pork offals could compete on the CIS market.

Longer-term market opportunities may exist in Taiwan as the Taiwanese pork production is moved offshore in response to increased economic and environmental pressures. The value of pork products in northern Thailand
is not known. However it must be assumed that as communication links are improved, product sourced from the Central Highlands could supply northern Thailand under the ASEAN Agreement.

**Poultry**

Table 3.6 evaluates the regional export value for poultry. Given suitable quality assurances it would appear that frozen product sourced from the Central Highlands could compete with internationally traded product. As with pork the northern Thailand market should be considered for product sourced from the Central Highlands. Poultry sourced from the Red River and Central Coast regions, if marginally costed, may also compete given favourable freight rates.

**3.5 Marketing Margins**

Table 3.7 summarises the marketing margins for beef and pork production. The analysis is based on the marketing margins identified during the 1992 Livestock Sector Review with the feed costs, producer/wholesale prices adjusted to 1996 figures as and when possible. The analysis would indicate that under the existing price structure all sectors of the marketing chain experience acceptable margins. The market however fails to fully recognise, and hence compensate, cattle fattening as a distinct component in the production of a quality product. The marketing margins for pork also reflect the lower unit returns associated with the higher throughputs.

The combined beef marketing chain margins identified in Table 3.7 amount to around VND17,250 per kg CW. If beef was sold on the export market the marketing chain would have to absorb a 45 percent reduction in these margins. It is suggested that the major share of this reduction could be absorbed by the collection and processing sectors.

The combined pork marketing chain margins identified in Table 3.7 amount to around VND 5,043 per kg CW. If pork was sold on the export market, the marketing chain would have to absorb a 60 percent reduction in these margins. The processing and collection sectors could not absorb these losses. The reduction in margins on exported product would therefore have to be absorbed by the producers.

**Table 3.1: Incremental Livestock Production and Feed Resource**

<table>
<thead>
<tr>
<th>Domestic Consumption</th>
<th>1990</th>
<th>1995</th>
<th>1997</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>million persons</td>
<td>66.23</td>
<td>74.03</td>
</tr>
<tr>
<td>Gross Food Production</td>
<td>000 t</td>
<td>padi equivalent</td>
<td>21489</td>
</tr>
<tr>
<td>less net Exports</td>
<td>000 t</td>
<td>padi equivalent</td>
<td>2308</td>
</tr>
<tr>
<td>Domestic Consumption composing:</td>
<td>000 t</td>
<td>padi equivalent</td>
<td>19181</td>
</tr>
<tr>
<td>Human Consumption</td>
<td>kg/capita</td>
<td>padi equivalent</td>
<td>300</td>
</tr>
<tr>
<td>Livestock Consumption</td>
<td>000 t</td>
<td>padi equivalent</td>
<td>19869</td>
</tr>
<tr>
<td>Grain</td>
<td>000 t</td>
<td>padi equivalent</td>
<td>-688</td>
</tr>
<tr>
<td>Crop By-products</td>
<td>%</td>
<td>Human Consumption</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>000 t</td>
<td>Dry Matter</td>
<td>1987</td>
</tr>
<tr>
<td>Total Feed Resource</td>
<td>000 t</td>
<td>Dry Matter</td>
<td>1299</td>
</tr>
<tr>
<td>Incremental Feed Resource</td>
<td>000 t</td>
<td>Dry Matter</td>
<td>2639</td>
</tr>
</tbody>
</table>

**Incremental Livestock Production**

| Liveweight Production | kg LW per capita per annum | 15.22 | 17.99 | 19.59 |
## Table 3.2: Pig Supply and Demand Projections

<table>
<thead>
<tr>
<th></th>
<th>1008</th>
<th>1332</th>
<th>1503</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Production</td>
<td>000 t</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incremental Production</td>
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<td>495</td>
<td></td>
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<tr>
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<td>kg</td>
<td>Dry Matter</td>
<td>5</td>
</tr>
<tr>
<td>Dry Matter</td>
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<td></td>
<td>1619</td>
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<tr>
<td>Milk Production</td>
<td>kg milk</td>
<td>per capita</td>
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</tr>
<tr>
<td>Total Production</td>
<td>000 t</td>
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<td>9</td>
</tr>
<tr>
<td>Incremental Production</td>
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<td>31</td>
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<tr>
<td>Feed Conversion 1 litre milk</td>
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<td>Dry Matter</td>
<td>3</td>
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<td>Dry Matter</td>
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<td></td>
<td>29</td>
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<td>Egg Production</td>
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<td>000 units</td>
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<td>Incremental Feed Balance</td>
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Source: Livestock Production in Vietnam 1990-1997 selected data
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<th>Supply</th>
<th>Demand</th>
<th>Surplus/Deficit</th>
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<td>tonnes 000</td>
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<td>134</td>
<td>215</td>
<td>103</td>
</tr>
<tr>
<td></td>
<td>149</td>
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<td>77</td>
</tr>
<tr>
<td></td>
<td>-16</td>
<td>28</td>
<td>26</td>
</tr>
<tr>
<td>1998</td>
<td>144</td>
<td>241</td>
<td>111</td>
</tr>
<tr>
<td></td>
<td>158</td>
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<tr>
<td></td>
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</tr>
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<td>1999</td>
<td>154</td>
<td>270</td>
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<td>07</td>
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<tr>
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<td>65</td>
<td>31</td>
</tr>
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<tr>
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<td>136</td>
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<td>37</td>
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<td></td>
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<td>156</td>
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<td>113</td>
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<td>47</td>
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<tr>
<td>2005</td>
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<td>tonnes 000</td>
<td>Carcass Weight</td>
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<td>------------</td>
<td>----------------</td>
<td>-----</td>
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<td>Demand</td>
<td>tonnes 000</td>
<td>Carcass Weight</td>
<td>234</td>
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<tr>
<td>Surplus/Deficit</td>
<td>tonnes 000</td>
<td>Carcass Weight</td>
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Table 3.3: Production and Consumption Figures

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<th>PRODUCTION '000 tonnes carcass weight equivalent</th>
<th>CONSUMPTION kg per capita</th>
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<tbody>
<tr>
<td>Ukraine</td>
<td>2900</td>
<td>2600</td>
</tr>
<tr>
<td>Belarus</td>
<td>820</td>
<td>740</td>
</tr>
<tr>
<td>Moldova</td>
<td>186</td>
<td>159</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>1300</td>
<td>1047</td>
</tr>
<tr>
<td>Kyrgyzstan</td>
<td>200</td>
<td>205</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>59</td>
<td>62</td>
</tr>
<tr>
<td>Turkmenistan</td>
<td>87</td>
<td>99</td>
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<tr>
<td>Uzbekistan</td>
<td>433</td>
<td>488</td>
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<tr>
<td>Armenia</td>
<td>46</td>
<td>55</td>
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<tr>
<td>Azerbaijan</td>
<td>100</td>
<td>85</td>
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<tr>
<td>Georgia</td>
<td>n.a.</td>
<td>137</td>
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Table 3.4: Regional Value Beef

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<th>CARCASS MEAT</th>
<th>Northern Mountains and Midlands</th>
<th>Red River</th>
<th>North Central Coast</th>
<th>South Central Coast</th>
<th>Central Highlands</th>
<th>North East South</th>
<th>Mekong river</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value Prime Cuts (1)</td>
<td>VND/kg</td>
<td>20299</td>
<td>23267</td>
<td>21889</td>
<td>22366</td>
<td>19932</td>
<td>23156</td>
</tr>
<tr>
<td>Distance to Port</td>
<td>km</td>
<td>250</td>
<td>25</td>
<td>50</td>
<td>50</td>
<td>150</td>
<td>25</td>
</tr>
<tr>
<td>Freight Cost to Port</td>
<td>VND/kg/km</td>
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<td>25</td>
<td>50</td>
<td>50</td>
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<td>Value on wharf</td>
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<td>23292</td>
<td>21939</td>
<td>22416</td>
<td>20082</td>
<td>23181</td>
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<td>Loading and Wharfare Costs</td>
<td>% Wharf Value</td>
<td>7%</td>
<td>1438</td>
<td>1630</td>
<td>1536</td>
<td>1569</td>
<td>1406</td>
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<td>Value fob Vietnam Port</td>
<td>VND/kg</td>
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<td>24922</td>
<td>23475</td>
<td>23985</td>
<td>21488</td>
<td>24804</td>
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<tr>
<td></td>
<td>US$/tonne(4)</td>
<td>11050</td>
<td>1990</td>
<td>2255</td>
<td>2124</td>
<td>2171</td>
<td>1945</td>
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<tr>
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<td>1.73</td>
<td>1.63</td>
<td>1.67</td>
<td>1.49</td>
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<tr>
<td>Nominal Protection Coefficient</td>
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<td>1.73</td>
<td>1.63</td>
<td>1.67</td>
<td>1.49</td>
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EDIBLE OFFALS

<table>
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<tr>
<th>Edible Offals (2)</th>
<th>VND/kg</th>
<th>6090</th>
<th>6980</th>
<th>6567</th>
<th>6710</th>
<th>5980</th>
<th>6947</th>
<th>6624</th>
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</thead>
<tbody>
<tr>
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<td>25</td>
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<td>25</td>
<td>50</td>
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Table 3.5: Regional Value Pork

<table>
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<tr>
<th>CARCASS MEAT</th>
<th>Northern Mountains and Midlands</th>
<th>Red River</th>
<th>North Central Coast</th>
<th>South Central Coast</th>
<th>Central Highlands</th>
<th>North East</th>
<th>Mekong river</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value Prime Cuts (1)</td>
<td>VND/kg</td>
<td>17232</td>
<td>19070</td>
<td>17988</td>
<td>18492</td>
<td>16398</td>
<td>18944</td>
</tr>
<tr>
<td>Distance to Port</td>
<td>km</td>
<td>250</td>
<td>50</td>
<td>50</td>
<td>150</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>Freight Cost to Port</td>
<td>VND/kg/km</td>
<td>1.00</td>
<td>250</td>
<td>25</td>
<td>50</td>
<td>50</td>
<td>150</td>
</tr>
<tr>
<td>Value on wharf</td>
<td>VND/kg</td>
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<td>19095</td>
<td>18038</td>
<td>18542</td>
<td>16548</td>
<td>18969</td>
</tr>
<tr>
<td>Loading and Wharfage Costs</td>
<td>% Wharf Value</td>
<td>7%</td>
<td>1224</td>
<td>1337</td>
<td>1263</td>
<td>1298</td>
<td>1158</td>
</tr>
<tr>
<td>Value fob Vietnam Port</td>
<td>VND/kg</td>
<td>18706</td>
<td>20432</td>
<td>19301</td>
<td>19840</td>
<td>17706</td>
<td>20297</td>
</tr>
<tr>
<td>Value Manufacturing Grade Pork ex Vietnamese Port (3)</td>
<td>US$/tonne (4)</td>
<td>11050</td>
<td>1693</td>
<td>1849</td>
<td>1747</td>
<td>1795</td>
<td>1602</td>
</tr>
<tr>
<td>Nominal Protection Coefficient</td>
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<td>1.22</td>
<td>1.26</td>
<td>1.12</td>
<td>1.29</td>
<td>1.28</td>
</tr>
</tbody>
</table>

**EDIBLE OFFALS**

| Edible Offals (2) | VND/kg | 5170 | 5721 | 5396 | 5548 | 4919 | 5683 | 5650 |
| Distance to Port km | 250 | 25 | 50 | 50 | 150 | 25 | 50 |
| Freight Cost to Port | VND/kg/km | 1.00 | 250 | 25 | 50 | 50 | 150 | 25 | 50 |
| Value on wharf | VND/kg | 5420 | 5746 | 5446 | 5598 | 5069 | 5708 | 5700 |
| Loading and Wharfage | % Wharf Value | 7% | 379 | 402 | 381 | 392 | 355 | 400 | 399 |
### Table 3.6: Regional Value Poultry

<table>
<thead>
<tr>
<th>CARCASS MEAT</th>
<th>Northern Mountains and Midlands</th>
<th>Red River</th>
<th>North Central Coast</th>
<th>South Central Coast</th>
<th>Central Highlands</th>
<th>North East South</th>
<th>Mekong river</th>
</tr>
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<tr>
<td>Value Carcass(1) VND/kg</td>
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<tr>
<td>Distance to Port km</td>
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<td>50</td>
<td>50</td>
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<tr>
<td>Freight Cost to Port VND/kg/km</td>
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<td>250</td>
<td>25</td>
<td>50</td>
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<td>Value on Wharf VND/kg</td>
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<tr>
<td>Loading and Wharfage Costs % Wharf Value</td>
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<td>1789</td>
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<td>1534</td>
<td>1996</td>
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<td>Value fob Vietnam Port VND/kg</td>
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<td>27349</td>
<td>27029</td>
<td>27103</td>
<td>23455</td>
<td>30504</td>
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<tr>
<td>US$/tonne (3)</td>
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<td>2475</td>
<td>2446</td>
<td>2453</td>
<td>2123</td>
<td>2761</td>
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<tr>
<td>Value Frozen Carcasses ex Vietnamese Port (2) US$/tonne cif</td>
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<td>2378</td>
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<td>Nominal Protection Coefficient</td>
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<td>1.03</td>
<td>1.03</td>
<td>0.89</td>
<td>1.16</td>
<td>1.12</td>
</tr>
</tbody>
</table>

(1) Strengthening Capacity for the Renewal of Rural Development in Vietnam (Phase 1) UNDP November 1997
(2) Estimated at 30% of the value of prime cuts
(3) Equating to cif value ex Russian Port Meat Imports 1996
(4) Foreign Exchange Rate US$ 1 =VND11,050

### Table 3.7: Marketing Margins (1)

<table>
<thead>
<tr>
<th>Herd Structure</th>
<th>Beef VND/kg CW</th>
<th>Pork VND/kg CW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herd Size</td>
<td>Nos</td>
<td></td>
</tr>
<tr>
<td>5 head</td>
<td>1 sow</td>
<td></td>
</tr>
</tbody>
</table>

(1) Strengthening Capacity for the Renewal of Rural Development in Vietnam (Phase 1) UNDP November 1997
(2) Equating to cif value ex Japanese Port Meat Imports 1996
(3) Foreign Exchange Rate US$ 1 =VND 11,050
4. INTEGRATION OF LIVESTOCK AND AGRICULTURE IN SUSTAINABLE HILLSIDE FARMING

4.1 Introduction

Agricultural production on much of Viet Nam's sloping land is not sustainable in the long term under current production systems. Cropped areas are increasing for a range of crops, with more marginal land coming into production, but this is not mitigated by a significant improvement in cropping practices. Crop yields are declining with soil erosion and the loss of soil fertility, and farm sizes are rapidly reducing in the face of natural population growth and transmigration. Fuel wood is becoming more scarce with the loss of tree cover.

Many NGO and Government programmes have demonstrated the technical efficacy of contour based farming and the use of hedgerows and improved ground cover, particularly in terms of reduction of soil loss. However overall adoption rates are typically very low, and new approaches must be sought to address this problem. Despite the major contribution of livestock to household income (particularly in poorer communities), and to the maintenance of soil fertility, their roles in improving the scope and adoption of conservation based farming have received little attention. It is now widely accepted that poor feed supplies are a major constraint on livestock production, with a major potential role for well adapted forage legumes. Many programmes have typically worked with species which are readily available locally, rather than the most promising material; in

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<table>
<thead>
<tr>
<th>Sale Stock</th>
<th>No./year</th>
<th>0.3 head</th>
<th>9.6 head</th>
</tr>
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<tbody>
<tr>
<td>Store Production</td>
<td>kg LW / head</td>
<td>220 kg</td>
<td>15 kg</td>
</tr>
<tr>
<td>Finished Production</td>
<td>kg LW / head</td>
<td>255 kg</td>
<td>80 kg (55 kg CW)</td>
</tr>
<tr>
<td>Fat Stock Premium</td>
<td>% store price</td>
<td>10% premium</td>
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<table>
<thead>
<tr>
<th>Store Production</th>
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<tr>
<td>Production Costs</td>
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<tr>
<td>Producer Margin</td>
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<tr>
<td>Gross Revenue</td>
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</tbody>
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<thead>
<tr>
<th>Fattening</th>
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<tbody>
<tr>
<td>Production Costs</td>
</tr>
<tr>
<td>Producer Margin</td>
</tr>
<tr>
<td>Gross Revenue</td>
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</tbody>
</table>

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<tr>
<th>Collection</th>
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<tbody>
<tr>
<td>Operating Costs</td>
</tr>
<tr>
<td>Operating Margin</td>
</tr>
<tr>
<td>Gross Revenue</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Slaughter</th>
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</thead>
<tbody>
<tr>
<td>Operating Costs</td>
</tr>
<tr>
<td>Operating Margin</td>
</tr>
<tr>
<td>Gross Revenue</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Tannery</th>
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<tbody>
<tr>
<td>Operating Costs</td>
</tr>
<tr>
<td>Operating Margin</td>
</tr>
<tr>
<td>Gross Revenue</td>
</tr>
</tbody>
</table>
almost all cases the scale of operations has been limited by availability of seed, often with new species being used only on very small demonstration areas.

The use of leguminous forages in improving sloping land agriculture has been well demonstrated in some other countries in the region, often with very high adoption rates. These lessons can be transposed to Viet Nam. Progress is contingent on widespread availability of the most suitable genetic material, and on establishment of a local seed production capacity for key species.

The scale and nature of the problem dictates the need for a major intervention and for some innovative approaches.

4.2 The Setting

4.2.1 Increasing Populations and the Need for More Intensive Production Systems

Population pressure has increased rapidly in mountain areas, with a major decline in annual crop land per household which is only partially offset by increased cropping intensity, as shown in the following Table 4.1. These trends are likely to continue.

Table 4.1: % Changes 1990-95 By Region

<table>
<thead>
<tr>
<th>Region</th>
<th>No. of agricultural h'holds % increase</th>
<th>Annual crop land per h'holds % decrease</th>
<th>sown annuals per h'holds % decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td>N. Mtns &amp; midlands</td>
<td>27</td>
<td>26</td>
<td>8</td>
</tr>
<tr>
<td>Red R. Delta</td>
<td>6</td>
<td>17</td>
<td>9</td>
</tr>
<tr>
<td>N. Cent. Coast</td>
<td>12</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>S. Cent. Coast</td>
<td>12</td>
<td>16</td>
<td>2</td>
</tr>
<tr>
<td>Cent. Highlands</td>
<td>50</td>
<td>27</td>
<td>1</td>
</tr>
<tr>
<td>N.E. South</td>
<td>6</td>
<td>2</td>
<td>-2</td>
</tr>
<tr>
<td>Mekong Delta</td>
<td>7</td>
<td>0</td>
<td>-14</td>
</tr>
</tbody>
</table>

Source: Statistical Data of Agriculture, Forestry and Fishery 1985-1995
General Statistical Office, Department of Agriculture, Forestry and Fishery

Associated with this is an increasing problem with underutilisation of labour. There is an urgent need to intensify farming systems.

4.2.2 Crop Production and Livestock Management on Slopes - Soil Erosion/ Soil Fertility Factors

Soil losses from unprotected slopes under annual cropping typically range from 10 tonnes per ha p.a. to more than 200 tonnes per ha p.a. Nutrient losses are correspondingly very high; organic matter is likely to reduce to 30% of original values within 5 years of annual cropping, with soil compaction likely to increase 3-5 times. Reduction in soil loss with appropriate hedgerow systems in other parts of S.E. Asia (with hedgerows at, say, 5m intervals) typically range from 60% to 95%. The system is clearly of extreme importance in sloping areas of Viet Nam, especially as fanning pressures increase.

Hedgerow systems have been introduced in various programmes in Viet Nam, with some success in terms of erosion control, but with disappointing adoption rates. The major problems have been:

- There has been too little attention to the experience of eastern Indonesia, where adoption rates in many cases have been extremely high, and too much attention to other models which have had very low adoption rates.
- Hedgerows have been promoted primarily for erosion control, without due attention to ancillary benefits.
- There has been little emphasis on incorporating more intensive livestock feeding (with generation of high levels of cash income) into the hedgerow system.
- Tephrosia candida has predominated, apparently because of the ready availability of seed. It has no value for livestock feeding, is relatively short lived, and is quite inferior for fuelwood production.
- Even on fertile soils, Leucaena has generally not been able to show its potential because of poor establishment techniques, use of inferior genetic material, and failure to inoculate seed.
- Other useful species such as Calliandra and Gliricidia have received little attention.
- Companion ground cover species have not been used, and as a result double rows of tree/shrub legumes have been used to effect reasonable soil erosion control, with resultant difficulties in weed control.

The use of **leguminous ground cover legumes** within farming systems has been poorly developed for a number of reasons, although there is some useful recent experience with species such as velvet bean and jack bean, and interplanting is quite widely accepted. There has been negligible work on undersowing of annual crops such as upland rice, corn and cassava with leguminous species with the ability to regenerate through subsequent cropping cycles. (A range of species including *Stylosanthes* hamata, *Wynn Cassia*, and *Centurion* centro are showing excellent early results in Gia Lai.) The slash and by systems present particular problems, but there has been little work done locally in terms of introduction of robust legumes which will persist through the bush fallow period and until and through the subsequent cropping cycle.

**Cover cropping in tree crop areas** is not well developed. Tree crops are expanding rapidly. Coffee is of particular importance in terms of land management because of the dramatic expansion under way, its production on fertile soils, and increasing use of steeper slopes. Partly because of the high potential returns from coffee, there has been little interest in intercropping, even on contour strips, although where this has been promoted it has been favourably received (e.g. in Gia Lai with Stylo CIAT 184.) Boi Loi establishment and fruit production in orchards and small back-yard plantings have also expanded rapidly; leguminous cover cropping in these systems is very uncommon. Rubber plantations are of less relevance because of the small fraction of plantings within the smallholder sector, and difficulties of utilising leguminous cover crops for forage in the early years of crop establishment; many mature plantations have a reduced leaf canopy in the dry season and support some rough grazing.

**Farmyard manure** is generally used on home garden and tree crop areas and in paddy nurseries. Tethering or shedding of grazing animals at night represents a transfer of nutrients from grazing areas towards the dwelling where it may be more conveniently utilised, but the resultant fertility shift away from the slopes can be highly significant. This is particularly so in cut-and carry operations. However stock control has a marked net benefit, in terms of reduced soil erosion and nutrient loss.

### 4.2.3 Degraded Forest and other Grazing Areas.

Grazing areas are typically characterised by predominance of grasses which have very low nutritive value for much of the year, and by a relative dearth of legumes. These features are particularly marked in the taller grass systems, including the naturally occurring open woodland systems and the degraded forest areas. Following the opening of forest areas, the rapid invasion of fire climax species (including *Imperata cylindrica*, *Pennisetum polystachyon*, and *Chromolaena odorata*) typically precludes the re-establishment of desirable forest species and presents a very poor bush fallow for fertility accretion. There has been little work done on legume introduction in either the degraded forest areas or other grazing systems.

**Fuelwood availability** is declining throughout, with loss of tree cover and increasing populations; the situation is acute in many areas, with markedly increased labour requirements for collection. Fuelwood collection has resulted in annual deforestation of almost 500,000ha (World Bank estimates 1992). There have been many initiatives on the introduction of fuelwood species through both communal forestry programmes and on-farm planting; adoption rates are typically good where growth rates are sufficiently conspicuous, and have been improved with better tenurial arrangements. Some ethnic communities have traditional live fencing systems which presents an excellent entry point for further development, but there has been relatively little adoption of such practices in other communities.

### 4.2.4 Forage Development Experience in Viet Nam

Forage development has received little attention compared with other aspects of feeding, and, more in particular, with animal health and breeding. External training in suitable environments has been limited and has been heavily skewed towards research. There has been very little exposure to other development-oriented work in the region. For example, there is little appreciation of the transformation of agriculture in parts of Indonesia and the Philippines which has evolved from the integration of forage development and intensive livestock husbandry into cropping systems.

There have been some successes with forage development in Viet Nam, but it has generally been plagued by
institutional disarray and very limited networking outside the NGO arena, with resultant ad-hoc approaches to research and extension programmes. Coordination of programmes and exchange of information and of planting material between provinces has been very weak. (For example, Leucaena has been successfully used on basaltic soils in Dac Lac since colonial times, but had not been planted on similar soils in Gia Lai until 1997.) There has been no effective coordination in the introduction and dissemination of new genetic material, with new germplasm often jealously guarded by a researcher or institution (such as appears to be the case currently with invaluable new Leucaena material.) Screening processes have often been restricted to research farms, with some evaluation of perennial species attempted over too short a period. There is no well established mechanism for field workers to access an adequate range of material, except through direct involvement with some internationally funded projects. Currently a significant range of very useful material, proven in similar environments elsewhere, has not been introduced into field programmes in Viet Nam, or at least not beyond the initial research plot phase. Recent involvement of the Forages for Smallholders Project (based in Laos) in a wide range of divergent on-farm sites should at least partially address this problem.

Ready availability of forage seed remains a major bottleneck to development. Imported seed is invariably very expensive, and mechanisms for regular importation have not been developed. There is still no significant local production of perennial species, with total output probably not exceeding one tonne per annum. Production efforts have concentrated almost solely on Government facilities. This should be seen in the light of production elsewhere in Asia. One cooperative in Andhra Pradesh in southern India has produced about 1,000 tonnes of stylo seed p.a. In North-east Thailand annual output of perennial species has often exceeded 400 tonnes.

4.3 Rationale for Approach

Livestock production, and particularly that of bovines, is seriously constrained by poor nutrition. This encompasses:

- or feeding practices, with inadequate feed and water offered in stall feeding systems, and Po grossly inadequate time allocated for grazing in most grazing systems.
- low nutritive value of fodder/fodder, particularly during the dry season. Introduction of even small quantities of legume into the ration can greatly enhance performance.
- low availability of feed on offer in many grazing systems close to settlement.

Development of a greatly improved forage/fodder base is the only widely appropriate solution.

More sophisticated approaches may be useful in specific areas. For example, molasses based feeding can be highly profitable close to the molasses source, but is rarely an option in more isolated areas. Chemical treatment of straws (e.g. with urea) is technically successful, but its efficacy is generally dependent on the availability of subsidised urea; adoption rates elsewhere in the region have been very low, and its use is likely to be restricted to intensive livestock enterprises.

On the majority of sloping areas, current cropping practices are not sustainable in the long term, and will certainly not accommodate increasing population pressures. Closer integration of livestock into cropping systems, and the development of appropriate forage interventions, are central to agricultural sustainability on sloping areas and to improved utilisation of "barren lands"; it will also address the issues of underutilisation of labour. On the basis of Thai experience, ley farming/beef fattening can significantly improve cash incomes, even without allowing for the benefits of improved soil fertility and reduced erosion.

Conventional physical approaches to soil erosion control will not be effective on a nationally significant scale; vegetative techniques offer a low cost option which will be acceptable to large numbers of farmers in the short-medium term only if they can derive an immediate benefit e.g. through improved availability of forage or firewood.

In areas where livestock grazing is a major factor in the erosion process, more control of livestock (through stall feeding or tethering) will eventually be imperative, and a productive and accessible forage base is the key element in this process.

The widespread and increasing problem of soil fertility decline cannot be addressed simply by purchased chemical fertilisers, which in any case would not be available to poorer or more remote communities. Legume based forage development in cropping systems affords the opportunity for improving chemical and physical soil
fertility; deeper rooted tree and shrub species can recover nutrients from deeper in the soil profile. Farmyard manures are highly valued, and any intervention (such as improved forage supplies) which increases the production and accessibility of manure will have a major impact on farming systems.

Fire climax vegetation systems on much of the barren lands are unproductive for grazing purposes, and preclude ready regeneration of more valuable forest species; in most cases the forests will not recover through the simple intervention of protection. Introduction of suitable leguminous species will assist in the control of the more insidious weed species and create an environment which is more conducive to forest regeneration. This can be achieved with a wide range of “Barren Lands” including those created by chemical defoliants during the war. Given the vast areas and difficult terrain involved, aerial seeding is a logical option.

Regional examples of the efficacy of recovering the integrity of “barren lands” include the following:

- The more or less sustainable slash and burn system of Amarasi, in West Timor (Indonesia). Leucaena, originally introduced into areas covered by the noxious shrub Lantana camara, forms a complete canopy on the slopes. Cropping of maize, sorghum, and cassava occurs in typical slash and burn systems. The Leucaena regrows through the crop, and forms a full canopy shortly after the crop is harvested. Even with a repeatedly short fallow phase of one year, the productivity of the system remains high, because of the nutrient retrieval from lower parts of the soil profile and the high N contribution.

- Greenleaf Desmodium in opium-poppy areas of N. Thailand and Laos.
  Greenleaf Desmodium has been successfully introduced into shifting agriculture systems, providing an excellent ground cover, good forage, and improved soil fertility.

- Rejuvenation of Imperata cylindrica land in Indonesia through the introduction of stylos. Stylosanthes scabra and S. guianensis have been effectively established in very low productivity Imperato cylindrica grasslands in Indonesia, partially controlling the grass and greatly improving the productive potential of the area.

- Rehabilitation of Imperata cylindrica slopes in Mindanao (Philippines) through establishment of Leucaena.
  Leucaena planted in strips in pure stands of Imperata cylindrica has gradually shaded out the grass understorey, and has enabled successful establishment of crops such as cocoa.

- Aerial seeding Leucaena into degraded hills in Philippines

- Establishment of large areas of Stylo 184 on slopes in southern China.

- Local examples

In a range of sites in the Northern Mountains and Central Highlands, some forage legumes have established well after rough cultivation, and have shown a capacity to persist, spread, and compete vigorously with major weed species including Chromolaena odorata. Of the legumes trialed, the most successful were axillaris, Greenleaf Desmodium, Seca stylo, and Wynn Cassia.

Leucaena has begun to volunteer in many areas of Viet Nam, with productivity in some sites adequate to provide a similar cropping scenario to the Amarasi model.

Grazing areas, particularly with medium-high grazing pressure and on lighter soils, can generally be improved through low cost oversowing with well adapted legume species at low seeding rates and without any other inputs. Interestingly, establishment is typically more successful on more degraded sites.

Evidence of the strategy's potential already exists in some areas. For example, Verano stylo has persisted and spread under grazing in the North-east South and near Ba Vi in the RRD; a wide range of legume species oversown in Gia Lai in 1997 have established well and are already beginning to spread under heavily grazed conditions. Centro, signal grass, and guinea grass are volunteering widely on suitable soil types. Both white clover and kikuyu grass (introduced to a dairy farm in Sapa, Lao Cai, during the French colonial era), have spread considerably, and are highly productive in the invaded area. Leucaena continues to volunteer under moderately heavy grazing pressure in the Central Highlands. Inferior lines of American jointvetch, probably introduced originally as a cover crop, can now be found in heavily grazed sites in many parts of the country.

Fuel collection is undertaken primarily by women, and is becoming increasingly arduous as farming pressures increase and forests retreat. Introduction of more multi-purpose trees within farming systems could impact very positively on female labour.

Wood yields from well managed alley farming systems can be high. Selection of genetic material with good wood /pole production characteristics in balance with high forage yields is important. The cultivar Tarramaba shows excellent potential; work on vegetative propagation of some of the remarkably productive Leucaena
hybrids could have a great impact on village-level production systems.

Livestock are crucial for generating cash incomes in many farming systems, and in poorer and more remote areas offer one of the few opportunities for significantly and quickly increasing cash incomes for a very large number of producers i.e. breaking the poverty cycle and creating an environment for other desirable farming systems interventions. In some communities in mountain areas, livestock may account for more than 50% of cash income. Low cost forage development can facilitate more intensive production systems even in very poor households, particularly for ruminant production; it is also central to the imperative shift from the currently excessive use of concentrate feeds in more intensive ruminant production systems such as dairying.

In most areas some stall feeding/cut-and-carry management is practiced, with women responsible for most of the fodder collection. Establishment of productive and conveniently located forage would significantly reduce labour requirements for forage collection. It is much simpler to improve such systems, than to introduce more intensive management where only extensive low input systems prevail. Also, it is invariably much easier to develop more productive cut-and-carry systems than to improve grazing management.

A well-designed forage development and forage-based/livestock production programme could have an enormous impact in terms of stabilising crop production systems, preventing or at least retarding further environmental degradation, and improving cash incomes. It would be most applicable to mixed farming systems on sloping areas. On-farm interventions are likely to have most impact in areas where farming pressures are already high i.e. where farmers do not have access to extensive off-farm areas for forage supply; but there is also enormous potential in the improvement of the vast areas of "barren lands".

Given the great diversity of agro-ecological systems, forage development will be an extremely slow process, and will not address the environmental and production issues, if conventional approaches to species screening, multiplication, and dissemination are followed. Development could progress rapidly with the adoption of selected approaches which have been successful in similar environments elsewhere.

The approach should be to:

- introduce, from the outset, a range of potentially useful development strategies, in each target area;
- encompass a wide range of commercial and non-commercial genetic material (with emphasis on the most promising material), in a very wide range of agro-ecological environments;
- work through a range of government and non-government institutions;
- and encompass a large number of farmers from the outset.

This would facilitate very rapid refinement of recommendations, would enable farmers to be involved in the evolution of the programme from the outset, and would enable spontaneous spread and adoption of the most useful material.

The major immediate constraint is the lack of substantial quantities of seed at reasonable prices. Many projects are already engaged in stabilisation of hillside agriculture and in intensification of livestock production, and the immediate potential demand for seed is very large. Imported seed is expensive, and supplies are erratic. Also, some of the genetic material which is most appropriate to Viet Nam is not available commercially from international sources.

The establishment of a local forage seed production capacity demands top priority. Production systems very successfully developed in similar environments elsewhere provide convenient models for a rapid start-up.

4.3.1 Seed Production

Only legume seed should be produced, at least initially. (There is a much greater requirement for legumes than for grasses in the appropriate development strategies. Also, grasses typically have very serious technical difficulties in terms of seed production and storage, and within smallholder systems they are well suited to vegetative propagation.)

Most emphasis would be on those species which are required in large quantities and which lend themselves to rapid bulking up i.e. with a satisfactory seed production potential although others could be introduced on a smaller scale. The inclusion, from the outset, of some very simple species such as Leucaena would assist in establishing the modus operandi for production, purchase, and conditioning.

Production of large quantities of low-cost seed would be feasible only with the establishment of a closely
supervised contract scheme, with timely purchase of seed central to the continuing success of the programme. The production of forage/fodder legume seed is generally quite different from the production of crop seed, often with relatively low yields and intensive labour inputs required. Larger farms are typically quite inefficient in such production.

Smallholder rainfed production systems with manual harvesting and cleaning are most suitable, encompassing both production in intensive specialised plots on individual holdings, and opportunistic harvesting from individual and communal areas. (Typically, intensive systems eventually account for the great majority of seed produced.) Smallholder manual systems can produce very large quantities of quality seed at highly competitive prices. For example, the Anantapoor Sheep Producers Cooperative in southern India generates about 1000 tonnes of stylo seed per year (wholesaling at approximately 5-10% of prevailing Australian prices); smallholder farmers in North-east Thailand produce several hundred tonnes per year, of mixed species, with the output constrained only by the market. Bhutan has initiated a smaller scale programme emphasising temperate species including Lotus pedunculatus and Trifolium spp; some seed is exported.

A conventional seed certification approach is not appropriate to the programme initially, when seed is to be used internally, although it would be necessary to continually monitor seed quality through existing seed laboratories. With close supervision of contract producers, and adequate attention to crop husbandry and seed cleaning, forage legume seed collected from small farmers can be of high quality. For example, contract farmers in North-east Thailand can produce stylo seed of 98-99% purity, which compares well with machine dressed seed in Australia.

It would be inefficient for each zone to produce its own seed requirements; some species may be well suited to forage production in a particular zone, but poorly suited to seed production under the same conditions. The programme would require the establishment of clusters of specialist seed producers located in key areas, formed into associations or cooperatives for marketing and for provision of technical support. The Central Highlands are well suited to production of most of the tropical/subtropical species, and higher altitude sites in the Northern Mountains to the production of temperate species (which would, however, be required in much smaller quantities.)

The nature of forage development in Viet Nam, with emphasis on conservation, improvement of barren lands, and smallholder systems, would preclude the establishment of a market-driven forage seed production programme. It is imperative that an intermediary seed procurement capacity be established to generate the required quantities of seed of diverse species. Whilst some seed would be directly marketed to larger corporations and individual producers, much of it would be channelled through government and NGO extension programmes, typically in a "mini-kit" approach, for which cost recovery would often not be feasible. It is anticipated that an informal market would gradually develop, as has occurred in Thailand.

The volume of production (encompassing primarily multipurpose tree legumes, climbing/sprawling species such as Aztec Atro and Greenleaf Desmodium, and the stylo/Wynn Cassia group) could exceed 500,000 tonnes per annum within 4 years of initiating the programme, given reliable funding for seed purchase, seed handling and storage facilities, and a core of staff for overall coordination. Perhaps 2,000-4,000 contracted households would be involved in this scale of production.

Seed production would be complementary to other cropping activities for these producers. For example, in Gia Lai it has been shown that undersowing of cassava and upland rice can result in a high yielding legume seed crop after the harvest of the host crop.

4.3.2 The Need for New Genetic Material

The diversity of environments and management systems within Viet Nam necessitate use of a very wide range of genetic material. Recent progress in screening of forages and development of new strategies has been dramatic in sub-tropical and tropical areas, and very useful material is continually becoming available. It is important to note that many valuable lines will never be released commercially in countries such as Australia, because they do not fit the production systems there. (Also, little of the forage selection elsewhere has emphasised the material’s role in pig nutrition, which should clearly be a criterion for Viet Nam.) It is vitally important to establish the framework to regularly access promising material from research and development elsewhere, for local screening and bulk-up.

It is imperative that mechanisms are established to prevent valuable genetic material being permanently isolated within research programmes.
4.4 Development Strategies

The major appropriate forage/fodder development strategies are:

- Live fences and contour-planted hedgerow systems
- "Ley" farming/undersowing
- Forage interventions in slash and burn agriculture
- Intensive forage plots
- Leguminous cover/forage crops in orchards and plantations
- Reinforcement of grazing areas and degraded forest with legumes

4.4.1 Live Fences and Contour-planted Hedgerow Systems

The development of effective live fencing and hedgerow systems could be central to sustained cropping on the slopes, in terms of erosion control, supply of mulch and animal fodder, and supply of fuelwood.

The approach should be:

- Identification of suitable site-specific species/accessions, and urgent provision of planting material; high quality forage species, with fuel wood value, would be most acceptable to farmers. The most promising material is likely to be:
  - Leucaena: *Leucaena leucocephala* (e.g. ev Tarramba) for basalt/limestone soils, and higher fertility alluvia. *L. leucocephala* X *L. pallida* and *L. leucocephala* X *L. diversifolia* hybrids for more acid or cooler sites.
  - Gliricidia: palatable lines from the Oxford Forestry Research Institute (available via FSP), for lower fertility sites.
  - *Calliandra calothyrsus*: for more acid and cooler sites.
  - *Chamaecytisus paimensis*: for high altitude sites with good drainage.
  - *Sesbania sesban*: for bund planting in moist areas; lines with high productivity and reasonable longevity are required; also as a pioneer plant in mixed plantings with Leucaena.
  - Napier grass and other erect grasses including *Panicum maximum* (guinea grass), *Setaria sphacelata* and *Paspalum atratum*, mixed with a ground cover legume such as *Arachis glabrata* (perennial or forage peanut) or *Desmodium ovalifolium*; for sites where there is need for effective soil erosion control, coupled with a strong demand for larger quantities of forage; fertiliser inputs will be required to maintain high productivity, and there may be some yield decrease in adjacent crops. The system has been very successful over large areas of sloping land development in northern Thailand.
  - *Vetiver grass*: for extremely difficult sites where soil erosion control is the primary objective; there is little opportunity of widespread adoption amongst farmers who are so heavily dependent on income from livestock.

- Careful selection of early sites. It is important to initiate some successful and conspicuous programmes from the outset; slopes on limestone derived soils e.g. in parts of Tuyen Quang and Son La and on the basalt soils of Gia Lai and Dac Lac could support productive strips of Leucaena in systems based on the dramatically successful Flores (Indonesia) model.

- Development of both back-yard nursery and direct seeding systems. Small bate-root nurseries are suited to Leucaena seedling production, and can generate about 200 seedlings per sq. m. Until more confidence is developed with Leucaena, strip planting should be based on transplanting bare-root/bare-stem seedlings. Seedlings up to about 1.5m can be effectively transplanted with very high survival rates. The back-yard nursery system helps to expose farmers to the productive potential of the species and gives stronger "ownership" of the overall strategy.

- Linkage with livestock enterprises including back yard pig production and cattle fattening, and poultry. Day-time tethering of stock in the hedgerow area reduces cut-and-carry Labour requirements and reduces the fertility shift away from the slopes.

- Development of a Leucaena leaf meal programme in selected sites (suited to high productivity and to ready marketing i.e. with, good access, to feed mills or to ports)

- Exchange visits within the country and to other sites in the region including Nusa Tenggara (Indonesia), and the Philippines.

Reasonable security of land tenure is generally a pre-requisite for widespread spontaneous adoption of this strategy.

4.4.2 "Ley" Farming, Undersowing

The introduction of self-regenerating forage legumes into annual cropping systems could have an enormous impact in those areas where land is fallowed for a period after crop harvest.
The basic features of the strategy are:

- Undersowing the crop typically at the time of final weeding, without attempting to further modify crop husbandry practices.
- Sowing forage legumes with the capacity to continue growing for some time into the dry season, to seed heavily under prevailing conditions, and to regenerate over a long period during the subsequent cropping cycle.

Suitable species at lower altitudes include *Chamaecrista rotundifolia* (Wynn Cassia) which is already showing great promise in some Nth Mountain areas and in Gia Lai, *Stylosanthes hamata* cv Amiga/Verano, *Centrosema pascuorum*, *Aeschynomene americans* (American jointvetch) and strongly stoloniferous lines of *Centrosema pubescens* e.g. cv Cardillo; at higher altitudes, species include *Vicia* spp, *Trifolium repens* (white clover) which is already volunteering after cropping around Sapa in Lao Cai, and the East African annual clovers *Trifolium matteriolanum* and *T rupepellianum*, which have performed extremely well in high altitude environments in Laos; a winter growing annual such as *T. balansae* could be used with adequate soil moisture.

It is anticipated that successful species would also spread spontaneously into adjacent areas.

### 4.4.3 Forage Interventions in Slash and Burn Agriculture

Slash and burn agriculture is still prevalent in Viet Nam, and for some time will continue to be a major form of agriculture in many sloping areas. Improvement of the vegetative cover and of the soil fertility on "barren lands" in all categories would have obvious production and environment benefits. The slash and burn areas may provide a very convenient entry point for introduced forage.

Suitable forage legumes undersown into the final crop of the cropping cycle could significantly reduce the period required for the regenerative fallow, provide high quality forage and possibly fuel wood, assist in the control of major invasive weeds, and provide a better environment for the recovery of key tree species.

Species with potential for such rehabilitation in low-medium altitudes include *Leucaena*, *Calliandra*, *Desmodium intortum* (Greenleaf Desmodium), *Macrotyloma axillare* (axillaris), *Neonotonia wightii* (glycine), Wynn Cassia, *Stylosanthes guianensis* CIAT 184, Caatinga stylo (*Stylosanthes seabrana* cv Primar/Unica) and *Stylosanthes scabra* cv Seca/Siran.

Undersowing should be done as early as possible (as distinct from the standard ley farming strategy, when it would commonly be undertaken only at the time of final weeding.)

### 4.4.4 Intensive Forage Plots

The strategy involves establishment of small plots of highly productive forage close to livestock sheds to enable convenient cut-and-carry and to take advantage of the high soil fertility there. Species would include guinea grass, Gamba grass, *Paspalum atratum*, *Brachiaria brizantha*, and hybrid Napier, with herbaceous and tree legumes.

Plots could initially be small (e.g. 100 sq.m.) but would preferably be large enough to have a conspicuous impact on the nutrition of selected animals.

There is also a role for small plots for tethered grazing; a mixed sward of *brachiaria brizantha* and perennial peanut would be suitable.

### 4.4.5 Leguminous Cover/Forage Crops in Orchards and Plantations

Emphasis would be on leguminous species with good ground cover characteristics and high nutritive value. Suitable species would depend on the tree crop, but would include *Stylo* CIAT 184, *Pueraria* phaseoloides (puero), Wynn Cassia, *Desmodium ovalifolium*, centro, jointvetches, perennial peanut, and for higher altitudes Greenleaf Desmodiurn, white clover, and *Lotus pedunculatus* cv Maku or Sharnae. Of the grasses, shade tolerant species such as *Panicum maximum*, *Stenotaphrum secundatum*, and *Brachiaria* spp could be included where there is a need for a very productive forage, with *Setaria sphacelata* at higher altitudes.

The most appropriate tree crops are various fruits, coconuts, and coffee (where soil moisture is adequate). The strategy could gain more widespread acceptance with smallholder communities if introduced species offered good forage for pigs (e.g. with the *Trifolium* spp, Sharnae/Maku Lotus, and perennial peanut), or where it was
linked to more productive cattle enterprises such as fattening and dairying.

Rubber offers some prospects for very shade tolerant species such as perennial peanut and jointvetches which could have acceptable productivity at least seasonally. (The rubber canopy is more open, seasonally, in most parts of Viet Nam compared with areas with higher and better distributed rainfall.)

### 4.4.6 Reinforcement of Grazing Areas and "Barren Lands"

Broadcasting (or "oversowing") seed of forage legumes on selected grazing areas is the simplest and lowest cost of all strategies. It entails the use of very low seeding rates (e.g. 0.5-1.0 kg/ha) of grazing-tolerant species with an ability to spread under prevailing conditions, they are established without cultivation or fertiliser, and typically without any initial modification of grazing management. Suitable sites would typically be grazed at medium-heavy pressure, at least during the wet season, and have a loose surface.

The cumulative area suited to the strategy is vast, and includes communal and individual grazing areas, roadsides, degraded forest and forestry interface areas, and miscellaneous waste areas. In the longer term, most grazing areas will be cropped at various intensities; some of the legumes introduced into the grazing system will volunteer through subsequent cropping phases in a rough ley system.

Roadsides should be sown early in the programme as a means of rapid introduction over varied environmental conditions, to familiarise farmers and extension workers with the species, and to provide convenient sites for monitoring. As seed becomes more readily available, aerial seed will become a feasible option.

At low and medium altitudes, key species for heavily grazed areas would include Amiga/Verano stylo, Seca/Siran stylo, Caatinga stylo, Wynn Cassia, and the jointvetches, with climbing/sprawling species including axillaris, Greenleaf Desmodium, and *Macroptilium atropurpureum* cv Aztec (Aztec atro) included in sites of taller weed cover. On suitable limestone /basalt soils with some broadleaf weed cover, Leucaena could be included.

At higher altitudes, oversown legumes would include white clover, Kenya white clover and other East African highland *Trifolium* species such as *T. matteriolanum* and *T. ruepellianum*, and Maku lotus. The grass kikuyu (*Pennisetum clandestinum*) would also perform well on many sites.

In general, the most successful establishment is likely to occur on the most degraded sites.

### 4.5 Relative Importance of Various Strategies

Factors involved in the selection of strategies, and their likely adoption and impact, are presented in the following table:

#### Table 4.2: Summary of Factors in Selecting Forage/Fodder Strategies

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Potential contribution to nutrition</th>
<th>Potential benefit to environment</th>
<th>Ease/rate of implementing</th>
<th>Likely farmer acceptance</th>
<th>Need for prior evaluation*</th>
<th>Critical Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contour hedgerows</td>
<td>Med-high</td>
<td>Very high</td>
<td>Difficult</td>
<td>Low-med</td>
<td>Site material available specific already</td>
<td>Link with intensive feeding</td>
</tr>
<tr>
<td>Live fences</td>
<td>Med</td>
<td>Med-high</td>
<td>Varies with site</td>
<td>Med - High, varies with site</td>
<td>Site specific material available specific already</td>
<td>Fuelwood and forage production potential</td>
</tr>
<tr>
<td>Undersowing</td>
<td>High</td>
<td>High</td>
<td>Varies with site</td>
<td>Med-high</td>
<td>Low</td>
<td>Good promotion</td>
</tr>
<tr>
<td>Forages in slash and burn</td>
<td>Low-med</td>
<td>Very high</td>
<td>Mod-difficult</td>
<td>Med</td>
<td>Low</td>
<td>Access to target areas</td>
</tr>
<tr>
<td>Intensive fodder plots</td>
<td>High</td>
<td>Low</td>
<td>Simple</td>
<td>High</td>
<td>Low</td>
<td>Distribution network</td>
</tr>
<tr>
<td>Cover crops</td>
<td>Med-high</td>
<td>High</td>
<td>Simple</td>
<td>High</td>
<td>Low</td>
<td>Seed</td>
</tr>
<tr>
<td>Reinforcement of grazing lands</td>
<td>High</td>
<td>Med</td>
<td>Very simple</td>
<td>High</td>
<td>Low</td>
<td>Seed</td>
</tr>
<tr>
<td>Reinforcement of other &quot;barren&quot;</td>
<td>Med-high</td>
<td>Very high</td>
<td>moderate</td>
<td>High</td>
<td>specific material Seed</td>
<td>Seed</td>
</tr>
</tbody>
</table>
Viet Nam has experienced rapid overall growth since its economic reforms took hold in the 1991-96 period, with close to 9% real GDP growth per year, and nearly 5% annual growth in the agricultural sector. It is less clear how rapidly industry or service grew in the rural areas, but they certainly grew faster than agriculture, though not always so fast-as-overall GDP growth. This is because a large share of foreign and overall investment has been concentrated in the larger areas around HCMC and Hanoi, the two major cities and centers of the "Growth Triangles." These are supposed to be the center of much future industrial growth, along with another, smaller, triangle around Hue-Da Nang.

The ability of the rural or non-triangle areas to grow rapidly are constrained by several factors, but one of the major ones is a lack of credit, especially for medium to long terms. The banking system until 1990 was a classic socialist mono-bank, with the commercial and central banking functions combined. In 1990, the Central Bank was split apart from the four major state commercial banks. In the next few months and years the number of banks increased to include four joint-venture banks, 52 joint-stock banks, 23 branches of foreign banks, and over 600 credit cooperatives and People's Credit Funds. Most rural credit is provided by the Viet Nam Bank for Agriculture and Rural Development (VBA). However, the credit cooperatives and the newly formed Bank for the Poor are also sources of finance. The Bank for the Poor is run out of the same offices as the VBA, but has separate, non-commercial, lending rules and funding sources.

The banking system in general has had trouble adapting to the demands of the market economy. The ratio of all bank loans to GDP has not grown much and is not high, still about 20% of GDP in 1996-97 compared to 17% in 1993. (M2/GDP has actually fallen from 27% in 1991 to 25% in 1996.) Most other Asian countries' ratios are now much higher and were even higher one to two decades ago. In addition, there are guarded reports of severe difficulties with bad loans, lack of ability to cover letters of credit, and an unwillingness of bank officers to make loans for which they may be held criminally liable if the loans are not repaid. The poor state of accounting in many companies, the lack of a central registry for claims on land, and the ineffectiveness of law allowing recovery of collateral if a loan is not repaid all contribute to the banks' difficulty of operation. Interest rates also remain under the control of the Central Bank, with maximum lending rates (15% a year in 1997) and a maximum spread between loan and deposit rates of 4.2% a year now in effect. Inflation is about 5% in 1997.

The share of deposits held by the four state banks has fallen from over 90% in 1991 to about 70% today, with foreign banks being among the fastest growing. Likewise, while most loans had been given to state-owned enterprises in 1991, this share has fallen steadily towards the one-half level. Much of the rapid growth in private credit has come from loans extended directly to farmers by the VBA. Out of VD 18,292 billion in loans by all banks to the non-state sector at the end of 1995, VD 7,308 billion were direct VBA loans to farmers, about two-fifths of total non-state loans.

The lending levels of the VBA have grown remarkably rapidly, supported by an extensive branch network, and ODA and state bank credits that have allowed the Bank to lend more than its meagre deposit base. By 1996, loans to households were $1.9 billion, while there were 8.2 million rural households. While high repayment rates are claimed, a recent audit by Coopers-Lybrand AISC indicated severe deficiencies in VBA accounts, to the extent that, "we do not express an opinion on these financial statements." [FEER, October 16, 1997, p. 69] Table 5.1 shows the development of household lending by VBA.

<table>
<thead>
<tr>
<th>Table 5.1: $ Index of Lending by Viet Nam Bank for Agriculture</th>
</tr>
</thead>
<tbody>
<tr>
<td>--------------------------------</td>
</tr>
<tr>
<td>$25</td>
</tr>
<tr>
<td>100</td>
</tr>
</tbody>
</table>

There were 8.2 million households borrowing from VBA at some time in 1995, which would imply a coverage of
two-thirds of the 12 million rural households. (It may be that some households get more than one loan during a year, after repaying the previous one. The 1994 coverage estimate was that only 30% of households has received loans from the VBA.) Most of the loans were for a time period of under one year and under $200, enough for short-term working capital for seed, fertiliser, and plowing but not for tractors, irrigation pump sets, or land improvement. A report on medium and long-term credit extended by the VBA in 1997 stated that VD 4, 690 billion (about $400 million) was outstanding, though how much of this was to state farms and how much to farmers was not reported.

The VBA has 2654 branches and 20,000 staff, and is the only bank in 20 out of 53 provinces. It is, by far, the biggest lender to households in Viet Nam. In spite of its reach, in the most recent published household survey (1992-93), less than one-quarter of families with debt had borrowed from a government bank, and less than half of the surveyed households (45%) had any debt at all, so the fraction of total households with a government bank loan was then only one out of ten. Most borrowing was from private individuals with interest (42% of borrowers), while 28% borrowed from money-lenders and paid interest. Government banks did not reach many families (12% of loans) in the bottom fifth, but did reach others with a coverage varying from 19% to 28% of all loans.

The concern with making credit available to the poor has resulted in a number of initiatives, most notably the Bank for the Poor (BFP). This was established by decree in 1995 and started operation at the beginning of 1996. The BFP staff is the VBA staff, and their buildings are in the VBA offices. They have maximum loans of $100, no collateral requirements, and low interest rates. Initially, it appears the BFP took on the loans from the VBA that had been "social" in nature - i.e. to the poor and often less likely to be repaid. Village committees nominate potential borrowers for these soft loans, but the amount of funds in this (financially separate) entity is very limited. Capital is being sought from ODA and the government. There does not appear to be a commercial basis for the transactions, so normal deposits cannot be used without accompanying subsidies.

In addition to the BFP, there are numerous other lending programmes, many of them local, sponsored by Non-Governmental Organizations, UN agencies, or government. The scale of these non-commercial loan programmes is typically small. For example, the UNICEF credit programme run with the cooperation of the Women's Union had reached only 17,000 borrowers at the end of 1994. These programmes may have a beneficial impact where the beneficiaries are well chosen, but cannot be compared to the commercial credit system in terms of their overall impact. If the poor are said to amount to four million households, or one-third of total rural families, it would take one-half billion to one billion dollars of loans to reach all of these families with significant loans. This is many times the resources likely to be available from these non-commercial programmes.

In terms of the overall credit demand (or, in the words of the World Bank, "needs") in the rural sector, one estimate was that the sector in 1994 required $3.5 billion, of which about 30% was then supplied by VBA. There can be little doubt that this amount has grown since then, and the volume of VBA lending is still less than half of this demand. If finance for tea, rubber, cocoa, and coffee is included with demand for food crops, sugar, livestock, fisheries, and agro-processing, there can be little doubt that the volumes of credit available fall well short of that desired at existing interest rates. The credit cooperatives and people's credit funds will not supply much of this difference. In May, 1995, there were 207 PCF's with outstanding loans of $11.2 million. Even if the target of 1700 is reached by the end of 1995 (they only started in 1994), the total loans would just equal $100 million, while the VBA's credit grew by $800 million from 1993-95.

There are then two major directions for expanding rural credit. One is to double or triple the current amount of commercial credit outstanding, so that commercial credit demands may be satisfied. Such an increase over the period of several years would create much more employment, thereby assisting those who do not directly qualify for commercial loans. There is, of course, the question of what interest rate would equilibrate supply and demand. Given the nervousness about Vietnamese banks and currency, it is likely that real interest rates would have to rise to entice more deposits into banks. (Even now, customers may open foreign currency accounts, but can only withdraw dong rather than the dollars or yen they deposited.) However, most medium and long term investments could not meet repayments if interest rates exceeded 20% per year, as they surely would if deposits were the basis of increased lending.

If producers of export crops would pledge some fraction of the expected harvest and agree to pay the current market value of so many kilograms of coffee or rubber, it is likely that at least some lenders (including foreign) would be willing to charge something closer to US$ based interest rates, since the repayments would essentially represent the dollar value of the crops. If the legal issues could be worked out, it is likely that at least some tree crops could be financed in this manner.

For agro-processing, the development of leasing firms is a potential answer to the medium term credit "needs" that many firms face. Leasing works best for machinery and equipment that can be repaid in a few years,
precisely what tea or rubber processing usually requires. Working capital would be in local currency and face
dong based interest rates, while the leasing firms usually charge dollar related interest rates.

The development of legal channels to reclaim collateral, improving the administrative expertise of VBA staff,
and upgrading the confidence of savers will all be part of the ongoing efforts to improve the financial system in
Viet Nam. If the rural sector can also tap the larger financial system for longer term credit and leasing, it is
likely that the considerable economic potential of this sector will be realized more quickly, and the balance of
economic and population growth in Viet Nam will be more equal and less concentrated in just a few areas. A
faster and more widespread rural economic growth will allow most inhabitants to share, to some degree, in the
widening prosperity. The poor will benefit in part from this overall progress, and in part from the specialized
programmes aimed at providing credit and other inputs to those currently lacking them.

Notes

1 This section prepared by Roland van Asch, ANZDEC Ltd.

2 Le Dang Doanh and Nguyen Xuan Nguyen. How farmers were better off after market liberalization. Viet Nam

3 World Bank, Viet Nam - Poverty Assessment and Strategy, January, 1995; (b) UNDP/UNFPA/UNICEF,
Poverty Elimination in Viet Nam, October, 1995; and (c) UNDP/Committee for Ethnic Minorities and
Mountainous Areas, Socialist Republic of Vietnam - Framework for External Assistance to Ethnic Minority

4 Proposals for the Establishment of a National Programme for Hunger Eradication and Poverty Reduction for

5 UNDP, Development Cooperation Report, 1996

6 Viet Nam: Agriculture for Sustainable Development, World Bank, October 1997 (Draft)


8 World Bank, Viet Nam: Water Resources Sector Review, May 1996

9 This assumes a slightly positive income elasticity of demand for rice which takes into a food deficit as a result
of the relatively high levels of malnutrition in Viet Nam today and low existing income levels. Typically, higher
income countries in the region have a negative income elasticity of demand.

10 World Bank, Agricultural Marketing Study, June 1994

11 IFPRI, Rice Market Monitoring and Policy Options Study, 1996

12 This contrasts with a projection by the World Bank (Viet Nam: Water Resources Sector Review, May 1996)
which forecast a slight growth in per capita consumption of rice up to 2025

13 World Bank, IFPRI, NIAPP

14 S. Syed. Agriculture and Rural Development in Asia: Some Lessons for Viet Nam, 1996

15 This section prepared by Roland van Asch, ANZDEC Ltd.


17 FAO Regional Project "Strengthening Re-afforestation Programmes in Asia" (STRAP)
See Table 2.1.

World Bank, Viet Nam: Environmental Program and Policy Priorities for a Socialist Economy in Transition, 1995

This section prepared by Roger Lough, Lincoln International Ltd.

This section prepared by Alan Robertson, Lincoln International Ltd.

Some caution is needed in selecting species on a basis of seed production potential. In Thailand, vast quantities of Ruzi grass seed have been produced, because of the ease of seed production; it is inferior to a range of other species in terms of forage production. With many species, including Leucaenz, seed production potential may be inversely related to forage production.

A major Australian forage seed company with a strong background in production and marketing has expressed an interest in establishing some production base within the region; this could impact on the nature of seed production and marketing, but would not change the emphasis on smallholder production.

This volume of seed could improve, say, 200,000ha of "barren lands".

This section prepared by Dr David Dapice, Harvard Institute for International Development.