

DRAFT REPORT

CMB/97/022: SPPD Report

Report No. RAPP/01/99



CAMBODIA

AGRICULTURAL STRATEGIES AND POLICY FRAMEWORK FOR
SUSTAINABLE FOOD SECURITY AND POVERTY ALLEVIATION

January 1999

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AGR

sh: Agriculture

ROYAL GOVERNMENT OF CAMBODIA, MINISTRY OF FOOD, FORESTRY AND FISHERIES
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
UNITED NATIONS DEVELOPMENT PROGRAMME

CAMBODIA

**AGRICULTURAL STRATEGIES AND POLICY FRAMEWORK FOR
SUSTAINABLE FOOD SECURITY AND POVERTY ALLEVIATION**

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ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
AFTA	ASEAN Free Trade Area
AMO	Agricultural Marketing Office
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
B CM	billion cubic metres
CARERE	Cambodia Resettlement and Reintegration Project
CCRD	Credit Committee for Rural Development
CEPT	Common Effective Preferential Tariff
CSEC	Socioeconomic Survey of Cambodia (1993-94)
CSES	Cambodia Socioeconomic Survey (1996, 1997)
DPSC	Department of Planning, Statistics and International Cooperation
DTEE	Department of Technique, Economics, and Extension
OTEE	Offices of Technique, Economics, and Extension
ESAF	Enhanced Structural Adjustment Facility
FAO	Food and Agriculture Organization of the United Nations
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GSP	General System of Preferences
ha	hectare
HDI	Human Development Index
HYV	high-yielding variety
ILO	International Labour Organization
IMF	International Monetary Fund
IMR	Infant Mortality Rate
IOs	international organizations
kg	kilogram
km	kilometer
LLPs	low-lift pumps
M ha	million hectares
M li/sec	million litres per second
MAFF	Ministry of Agriculture, Forestry, and Fisheries
MEF	Ministry of Economy and Finance
MFN	Most Favored Nation
MIS	Market Information Service
MoC	Ministry of Commerce
MOTs	manually operated tube-wells
MRD	Ministry of Rural Development
mt	metric tons
mt/ha	metric tons per hectare
NBC	National Bank of Cambodia
NGOs	non-government organizations
NPIMS	National Public Investment Management System
NPRD	National Programme to Rehabilitate and Develop Cambodia

PIP	Public Investment Programme
PRA	participatory rural appraisals
R&D	research and development
RAPP	FAO Policy Assistance Branch for Asia and the Pacific
RDB	Rural Development Bank
RGC	Royal Government of Cambodia
SEDP	Socioeconomic Development Programme
SPFS	Special Programme for Food Security
SPPD	Support to Policy and Programme Development facility
sq km	square kilometre
sq m	square metre
STWs	shallow tube-wells
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
WFP	World Food Programme
WTO	World Trade Organization

Agricultural Strategies and Policy Framework for Sustainable Food Security and Poverty Alleviation

Executive Summary

I. Background

RAVAGED by nearly three decades of war, Cambodia now confronts enormous development challenges. With a per capita income of US\$291 (1996), the country remains one of the poorest in the region and continues to lag behind its neighbors in terms of socioeconomic development indicators. Among the 174 nations covered by the UNDP's latest Human Development Index (HDI) survey, Cambodia ranked a dismal 140th.

The main cause of the low level of human development has been pervasive poverty, which afflicts mostly agricultural households. Many small, marginal farmers still do not produce enough food in their farms despite notable progress in rice production over the past few years while non-farm employment opportunities have been limited. Widespread rural poverty, poor transportation, marketing constraints, and internal security problems—all these have created an atmosphere of food insecurity in the country today.

The Royal Government of Cambodia (RGC) has already created a development framework for poverty reduction through employment generation, improvement of transportation, and removal of marketing constraints with special provisions for and support given to vulnerable groups in society. However, the country still lacks a well-focused strategy to realize these goals.

Against this backdrop, the Food and Agriculture Organization (FAO) in consultation with the Cambodian Ministry of Agriculture, Forestry, and Fisheries (MAFF) formulated a direct technical support activity for Food Security and Poverty Alleviation to be carried out under the United Nations Development Programme's (UNDP's) Support to Policy and Programme Development (SPPD) facility. UNDP and FAO, the funding and implementing agencies, respectively, signed the SPPD document in July 1997.

A. Objectives

The main objective of the SPPD is to formulate a coherent policy framework and to craft viable agriculture sector strategies to solve Cambodia's food security problems and alleviate poverty. In addition, it intends to identify areas of intervention at both policy and programme levels within the long-term socio-economic objectives of the government for agricultural and rural development.

The main tasks can be summarised as follows:

- To carry out an assessment of the overall development context;
- To analyse the nature, incidence, and causes of poverty and food insecurity;
- To briefly review the macroeconomic, agricultural, and rural development policy as well as the institutional framework;

- To assess the resources and potentials for—and constraints to—rapid agricultural growth;
- To propose a policy framework and an agricultural strategy for food security and poverty alleviation; and
- To recommend sub-sectoral as well as non-agricultural and cross-sectoral policy and institutional measures within a “growth-equity-sustainability” framework.

The FAO Policy Assistance Branch for Asia and the Pacific (RAPP) fielded an inception mission in January 1998 to sharpen and focus the scope of work in collaboration with government officials, the UNDP, and other related agencies active in the field of food security and poverty alleviation. An assigned SPPD mission then visited Cambodia for three weeks (15 March to 4 April 1998) to carry out the fieldwork.

During its stay in the country, the SPPD mission collected and reviewed data and information prepared by state agencies and private institutions. It also discussed and consulted with a number of international and non-government organizations (NGOs) on various issues regarding food security and poverty. The team’s main findings and analyses are detailed in the main report, the summary of which is provided below.

II. OVERVIEW OF THE DEVELOPMENT CONTEXT

A. The Economy

For a nation emerging from a difficult period in its history, Cambodia has managed to chalk in respectable growth rates with national output expanding by an average of 6.2 percent per annum from 1991 to 1996. Other macroeconomic indicators have also been very encouraging. Inflation, which averaged about 140 percent in 1990 to 1992, has dropped to single-digit levels, while total investment as a percentage of GDP increased from 14 percent in 1993 to 21 percent in 1996.

The positive performance of the Cambodian economy to some extent owes to the generous flow of resources into the country in the form of foreign direct investment (FDI) and bilateral and multilateral loans and grants. Another encouraging development is the increased participation of the private sector in the economy.

Structurally, Cambodia can be described as a predominantly rural economy largely based on agriculture. Some 85 percent of the population live in the rural areas with 82.5 percent of the rural work force directly employed in the agriculture, forestry, and fisheries sector. This sector, which accounted for the largest share of real GDP (42.7 percent) in 1996, provides direct employment to nearly 80 percent of the total labour force.

Within the agriculture sector, crops and rubber constitute the bulk of the total value of production (56 percent), followed by livestock (30 percent), fishery (7 percent), and forestry (7 percent). Small-sized farms characterize the local agricultural system with roughly two-thirds of the cultivated area devoted to lowland rice. Farmers also plant annual crops such as vegetables, fruit trees, and industrial crops in the uplands and perennial crops such as rubber, coconut, and sugar palms.

Despite its importance, the agriculture sector has grown slowly at just 2.7 percent annually (or slightly below the population growth rate of 3 percent) from 1991 to 1996. Slow growth and production instability were partly due to low irrigation levels and structural constraints such as inadequate transport infrastructure and inefficient marketing systems. The low growth of agriculture plausibly accounts for the very modest decline in poverty (from 39 percent in 1994 to 36 percent in 1997) and the worsening income distribution in Cambodia.

B. Human Development

The 1998 Human Development Report calculates an HDI value of 0.422 for Cambodia, one of the lowest scores in Asia. A similar value of 0.427 was obtained using the Cambodia-specific HDI, which incorporates ten additional indicators of living standards in the computation (i.e., in addition to life expectancy, adult literacy, and adjusted real gross domestic product per capita, which are the main components of the original estimate).

The country has performed less than ideally on various socioeconomic indicators, some of which are outlined below:

- The adult literacy rate is about 68.7 percent based on 1996 estimates. This rate is higher in urban areas (80 percent) compared to rural areas (67 percent) and significantly greater among males (82 percent) than females (58 percent). The gross enrollment rate at the secondary level is estimated at 31 percent, a figure higher than in Laos (25 percent) but lower than in Vietnam (35 percent) or Thailand (37 percent). For every 1,000 students who enroll in primary schools today, only 27 are expected to finish secondary school.
- The labour force participation rate for those 10 years or older (i.e., the ratio of the economically active population to the total population) stands at about 65 percent. While 99 percent of the labour force are currently employed according to latest statistics, there are indications of underemployment with about 8 percent of those reported to be fully employed actively seeking additional work.
- Half of the population of Cambodian children aged zero to five years are malnourished, one of the highest ratios in Southeast Asia. Malnutrition, however, is prevalent across economic states. About one-third of the children numbering among the richest 20 percent of the urban population are moderately underweight while 21 percent are severely stunted.
- Cambodians have weak access to health services, water, and sanitation. Consequently, the country now has one of the highest infant mortality rates in the world (at 90 per 1000 live births) and one of the lowest life expectancies at birth (50.3 years for males and 58.6 years for females).

The low level of human development in Cambodia is consistent with its small per capita income. There are marked differences in social and human indicators across income groups, provinces, and gender. But in general, the poorest 20 percent of the population suffer the worst possible outcomes.

III. FOOD SECURITY AND POVERTY ISSUES

A. Poverty Incidence and Status in Cambodia

Reports based on the 1993-94 and 1996 national socioeconomic surveys indicate that nearly four out of ten Cambodians still live in absolute poverty, lacking adequate income to afford at least 2,100 calories of energy per day plus some allowance for non-food consumption. An updated poverty profile using newly available data from the 1997 Cambodia Socioeconomic Survey (CSEC) reports a modest decline in poverty from 39 percent in 1994 to 36 percent in mid-1997.

The reduction, however, was not uniformly spread across the country: poverty incidence declined significantly in urban areas outside of the nation's capital (from 37 to 30 percent), modestly in rural areas (43 to 40 percent), and remained unchanged in Phnom Penh (11 percent). The 1997 poverty estimates indicate persistence of rural poverty, particularly for households with agriculture as the primary source of income. Such households account for about 90 percent of Cambodia's poor.

The overall Gini coefficient increased by about 10 percent, signaling a worsening income distribution. The inequality widened in Phnom Penh and rural areas, while it remained unchanged in other urban areas. These results imply that the rich appear to have benefited more than the poor have from recent growth.

B. Food Security: Macro Issues

1. Supply and Demand Scenario

The growth rate in rice production has picked up considerably in recent years, with yields rising from about 1.3 mt/ha in 1993-94, to 1.8 mt/ha in 1997-98. The area planted with rice has also increased somewhat (from 1.82 to 1.88 M ha over the same period) although total acreage remains well below the pre-Khmer Rouge period. Thus, despite a high population growth rate of around 3 percent, a small rice "surplus" emerged during the three-year period since 1993.

Despite a snug situation on a national level, performance at the province level varies considerably. While a number of provinces suffer from perennial food deficits, only a few have experienced very rapid growth, with the others typically stagnating. Several provinces have managed to transform from deficit to surplus areas (e.g., Pursat, Kompong Chhnang, and Kampot), but some continue to suffer from chronic shortfalls (Banteay Meanchey and Ratanakiri).

2. Consumption

Adequacy of calorie intake (except for the urban poor) and rice consumption is not a critical issue at the moment. It could even be argued that rice consumption is "excessive," accounting for over 70 percent of calories and representing about 40 percent of food expenditures. The predominance of rice in the local diet is even a major issue with regard to malnutrition, especially of young children and pregnant and breast feeding women.

The issue of food security, however, is particularly relevant for small and landless farmers in Cambodia. Among small farmers with landholdings of 1 ha or less, only a few can produce food enough to last the whole year, even a good one. Most have to endure rice deficits often for a period of one to six months in a year.

While outright destitution is not widespread, a hard core group of between 5 to 15 percent of households can be described as facing food insecurity, with another 15 to 20 percent managing to attain minimum consumption levels albeit at a high cost: Recourse to risky coping strategies such as sale of labour and assets in times of distress and indebtedness (at high interest rates).

C. Factors Influencing Food Security: Key Findings

Factors influencing the socioeconomic state of households in Cambodia can be quite diverse, the most salient of which include chronic poverty, rapid population growth, stagnant growth, and weak access to arable land. To simplify and aid policymaking, one can compress determinants of food security into three broad categories: ownership or access to resources crucial to food production, income opportunities of individuals, and participation in markets. Key findings from an assessment of the Cambodian situation are condensed in this section.

1. Ownership and Access to Land

The average land size for the 2 million farm households in Cambodia is about 1 ha. In areas identified as high risk in terms of food security loss, the average size is 0.75 ha. Although nationwide

data on the distribution or extent of landlessness is not readily available, the proportion of landless households is believed to be generally low in Cambodia. According to the World Food Programme's (WFP's) 1996 poverty mapping, only 8 out of 100 communes surveyed had a rate of landlessness of 20 percent or greater.

Landlessness, however, is believed to be prevalent in certain regions where there is a high count of rebel returnees and internally displaced people. There are also indications of considerable inequity in land distribution. Forced evictions and sales have been reported in Phnom Penh and other urban centers noted for tourism as well as in areas desired because of profitable concessions (e.g., timber) and for commercial exploitation such as the northwestern part of the country.

While private ownership was legally reintroduced in the country in 1989 and the framework for land ownership broadened under the state land law in 1992, the process of land titling and registration remains cumbersome. So far, only 10 percent of the applicants have been granted certificates of ownership and until now these land title certificates are still of a temporary nature.

2. Income Flows

The average peasant household obtains food and generates income through a combination of activities such as farming, hunting, fishing, and gathering of wood. Other supplemental sources of livelihood are livestock raising, primary processing of agricultural, forestry and fishery products, odd jobs, and vending.

For the poor, specifically the land poor, income is generated based on a diversified portfolio that typically involves the sale or exchange of labour (especially for females), petty trading (of goods transported between markets and villages), retailing, and processing activities. Less privileged households in rural areas obtain much of their food and livelihood from common territories.

High level of yield fluctuations, particularly in areas without water control (i.e., irrigation and drainage systems), and lack of diversification in the cropping system indicate income instability. Outside agriculture, earnings derived from common property resources also exhibit high uncertainty as livelihood source in contrast to earnings from wage labour, which are found to be stable. Uneven access to land has generated sharp inequalities in agricultural incomes, but to some extent earnings from the labour market offset these discrepancies.

3. Market Participation

Food security also depends on a household's ability to participate in markets, and engage in a complex set of social and economic relationships that characterize exchange.

a. The Asset Markets

- *Land*

There is significant land market activity in Cambodia, but principal players in this market are mostly groups that have managed to corner vast tracts of land through rent-seeking behavior and because of a poor system for the protection of property rights. In the past five years, 11 to 13 percent of total land changed hands. The rich and well off were the net buyers while the poor were found to be net sellers. From this perspective, it appears that the poor are in fact gradually losing access to the most important factor determining food security.

- *Livestock*

Ownership and trade in cattle and pigs seem to be concentrated in the hands of better off households, the rich accounting for over 80 percent of market purchases and sales. Poor households, particularly those headed by a female, are mostly restricted to the ownership and trade of chickens and ducks. The livestock market does not appear to be a significant source of income or profit for the poor, who are basically small-scale operators.

- *Lease/Rental*

One possible way for poor households to overcome the disadvantages of having inadequate resources is to participate in the lease or rental market for land, animals, and trees. Although significant activity has been reported in these markets, transactions mostly benefited the non-poor who are the primary players.

b. The Labour Market

Despite significant differences in labour market conditions, some trends can be identified. The most salient one is the increasing dependence of the poor on wage labour as a source of income. When local labour demand conditions are adequate, "out" migration becomes noticeably small. This is true for surplus areas where introduction of modern rice cultivation has increased the demand for labour, raised output, and heightened economic activity.

Other developments that have reinforced dependence of the poor on the formal labour market are increasing pressure on common property resources because of greater exploitation, adverse shifts in the pattern of traditional rights over these common resources, and growing inequality in land and asset holdings. These trends have also begun to alter the traditional division of labour between males and females and have ushered in more formal wage contracts in the labour market, replacing older practices such as labour sharing and mutual exchanges.

c. The Credit Market

There is a high incidence of participation in credit markets reported in Cambodia, with participation rates invariably greater for poorer households. The proportion of households reporting outstanding debt ranges from 63 to over 90 percent, but the incidence is much higher for poor households, at 89 to 94 percent.

With limited access to financial services, people in rural areas are forced to rely on moneylenders to purchase essential inputs and meet short-term exigencies. The cost of credit in the informal money market is normally high, with nominal interest rates ranging anywhere between 10 to 30 percent per month (although there is some degree of interest-free borrowing and lending among close relatives). The high cost of credit can be traced to the nature of the borrowing, distress loans for emergency rice purchases or treatment of illnesses predominating.

D. Targeting the Poor: An Operational Question

The advantage of targeting as a policy tool for poverty alleviation is obvious. Success, however, depends on the ability to identify the poor in an efficient manner. In view of the costs and benefits of alternative modalities of targeting for poverty alleviation, choice of an appropriate method is important. The criterion should be achieving the greatest poverty reduction for a given budget, or at the least cost for a specified reduction target.

Geographical targeting can be a cost-effective means of reaching the poor if poverty is geographically concentrated and targeting based on a means test (e.g. income) becomes costly due to administrative limitations. In the case of Cambodia, one can argue that provinces that perform poorly in at least two out of the three province level indicators (i.e., provincial information on child malnutrition, rice surplus-deficit reports, and WFP ranking) and which number among the ten provinces with lowest HDI rankings in Cambodia deserve to be included in a priority list (See the main report for a full discussion).

E. Food Security and Poverty: Critical Issues

In terms of calorie intake, consumption levels in rural Cambodia appear to be adequate though highly unbalanced in terms of other nutrients. However, for the poor, this state can only be described as precarious, sustained as it is by risky coping. An agricultural and rural development-oriented strategy aimed at poverty alleviation and food security must address a number of issues. These include a growing inequality in asset ownership and access to productive resources (including common property or open access resources where traditional access has been rapidly eroded); low agricultural productivity and instability of output; poor health and nutrition; and basic weaknesses in infrastructure (e.g., inadequacy of road and communications systems), human resources (e.g., lack of education and training of workers), and institutions.

IV. ECONOMIC POLICIES AND THE INSTITUTIONAL FRAMEWORK

A. Macroeconomic Policies

Cambodia has taken giant strides towards creating a market-oriented economy since the early 1990s by liberalizing trade, rationalizing the tariff structure, and eliminating trade bans (e.g., on rice). The goal of the state has been to foster a market-oriented economy nurtured by the private sector and to achieve macroeconomic stability. Broad national development objectives articulated in the country's Socioeconomic Development Programme (SEDP) for 1996-2000 are the creation of a just, fair, and peaceful society and the attainment of a higher standard of living.

With respect to poverty alleviation, supposedly the central thrust of the SEDP, the strategy is to actively support self-employment and job training. Participation of local and international NGOs in this respect is encouraged given the fiscal limits in the provision of social support services. Further, the Cambodian government intends to develop an effective and sustainable rural credit system to create an atmosphere that allows income- and employment-generating activities to flourish.

B. Agriculture and Rural Development Policies

1. Agricultural Policy and Reforms

The government's food security policy emphasizes sustained growth in farm production, processing and marketing activity. The main ingredients are technology development; credit and input availability; infrastructure development; provision of agricultural extension services; and production zoning.

Major policy changes over the past several years include a lifting of a ban on rice exports, removal of the guaranteed procurement or support price for cereals, and withdrawal of the subsidy element in fertilizer prices offered by the government-owned Central Company for Agricultural Materials to ensure fair competition with the private sector.

The Cambodian government has also committed to divest of state-owned rubber estates, to revise and rationalize land laws, and to finalize rural credit strategies and policies. The policy of cost recovery is now being implemented in the context of irrigation systems via the creation of water users' associations.

Yet despite moves toward a freer economy, subsidies, and assistance schemes continue to exist in the form of free irrigation water and pump fuel; interest-free loans in the form of rice seeds; free pesticides (at request). To assist farmers facing supply shortfalls, financial hardship, or calamities, the state occasionally buys rice and seed at market prices and distributes subsidized fertilizers.

2. Challenges of Regional Integration

Major trade issues in Cambodia relate to the country's imminent entry into the AFTA Common Effective Preferential Tariff (CEPT) scheme following its membership in the ASEAN, where it currently has observer status. Membership in the organization will obligate the country to reduce tariffs towards the agreed target of zero to 5 percent within ten years and remove non-tariff barriers such as quotas and licenses.

Hence, under a task force chaired by the Ministry of Economy and Finance (MEF), several working groups are currently identifying commodities to be placed in the inclusion list (items for which tariff rates will be reduced) and the temporary exclusion list (list of goods viewed to be too sensitive for immediate rate reductions). The major problem, however, is the lack of clarity about Cambodia's competitive advantage due to a paucity of data and information on the current status of the country as well as its potential improvements.

3. Rural Development Policies and Programmes

Rural development strategies follow four broad principles. These aim to: embrace both social and economic dimensions and employ an integrated approach; pay special attention to disadvantaged and groups; encourage people's participation; and promote "bottom-up" planning or decentralization of development efforts.

One of the major thrusts of rural development is to create local level institutions to plan and execute development activities. This policy is being fleshed out at the provincial, district, commune, and village level in the form of development committees which have recently flourished. Another is to establish an effective rural credit system operating under the overall supervision of the National Bank of Cambodia as an integral part of the financial sector.

Recently in 1998, the RCG formally established the Rural Development Bank (RDB) with start-up capital worth 10 million riels (\$2.8 million) financed by government revenues derived from the privatization of state-owned enterprises. But the bank, which falls under the umbrella of the MEF, has not been looked upon favorably by the donor community (e.g. the World Bank, Asian Development Bank, and UNDP) and local NGO credit operators.

C. Rural Institutions and Support Services

There are three principal players involved in the provision of services to farmers and the rural population in general: the private sector, the public sector, and international organizations (IOs) and NGOs. The public sector is still weak in rural areas due to fiscal and manpower constraints and the private sector has not yet entered this field substantively. IOs and NGOs, therefore, hold a special role in that they bring in new technologies and innovations, and allied technical expertise and funds needed to reach out to communities and conduct extension programmes.

NGOs now substitute for government in the provision of services to rural areas, while a number of them conduct important agricultural development services. They also collaborate with the state in extending technical assistance and resources to the rural population and help improve the community's knowledge, skills, and awareness.

V. DEVELOPMENT POTENTIALS AND CONSTRAINTS

Rich in natural resources, Cambodia faces excellent opportunities for economic expansion. For a largely agricultural society, such opportunities can be turned into real growth by revitalizing the farm sector.

But before an effective strategy or appropriate policy framework can be crafted, development potentials of the country as well as its constraints first have to be identified to ensure that scarce resources are used in the most efficient manner.

A. Potentials of Agricultural Growth

1. Irrigation

Irrigation offers the best opportunities for agricultural growth in Cambodia. There are bright potentials for substantial increases in unit area productivity through improvements in irrigation systems and water management. The level of irrigation development is very low at present with irrigated lands covering only 16 percent of the total area under food crop production.

Extensive and good shallow aquifers, which span an estimated 4.8 M ha, underlie most of the arable areas of Cambodia. Studies have shown that even if estimates of shallow well areas are cut by half, most of the areas planted with rainfed lowland rice, flood recession rice, and annual upland food crops can still be irrigated.

Shallow tube-well (STW) irrigation, a system suitable to most regions where crops are grown as well as to small-scale agricultural production (i.e., land holdings of 0.4 ha or larger), can serve as a good engine of growth. Manually operated tube-wells (MOT), on the other hand, can be ideal for watering home gardens and livestock and as source of potable water supply, particularly in areas with shallow flooding.

There are areas, however, where small, low-lift pumps (LLPs) might be appropriate. Their advantage is that they are portable, cost-effective, simple to install and operate, and capable of drawing water from diverse sources including rivers, streams, colmatage canals, lakes, farm ponds, and small bunded reservoirs. LLPs can also be used to control water regimes (i.e., useful for both irrigation and drainage) in flood recession rice areas.

When used together with colmatage canals, LLPs help intensify and diversify cropping systems. The prime movers or engines of these devices can also be used to power boats, hand tractors, and other farm machines. According to research, there are sufficient surface water resources to irrigate an area of at least 1.0 M ha by LLP, small run-of-the river, and colmatage canal irrigation systems during the dry months.

In contrast, there is very little hope for the development of large run-of-the-river irrigation systems, pumping stations, and storage dams in the short to medium term. Gravity systems have wider service areas but are more expensive and difficult to operate and maintain. The associated costs of such systems are very high; it is extremely difficult to develop adequate institutional capability at all levels to efficiently plan, maintain, and manage such systems.

2. Rice Production

There are good short- and medium-term potentials for increasing rice yield levels, cropping intensity, and unit area productivity in the different rice ecosystems. Maximum productivity potentials can be achieved by developing appropriate irrigation facilities (e.g., STWs and LLPs) for double cropping in lowland areas. Irrigation can increase both yield and cropping intensity especially in areas with medium to high soil productivity where an average annual unit area rice productivity of 5.4 mt/ha—or double the present productivity level—is feasible.

It is estimated that for every 100,000 ha increase in irrigated (lowland rice) areas with medium to high soil productivity, rice production can rise by as much as 300,000 mt. Even in areas where soil has low productivity, output levels can similarly be expanded by about 250,000 mt. These increases amount to 8.7 percent and 7.2 percent, respectively, of 1996-97 rice production. With the potential for a substantial surplus, the possibility of exporting rice (and other crops, given farm diversification) is no longer remote.

3. Other Field Crops (Food and Cash Crops)

At present, Cambodia seems to have some competitive advantage over neighboring ASEAN countries in the production of corn, soybean, and mong bean. With irrigation and introduction of improved production technologies, it can be competitive in the production of other crops as well (e.g., peanut, cassava, sweet potato, and vegetables). Its major advantages are its favorable man-to-land ratio and low agricultural wage rates.

Although the country exports some of the basic ingredients of feeds for hog, poultry, and fish production (e.g., fishmeal, rice bran, corn, and broken rice) to Thailand and Vietnam, it has been importing formulated feed concentrates and meat products. There is considerable scope not only for reversing this sort of trade but also for exporting these goods to other ASEAN countries by improving production efficiency with increased investments in commercial-scale livestock production by local and foreign investors.

4. Rubber, Fruit Trees, and other Commercial Crops

Rubber has traditionally been Cambodia's export crop. It is one of the few crops in which the country appears to have comparative advantage in terms of production. But there is still room for improvement in terms of harvesting techniques and in the quality of processed products. Output can also be raised in the medium and long term by expanding the area under cultivation, increasing tree density (up to 350 per ha), and improving the productivity of individual trees.

Meanwhile, there is also room (and reason) to expand areas planted to fruit trees to meet domestic requirements for balanced nutrition. Accurate data regarding the production of and size of land devoted to fruit production are not available, but present estimated levels imply low per capita consumption of fruits.

There are similar possibilities of increasing the production of cashew and coconuts for export and coffee as an import substitute. The country used to export coffee in the 1960s, but produces practically nothing today. Agro-climatic conditions are particularly suitable for the cultivation of coconuts, which are currently produced primarily for fresh nut consumption. There are opportunities in diversifying into coconut-based products that can cater to local and international markets.

5. Livestock

There are also clear opportunities to be found in increasing the efficiency of backyard livestock production with emphasis on animal health services and nutrition. In the long term, the prospects for the contract growing of pigs and poultry with food conglomerates and agribusiness corporations as investors are particularly bright given the entry of the country into AFTA. ASEAN entrepreneurs and multinational corporations can provide the capital, technology, and management inputs as well as the potential export market, while their rural partners can provide land and labour.

There are likewise compelling reasons to increase large animal production not only for meat and dairy products, but also to meet draft power requirements of a growing crop agriculture sector. A relatively inexpensive way to achieve this goal of promoting livestock such as cattle and buffalo is to use vast shrub-lands and open areas as feeding ground but taking into consideration the environmental impact of such activities.

In the context of increased agricultural output, there is a large potential for the development of a vertically integrated agribusiness system based on local crops, livestock, and fishery products. The integration progresses from small- to medium-scale feed crop productions systems; to animal feed and fishmeal processing plants; to swine, poultry, and fishery production using locally formulated feed concentrates; and all the way up to fish and meat processing. The country can have a competitive edge over other ASEAN countries in such ventures since it is a low cost producer of raw materials for fish and animal feeds processing.

6. Fisheries

Both inland and marine captures, however, have stagnated since 1992. The decline in inland capture has been blamed on the high level of exploitation, conversion of inundation forests into flood recession rice areas, poor management, and continuing environmental degradation, among others.

In this case, the only chance for significant growth in inland fishery production in the future is through the expansion and improvement of rice-fish farming in lowland rice areas and via aquaculture. Better management and steps to protect aquatic resources from overexploitation and arrest the dwindling fish stock in inland water bodies should, however, accompany these productivity-enhancing activities.

Under present circumstances, improving the lot of small farmers and fisher-folk, which are the target groups in fishery development, can best be accomplished by developing rice-fish farming and aquaculture technologies. This is because commercial fishing lots now dominate a large part of inland coastal areas (with about 80 percent of the lake shoreline under fishing concessions).

a. Rice-Fish Farming

Based on official statistics, fish production in lowland rice areas contributes very little to total inland fish capture. The bulk of available information indicates annual production levels of at least 25 kg per ha for capture fisheries within or near rainfed lowland rice regions. But with the use of trap ponds to gather fish that escape capture within the rice paddies, a common technique in a number of Southeast Asian countries, the harvest can be doubled. There is, therefore, potential for annual fish production in the order of 50,000 mt in lowland rice fields.

Rice-fish culture with trap ponds requires little investments (e.g., digging of the pond and canals, purchase of fingerlings, and some feed supplementation), and income from fish and other aquatic animals can exceed that from rice cultivation. Annual fish production is usually in the order of 200 to 400 kg per ha or four to eight times higher than that of capture fisheries. Output is often higher in

irrigated areas and when farmers have greater control over their irrigation facilities. This further highlights the prospects of small-scale systems.

b. Aquaculture

Aquaculture, especially inland pond culture is relatively new to Cambodia. In 1975, aquaculture production totaled 5,000 mt (or less than 5 percent of total fish production). This activity was interrupted during the Khmer Rouge regime, but was reintroduced in 1984 in the areas surrounding Phnom Penh City, Tonle Sap Lake, and the Mekong regions. From 1,600 mt in 1984, aquaculture output steadily increased to 8,600 mt in 1997. With such capacity for progress, there are obviously good chances of rapid expansion in the industry.

7. Forestry

The present rate of extraction of forest resources is approximately seven times the sustainable yield level, a rate that will decimate much of the remaining commercial stand within the next 10 years. Valuable non-wood forest resources (e.g., rattan, bamboo, wildlife, and food crops) are also being diminished at a rapid rate. Clearly, long-term benefits from the country's forest resources can only be optimized through proper conservation and management. It has been estimated that with a sound forest policy framework, the industry can generate sustainable government revenues of at least US\$100 million annually.

B. Constraints to Agricultural Growth

1. Absence of a Clear Policy Framework

Typical of a nation still in the process of building the basic structures for development, there is at the moment a lack of a clear policy framework. Investment strategies for the development of resource- and technology-based production systems including agro-industries have not been developed. There is also a need for a more solid legal framework and clearer regulatory guidelines governing the allocation, protection, and management of resources, particularly with regard to institutional control and responsibility.

2. Undeveloped Market for Rice and Other Food Crops

The biggest obstacle to an expansion of areas under crop agriculture and intensification of cropping systems in irrigated areas is a lack of a market for rice and other food crops. Considering the level of cereal consumption, there is not much scope for greater domestic absorption of incremental production. Unless export possibilities are enhanced, the potentially negative effect of increased production on output prices (i.e., lower prices leading to reduced profitability) will continue to serve as a disincentive to greater investment for and efforts towards improvements in farm productivity.

3. Barriers to Export Growth

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a. Deterrents to Legal Exportation

The exportation of most agricultural products is carried out illegally. There are no taxes, records, or control mechanisms in these transactions. Legal exportation of rice is a problem, as purchasers in importing countries reportedly do not honor certificates issued by Camcontrol. Many rice millers and wholesalers in the northwestern part of Cambodia complain about the difficulty and high cost of obtaining an export license. Moreover, there are still many regulations that make legal exportation unattractive.

b. Inferior Product Quality and Lack of Trade Information

A major hindrance to export promotion is the failure of a number of agricultural products to meet international standards in overseas markets. When it comes to the formulation of policies and intervention measures, meanwhile, scarcity of records relating to imports and exports emerges as the biggest drawback. This signals a clear need to establish a network that can collect needed information.

c. Poor Infrastructure and Support Services

Infrastructure, facilities, and institutional mechanisms for the handling, processing, and export of food grains are still undeveloped. Essential market support infrastructure and services such as farm-to-market roads, transport facilities, power supply systems, and quality control facilities and services are grossly inadequate. Marketing and transactions costs remain high due to bad road conditions, poor security, high transport costs owing to a collection of ad hoc road fees, and shabby conditions of city and local markets.

d. Inadequate Post-harvest and Processing Facilities

Facilities for minimizing post-harvest losses and for the secondary and tertiary processing of agricultural products and by-products that are needed to achieve efficiency as well as to diversify and improve output are inadequate. This is true even for rice, which is the country's major food crop. Rice harvest and post-harvest losses of about 30 percent have been reported. Cheap, small-scale but appropriate feed and food processing equipment are unavailable in many areas. There is, in addition, a lack of drying, bulk handling, and storage facilities for product quality management.

e. Weak Institutional Capacities

The institutional capacity for regulating and supporting the private sector as it carries out its marketing functions is weak. The newly established Agricultural Marketing Office (AMO) within the Department of Planning, Statistics, and International Cooperation (DPSC) of the MAFF still lacks capable and experienced staff. The same problem is encountered in the Ministry of Commerce (MoC), where assistance is also needed to build the institutional capacities of a newly opened unit for export promotion as well as the existing Camcontrol.

At present, there is no national marketing institution. Only the Market Information Service (MIS) under the MAFF, which is receiving some assistance from the FAO, seems to be carrying out marketing activities in any significant sense. However, essential services and functions such as the assessment of overseas market signals, the establishment of internationally accepted norms and product standards, and the introduction of modern storage and packaging materials and techniques are only given lip service.

4. Low Crop Productivity

Current yield levels and cropping intensities in rice ecosystems are very low compared with those under similar ecosystems in many Southeast Asian countries. In addition, production of other field and cash crops has been weak, hindering the development of agriculture-based processing industries. Clearly, export potentials of the agriculture sector can only be fully tapped if surpluses are consistently achieved and product variety (and quality) attained. Mediocre performance in terms of productivity is attributed to:

a. Poor Soil Fertility and Other Natural Constraints

Poor soil fertility is a major production constraint in most of lowland areas that has to be addressed by suitable soil and fertilizer management technologies. Nearly half of the soil types found in rice growing areas can be classified as being of low productivity—mainly, deep sandy soils, shallow-sand-over-clay, and soils of the depressions. This is compounded by weather uncertainty and recurrence of devastating floods and drought.

b. Inappropriate Irrigation and Water Control Systems

The low level of irrigation development in the country coupled with the poor performance of existing irrigation facilities discourages diversification of the local farming system. Without good water management and control, farming remains a highly risky activity. Farmers are hence unable to take full advantage of modern farming technologies (e.g., seeds, seedlings, soil, fertilizer, and pest management).

Focus on large-scale gravity irrigation systems, which do not give individual farmers control over the management of irrigation water, has resulted in irrigation systems that favor rice monoculture. Because of this, the production of other field crops such as corn, peanuts, and vegetables, which require more stringent drainage and on-farm water management, are currently not feasible.

In addition, many of these facilities, the popularity of which had started in 1950s, are beyond the capabilities of the concerned public and private organizations to properly operate and maintain and are hence unsustainable. Existing schemes—mostly gravity-dependent systems—are performing sub-optimally today because of poor planning and design.

c. Lack of R&D and Suitable Farm Technologies

There is currently a paucity of knowledge of new farming technologies appropriate to the local farm setting. Limitations in both the availability of technology and the capability to identify, test, and adopt promising technology also exist. These are mainly rooted in a lack of funding for research and development (R&D) activities.

The government does not have the means to plan and finance, much less manage a comprehensive agricultural research programme. Whatever limited R&D activities there are have been fragmented, carried out by independent organizations without the benefit of coherent planning and coordination, and rarely reflect actual farming conditions.

Intended end users have very little input in R&D and extension delivery systems. Research and extension linkages are very weak, and technology demonstration activities often commodity-oriented and seldom geared towards a diversification of farming systems.

5. Institutional Problems and Financial Constraints

There are serious gaps and overlaps in the mandates of institutions in support of agriculture, fishery, and forestry. At all levels, there is a shortage of skilled technical manpower in the government institutions in support of agriculture.

Public institutions encounter not only severe technical manpower shortfalls but also financial constraints. The government has very meager budgetary resources and weak access to development finance. Without external assistance, public institutions can only pay the salaries of the employees and provide for about 10 percent of the rest of their budgetary requirements.

These institutional weaknesses have resulted, *inter alia*, in a lack of a systematic assessment of the developmental potentials of the country's resource base (e.g., water resources) and of baseline information for planning, programming, and implementing agricultural development projects. They have also hampered the construction of sorely needed infrastructure. Among others, the results are cumulative neglect of the repair, operation, and maintenance of infrastructure such as roads and irrigation facilities; limited interactions among farmers and extension agents; and weak dissemination of new technologies.

6. Inadequate Extension Services

The institutional arrangements and mechanisms for the effective delivery of agricultural support services such as extension programmes are either not in place or are inadequate. Agricultural extension services are very weak, and a fully functioning system for extending support services—and more importantly, of spreading technology—to the rural population has yet to be established.

Technical information is mainly conveyed through informal channels that include neighboring farmers, NGOs, agricultural technicians, and distributors of farm inputs. Farmers have very limited access to improved technologies with existing agricultural extension services unsupported by R&D. State institutions are unable to focus and effectively deliver on a timely basis essential services and functions in support of highly productive, intensive, and diversified farming systems.

7. Limited Access of Farmers to Production Resources

a. Land

Although there have been improvements in legislation regarding land rights over the last decade, land laws remain ambiguous in some aspects. For instance, while the 1992 State of Cambodia Land law presented a broader framework for the ownership, transfer, and registration of lands, it did not preserve nor abrogate earlier decrees (i.e., those passed in 1989 when land ownership was reintroduced) thus becoming a source of confusion and legal conflicts.

Under present legislation, access to land of certain groups (e.g., returnees and people displaced by fighting and land mines, female-headed households, and elderly people) has been extremely difficult. Land disputes have multiplied as speculative transactions rapidly take place in certain areas in the country.

b. Common Property Resources

An issue critical to poverty alleviation and food security is securing (equitable) access to common property resources such as forestlands and inland water bodies. Marginalized rural dwellers, for example, are unable to secure tenure over both forestlands and trees as access to these can only be acquired through timber concessions and fishing permits.

c. Inputs and Credit

Farmers and fisherfolk have weak access to credit and quality agricultural inputs such as certified seeds. Although the Cambodian government accords top priority to increasing farmers' access to rural credit, the expansion of such services in the country is constrained by the absence of rural banking facilities and lack of personnel with experience in rural finance.

8. Peace and Order Problems

The continuing conflict in some parts of the country, the presence of land mines in some 200,000 ha of agricultural land, and the peace and order problems brought about by infighting among political parties and plain banditry in many areas contribute to instability in farming communities.

VI. STRATEGIC FRAMEWORK FOR AGRICULTURAL DEVELOPMENT: Focus on Food Security and Poverty Alleviation

Given the nature of Cambodian agriculture (i.e., small farm holdings, low level of technology, and lack of security of tenure), the end view of any socioeconomic and agricultural development plan should be the promotion of a farm sector that is dynamic, productive, and competitive: one that takes advantage of technological innovations, stretches its developmental potentials, and is environment friendly, guided by sound principles of management technology for sustainable growth. Emphasis of such a plan should be the entitlement of small farmers and fisherfolk over production resources and the availability of opportunities to choose from a range of farming options.

A. General Framework

An assessment of the situation in Cambodia points to a two-pronged strategic framework—one that embraces rapid, sustained, and equitable agricultural growth as well as empowerment of the poor.

The main thrust of the growth-mediated approach is to invigorate the agricultural sector through the maintenance of a consistent macroeconomic and agriculture policy framework that promotes an environment conducive to increased private sector participation in agricultural development. Such a strategy seeks to promote rapid and sustainable increases in productivity through the adoption of appropriate technologies, systems, and infrastructure such as irrigation and crop diversification.

The second thrust of the two-pronged framework highlights the need for an entitlement-mediated approach to enhance the ability of the rural poor and vulnerable groups to participate in the growth process. This strategy focuses on improving these groups access to land, water, and other production resources, but also features intervention measures or programmes specifically (and accurately) targeted to underprivileged communities and individuals in the interim.

Given the goals of food security, poverty alleviation, sustainable growth, and global competitiveness and the principle of equitable development, the strategic framework centers on ten components:

- *Maintenance of an appropriate macroeconomic framework* and a favorable agricultural policy and institutional environment.
- *Accelerated and sustainable irrigation development* including a greater degree of water control (and drainage) by farmers.
- *Development of highly productive and diversified farming systems* through, among others, soil, pest, and seed management, and appropriate farm mechanization and post-harvest technologies.
- *Accelerated programme for land titling* and land distribution.
- *Strengthening essential agricultural support services* including marketing, input distribution, extension programmes, research and development (R&D), and credit.
- *Provision of essential social services and public goods* such as village water supply systems, transport and communication facilities, and storage and warehouse facilities.
- *Expansion of livestock production* with emphasis on animal health services, nutrition, and range management; and focus on small-scale poultry and swine production, large animal husbandry, and establishment of feed processing plants.

- *Improved management of appropriate technologies* for rice-fish farming and aquaculture.
- *Promotion of community-based forestry, agroforestry, and agroforestry-livestock farming systems*; sustainable production of fuel wood; and protection and management of critical watersheds.
- *Direct support and protection to the poor* through targeted programmes.

B. Implementation Strategies for Key Sectors and Components

Two caveats guided the creation of the implementation strategies. The first is that success of any strategy depends on the existence of a favorable policy environment and institutions supporting that environment. The second is the need to ensure that incentives offered do not conflict with the country's commitments under international agreements and its possible entry into the ASEAN and World Trade Organization (WTO).

In accordance with the macroeconomic framework emphasizing market-orientation of the Cambodian economy, policy initiatives are needed to foster an environment conducive to the development of a modernizing and vibrant rural economy and harness Cambodia's agricultural export potentials. These are represented by the following policy directives:

- *Preserve and maintain a liberal and market-oriented trade environment* characterized by uniformly low tariffs and export taxes, and free of bans and quotas;
- *Deregulate further the exportation of agricultural products*, remove unnecessary internal regulatory constraints, minimize licensing, and remove capacity limits;
- *Develop product quality standards by encouraging private sector investment* in appropriate infrastructure and equipment for post-harvest handling, storage, and processing (e.g., milling, cleaning, and drying); and
- *Legislate and enforce appropriate commercial laws and institutional arrangements* for efficient and cost-effective conflict resolution to enhance transparency and accountability and reduce transaction costs.

1. Irrigation Development

Small-scale irrigation systems should ideally be constructed by the private sector. The government, in collaboration with private entities such as NGOs, can provide support in the form of credit, training, extension services, technology demonstrations, and research. The rehabilitation of existing systems and development of new irrigation schemes should be strongly promoted in depressed areas and food-deficit provinces where potentials for crop intensification and diversification exist. The actual measures, in their order of priority, are discussed below:

a. Accelerated Development of Small-Scale Irrigation Systems

Cost-effective, short-gestation, and farmer-controlled irrigation facilities such as motorized STWs, LLPs, and MOTs must be immediately developed. In addition to improving yields, use of groundwater irrigation systems can also increase the supply of potable water in most farming villages.

Small-scale systems should ideally be initiated by the private sector in collaboration with state agencies or NGOs, which can provide support in the form of credit, training, extension services, technology demonstrations, and research. (Specific implementation modalities are discussed in the main report.)

b. Improvement and Selective Rehabilitation of Existing Irrigation Systems

With minor repair, design changes, and a rectification of operation and maintenance oversights, a number of existing irrigation systems can still be made fully operational. Such efforts should be limited, however, to irrigation, and flood control systems that are functional and which local governmental units and farmers groups can operate and maintain effectively and efficiently. These include some small- to medium-scale flood recession or inundation schemes, colmatage canal systems, reservoirs, and river-based systems with low diversion dams.

c. Development of Small Storage Reservoirs and Colmatage Canals

Apart from technical feasibility, criteria for the choice of such irrigation systems should include cost-effectiveness, affordability (with focus on technologies with investment cost below \$2000 per ha), sustainability, and simplicity of operation and design such that they are within the capacity of farmers or farmers' groups to repair, operate and maintain.

d. Optimization of Benefits from Irrigation Development

To bring rice yields up to their estimated potential levels of 4 to 6 mt per ha with irrigation development, it is important to promote new and improved technologies (e.g., integrated irrigation water-soils, fertilizers-pest, diseases-seeds, and seedling management; and suitable farm mechanization). These should be accompanied by technology demonstrations by competent trainers.

2. Improving Farming Systems

Opportunities and potentials for improving existing farming systems cannot be fully harnessed because of an unfavorable policy environment, lack of full appreciation of the nature of such opportunities, and inappropriate development strategies. Appropriate changes should enable farmers and fisherfolk to take advantage of these opportunities.

a. Crop Intensification and Diversification

High-impact intervention areas include the following: improved water regime control (i.e., field drainage); R&D and subsequent field testing demonstrations of appropriate technologies (e.g., new crop techniques, farm mechanization, balanced fertilization, integrated pest management, and improved land preparation techniques); and effective support services for intensive and diversified farming systems.

The development of an export market for rice and other food crops must go hand in hand with the promotion of crop diversification in rice-based cropping systems. The public and private sectors should work together in pursuing such improvements in farming systems for desirable results.

Benefits of intensifying production and diversifying crops in local farms include the following: a wider range of technology options; economical use of water (e.g., in rice-fish farming); improved nutrition through the production of additional crops such as legumes and vegetables; higher yields; stable food supply; enhanced ecological stability and soil productivity; farm product variety; and the vertical integration of agriculture enterprises through the development of associated processing industries (i.e., feed crops, to processed feeds, to livestock and fishery production).

b. Expansion and Improvement in Livestock Production

The thrust in the poultry and swine industry should be to increase production efficiency through improved animal health services and nutrition (e.g., improved veterinary services at the village level comprising mainly vaccination and disease control).

The strategy for large animal production, meanwhile, should combine raising of draft animals in backyards and draft and dairy animals in ranges and pastures. The possibility of utilizing shrub lands and open areas for cattle and buffalo production should be explored, but possible adverse impacts such as soil erosion should also be carefully studied.

The feed industry should be developed, and opportunities harnessed to set up integrated animal and fish feed processing plants. These can concentrate on small- to medium-scale feed crops production (e.g., corn, mong bean, soybean and root crop production where the country has a competitive advantage), feed and fish meal processing, and swine, poultry, and fish production using locally formulated feed concentrates.

Small-scale feed plants require equipment like dryers, mills, and mixers. If such machinery could be designed and produced locally, the country could have a competitive edge over other ASEAN countries.

With the opening up of the Cambodian economy under AFTA, contract growing of pigs and poultry should also be encouraged where agribusiness corporations provide the capital, technology and managerial know-how and small farmers and rural folks provide land and labour.

c. Improved Management and Appropriate Technologies for Rice-Fish Farming and Aquaculture Schemes

Practices that are already well established in many Asian countries should be introduced and allowed to take root with the training of recognized leaders in farming and fishing communities. An example is rice-fish farming where fingerlings are introduced into the rice fields, their natural food supplemented with feed concentrates, and trap ponds built within or near the rice paddies to serve as refuge for the fish when the fields start to dry up.

LLP and STW irrigation systems and chemical-free pest management methods, the lack of which presents major constraints to productive and sustainable rice-fish farming, should likewise be applied. Adoption of these two methods allows for better water quality management,

Given the potentials for rapid growth, aquaculture (e.g., inland pond, pen, and cage fish culture) can be introduced throughout the country. The long-term goal should be the expansion of commercial aquaculture enterprises.

3. Community-Based Forestry and Agroforestry

The first step to promoting a truly community-based agroforestry should be to transfer control of forest areas from the state to communities or individuals, and the establishment of long-term leases or land ownership. Without the security that such arrangements provide, users are unlikely to initiate improvements in forest areas or even strive to protect these resources.

The development of agroforestry must be planned in harmony with the development of crop agriculture. It is imperative that community-based forestry, agroforestation, and agroforestry-livestock farming systems strike a balance between preserving the beneficial hydrologic role of forest ecosystems and increasing food production. Government must come up with a coherent set of policies to address problems surrounding forestry management and conservation and strengthen its political resolve to effectively implement these policies.

4. Land Tenure and Titling

Given the growing concern over land issues, quick steps must be taken to correct the situation. These include:

- *Rationalization of existing land and natural resource legislation.* A thorough review must also be undertaken as relevant provisions in various laws concerning these resources are often complex and unclear.
- *Strengthening of public institutions through reorganization and retraining.* The present judicial system—from municipal and provincial courts to appellate courts—is ill equipped to deal with land disputes and should be improved. Technical and administrative capability of the Department of Land Titling, the state agency charged with processing land titles, similarly needs to be enhanced.
- *Immediate drafting of a land use code.* Ideally embodying sound planning, allocation, and regulation of property, this can serve as a blueprint for zoning in the country. Military landholdings, however, must not be exempted from the zoning process.
- *Allocation of additional land to farmers who missed out during the initial phase of the land distribution process or whose land holdings are very small.*
- *Special measures to secure land tenure for vulnerable groups (e.g., new settlements and ethnic groups subsisting on forestlands).* These could consist of long-term leases or permits from national and regional government units.

5. Strengthening Essential Agricultural Support Services

There should be renewed efforts to provide timely and effective agricultural support services in the form of marketing assistance, input distribution, extension programmes, skills training, technology demonstrations, credit support, product standardization and testing, and quality control and monitoring. The capacity of the private sector to eventually perform most of these essential functions should be enhanced.

a. Marketing

The following recommendations are offered towards improving agricultural marketing in Cambodia:

- *Continued mobilization of donor support to rehabilitate Cambodia's road infrastructure.* This should be coupled with mobilization of internal resources to enhance national capacity to plan and implement provincial and local roads rehabilitation projects.
- *Intensification of efforts to curb illegal road taxation still practiced in some areas.*
- *Improvement of existing wholesale and retail markets in the cities, as well as district and town level facilities and services for trading.*
- *Enhancement of the capacity of public institutions to improve essential agricultural marketing services and functions.* The MAFF and the MoC should cooperate to provide leadership in the development of agricultural marketing, and develop strong partnerships with private trade associations and NGOs in devising a national market development programme
- *Rationalization of export procedures to promote legal export.* The government must act quickly to reduce or remove all internal regulatory constraints as well as to establish a network that can pool essential trade information.
- *Establishment of credit facilities for all participants in the marketing chain.* The government should enact appropriate banking legislation that facilitates the opening of private banks geared to the need of the traders and processors; and provide credit lines required by the private sector to establish much needed post-harvest, storage, and processing facilities.

- *Government support for the Market Information Service (MIS) to ensure that its operation is maintained even after completion of external aid (from FAO).*

b. Research and Development

The government should target its limited financial and technical resources into research that will enable the country to harness the developmental potentials. This implies formulating a comprehensive research agenda that focuses on location-specific problems and opportunities, and places a premium on coordination, collaboration, and concerted effort.

There is also a need to depart from the traditional commodity-specific outlook and move to an integrated production systems or resource-based orientation which can support vertical integration of agricultural production activities (i.e., from irrigation to farm mechanization, to primary post-harvest operations, up to tertiary processing of farm products and their by-products).

For accelerated and sustained growth of agriculture, a comprehensive R&D programme for developing irrigation systems should be formulated and relentlessly pursued. There should be greater investment in the training of R&D personnel and improvement of facilities that support the agenda. Greater participation of intended end users is also implied if R&D activities are to be attuned to the needs of diverse farming communities.

c. Delivery of Extension Services

The government is currently developing a national extension policy framework. However, the proposed delivery system, which involves a network of district level extension agents, may not be appropriate given financial, technical, and institutional constraints. In the short and medium term, it would be more appropriate to disseminate information through existing channels or media.

The institutional mechanisms or arrangements for the shared responsibilities of the technical departments of the Department of Technique, Economics and Extension (DTEE) and the MAFF, meanwhile, should be made explicit, with an eye to strengthening these linkages. The processes connecting research and extension should also be strengthened.

Since it is not feasible to supply the extension system with location-specific research in the short and medium term, the initial focus of research and extension services should be on the identification, testing, and adaptive modification of promising technologies developed outside of the country. This is especially true in the case of agro-industrial extension services (e.g., assistance on the design and specifications of post-harvest and processing facilities).

d. Input Supply and Distribution

A national seed programme with greater private sector participation must be developed. The relatively poor distribution of inputs can also be improved through a rehabilitation of the local road system. There should be greater effort exerted in the monitoring of both quality and quantity of inputs.

e. Credit

The strategy for the financial sector should be focused on the following areas:

- *Training for National Bank of Cambodia (NBC) officials, other government policy makers, and credit operators.* This should include exposure visits to Southeast Asian countries (for NBC officials and policymakers), and training in diverse fields such as best practices and methodologies (for credit operators).

- *Technical assistance to develop and refine credit policies and legislation and create an appropriate regulatory framework for microfinance institutions.* This is needed in the feasibility study of the RDB, research that should include identification of the demand for the bank's services and an assessment of its operating plans. For most credit operators, technical assistance must be focused on mentoring nascent rural credit programmes of local NGOs. The more mature operators will require assistance in the area of transforming these credit schemes into formal microfinance institutions.
- *Mobilization of loan capital for the expansion of the sector.* Greater emphasis should be placed on mobilizing domestic savings rather than depending on external grants or loans.

Other activities that can support the development of the microfinance sector include the establishment of a Credit Operators Association that could be used as a vehicle for capacity building, coordination, and self-regulation; and the formation of Technical Working Groups among credit operators to communicate with the NBC on specific technical issues such as performance and reporting standards as well as licensing procedures.

f. Farm Mechanization

A combination of four-wheel and hand tractors should appropriately supplement the traditional methods of using animal-drawn plows and carts for field preparation and farm transport. As a matter of principle, mechanization should not be pushed in Cambodia; it should rather be demand-driven based on the realities of labour demand and supply conditions in relation to the cropping cycle. Public institutions can facilitate appropriate mechanization through provision of technical advice to farmers and bankers on the choice of machinery.

For the long-term, a national mechanization plan should be formulated. Such a plan should be based on in-depth analysis of the mechanization needs of a modernizing agriculture, the capability of local machinery manufacturers, the availability of raw materials for fabrication, the feasibility of machinery pooling, and the need to strengthen after-sales service of farm machinery. Analysis of mechanization needs should be oriented towards farming or production systems to fully exploit the multiple use of machines or their components.

g. Post-harvest Facilities

Existing rice mills should be upgraded to save about 6 to 8 percent of rice output, while better drying, bulk handling and storage facilities, and product quality management should be established. There must also be continued testing and evaluation of performance of post-harvest facilities and quality of farm products and their by-products.

The lack of inexpensive small-scale feed and food processing equipment and technologies ought to be addressed through relevant R&D activity. But given the constraints, a good starting point in solving this problem is to introduce (for testing and adaptive modification) promising technologies and equipment developed abroad. Emphasis should be on secondary and tertiary processing and the local manufacture of simple farm machines such as power tillers, threshers, trailers, and pumps.

h. Provision of Other Essential Social Services and Public Goods

The joint use of water transport (e.g., rivers and man-made canals) with rural roads in light of increasing availability of small engines (prime movers of pumps) that can power boats should be reexamined. Storage and warehousing requirements at strategic locations to house projected rice export volumes in a gradually modernizing agricultural sector must also carefully assessed.

The emphasis on groundwater irrigation can improve the potable water supply situation for most farming villages. Whenever necessary and feasible, the installation of STWs and hand tube-wells (HTWs) should also be for the purpose of providing alternative sources of domestic water supply.

6. Direct Support and Protection to the Poor

Direct entitlement-enhancing programmes such as the WFP's "food-for-work" projects and emergency food targeting should be maintained. Given current trends, such programmes do not need to be expanded, although some flexibility is desirable to tackle emergencies when they arise.

Cereal banks, which have already exhibited some degree of success in stabilizing household consumption, should be established in villages suffering from very high yield fluctuations. The institutional capability to create and operate such schemes, however, has to be strengthened.

Special safety nets that enhance the competitiveness of small farmers and fisherfolk, especially those who produce commodities that are likely to be included in the county's sensitive list (e.g., some vegetables, legumes, fish, and livestock) under the AFTA scheme, should also be provided. Tariffs collected during this grace period provided by AFTA can be earmarked for the funding of safety nets.

7. Empowering the Poor

For the poor to be truly partners in progress, they should be given access to production resources, which can be in the form of land ownership or claims over the use of common property resources. Another way to empower them is to guard their health and nutrition—labour being the most basic asset—through provision of public goods such as safe water and health services and credit.

So that the fruits of development might be distributed more equitably, issues concerning land titling and distribution, access to common resources, health, nutrition, and credit must be swiftly addressed. Instead of holding a separate strategic reserve, which is costly, government should instead designate financial facilities for emergency rice procurements. With the membership of Cambodia in the ASEAN in the near future, Cambodia will also be able to draw on the organization's food security reserve, which for a small country may be quite adequate.

Introduction

Background

Emerging from nearly three decades of war resulting in death, destruction, and lost opportunities to participate in the rapid growth of Southeast Asia, Cambodia now faces enormous development challenges. With a per capita income of US\$291 (1996), the country remains one of the poorest in the region and continues to lag behind its neighbors in terms of socio-economic development indicators relating to education, nutrition, health, and sanitation. Among the 174 nations covered by the latest survey applying the Human Development Index (a composite index of life expectancy, adult literacy, and adjusted real gross domestic product per capita), Cambodia ranked a dismal 140th.¹

The main cause of the low level of human development has been pervasive poverty. Roughly four out of 10 Cambodians live below the official poverty line. Poverty afflicts mostly the rural population, especially agricultural households. Many small, marginal farmers still do not produce enough food despite notable progress in rice production over the past few years while non-farm employment opportunities have been limited. Widespread rural poverty, poor transportation, marketing constraints, and internal security problems—all these have created an atmosphere of insecurity in the country today.

Poverty alleviation and sustainable food security are therefore fundamental policy objectives of Cambodia and listed high in the country's priority agenda under the first *Socio-Economic Development Programme 1996-2000* (SEDP).² Food security has been identified as the medium-term objective of the agricultural sector. The 1997-99 *Public Investment Programme* (PIP) has clearly recognized that sustaining increases in economic growth and reducing poverty depends heavily on improving the growth performance of agriculture and developing the sector's downstream processing industries.

Yet employment opportunities and economic activities outside of agriculture that can lift the rural poor from poverty are extremely limited. Even within the sector, rice production alone does not alleviate the problem. Experiences of other countries in Asia (e.g., the Philippines, Vietnam, Thailand, and Laos), for instance, have shown that farmers who fail to diversify their crops remain poor despite improvements in technology.

To ensure that every Cambodian has reliable access to adequate food supply, the Royal Government of Cambodia (RGC) has formulated a development strategy that focuses on poverty reduction through employment generation, improvement of transportation, and removal of marketing constraints, with special provisions for and support given to vulnerable groups in society. The country, however, still lacks a well-focused strategy (i.e., an appropriate policy framework with well-crafted programmes, targets, and resource allocation measures) to realize these goals.

¹ UNDP, *Human Development Report 1998*, Oxford University Press for the United Nations Development Programme, New York: 1998.

² Ministry of Planning, *First Socio-Economic Development Plan 1996-2000*, Phnom Penh: February 1996.

Against this backdrop, the Food and Agriculture Organization (FAO) in consultation with the Ministry of Agriculture, Forestry, and Fisheries (MAFF) formulated a direct technical support activity for Food Security and Poverty Alleviation to be carried out under the United Nations Development Programme's (UNDP's) Support to Policy and Programme Development (SPPD) facility. The SPPD document was signed in July 1997 by UNDP and FAO, the funding and implementing agencies, respectively.

Objectives

The main objective of the SPPD is to formulate a coherent policy framework and craft viable agriculture sector strategies to solve Cambodia's food security problems and alleviate poverty. In addition, the SPPD intends to identify areas of intervention at both policy and programme levels within the framework of the long-term socio-economic objectives of the RGC for agricultural and rural development.

Scope, Design, and Methodology

In order to meet the above objectives, the SPPD laid down the following tasks:

- *To carry out an assessment of the overall development context* as well as the challenges to and opportunities of the Cambodian economy;
- *To analyse the nature, incidence, and causes of poverty and food insecurity* with particular emphasis on agricultural households and other vulnerable groups;
- *To briefly review the macroeconomic, agricultural, and rural development policy* as well as the institutional framework and their implications on food security and poverty alleviation;
- *To assess the resources and potentials for—and constraints to—rapid agricultural growth* in addressing poverty and food insecurity problems;
- *To propose a policy framework and an agricultural strategy* for food security and poverty alleviation; and
- *To recommend sub-sectoral as well as non-agricultural and cross-sectoral policy and institutional measures* to address poverty and food security issues within a "growth-equity-sustainability" framework.

The SPPD was designed to be carried out in full consultation and collaboration with concerned government ministries, national institutions, and non-government organizations (NGOs). Full participation of UN agencies and other development partners of Cambodia in the form of data and advice were also envisaged to profit from these institutions' wisdom on, experience with, and analysis of food security issues. This approach is deemed particularly useful in developing well-accepted and consistent policies, measures, and programmes.

Under the devised work plan, the results of the review, analyses, field investigations, and consultations with relevant stakeholders must be distilled in a draft report containing the initial findings and recommendations. This would then have to be followed by the preparation of the final report taking into account all relevant comments, suggestions, and concerns expressed by the stakeholders involved in policy and programme formulation and implementation.

In accordance with the above design, in January 1998 the FAO Policy Assistance Branch for Asia and the Pacific (RAPP) fielded an inception mission comprising Messrs. D.B. Antiporta, Chief, and P.K. Mudbhary, Policy Officer. It reviewed the planned SPPD to sharpen and focus the scope of work in collaboration with government officials, UNDP, and other related agencies active in the field of food security and poverty alleviation in the country. This inception mission, in consultation with the MAFF, UNDP, and the FAO representative, determined a suitable time frame to field a multidisciplinary SPPD mission.

The SPPD mission comprising six international experts visited Cambodia for three weeks (15 March to 4 April 1998) to carry out the fieldwork. The mission, assisted by three national consultants, aimed to study all technical aspects of the SPPD; and to conduct rapid participatory rural appraisals (PRAs) to assess the potentials and constraints to accelerated food production in collaboration with the FAO/Special Programme for Food Security (SPFS) team. It also intended to present to and discuss with the UNDP, MAFF, and other concerned institutions its preliminary findings and conclusions at the end of the Mission.

During its stay in the country, the SPPD mission collected and reviewed a substantial amount of data and information prepared by government ministries and departments, national institutions, bilateral and multilateral agencies, and NGOs. Moreover, it discussed and consulted with a number of national and international agencies and NGOs on various issues related to food security and poverty.

The group complemented this process of analyses and consultation at the central level with micro-level field studies in the Siem Reap and Takeo provinces. Utilising PRA methods, it directly interacted with a cross-section of farmers, government service providers, NGOs, and key informants to understand the problems and constraints at the farm, community, and provincial levels.

The analysis of the potentials for and constraints to enhancement of agricultural productivity under the SPPD overlaps with one of the objectives of the FAO/SPFS pilot activities (i.e., the participatory constraints and results analysis). In view of this, the SPPD Team conducted the PRA exercise with the backstopping of the SPFS. This exercise produced interesting grass-roots level information about the opportunities and constraints to increasing food production.

At the end of the mission, the SPPD team prepared a debriefing note summarising its preliminary assessment of food security and poverty issues and outlining the policy framework and strategies to overcome inherent problems. Prior to leaving the country, this note was presented to and discussed with the MAFF and UNDP during the mission's separate debriefing with these institutions.

This draft report is based on the SPPD mission's work in the country and the reports prepared by the consultants complemented with further review and analysis under the overall guidance of the Chief, RAPP by Mr. Mudbhary (RAPP Policy Officer/Team Leader). In this regard, the contributions of Dr. Wilfredo David (Irrigation and Farming Systems Specialist) and Ms. M. Debuque (for research and editorial assistance) are acknowledged. The report is intended for review and comments by the government and other stakeholders. It will be the basis for the writing of the final version of the report, which can be used by both RGC and its development partners in policy and programme formulation for addressing poverty and food security in the country.

Overview of the Development Context

Three decades of war and civil strife have left the Cambodian economy in shambles. The long-running internal conflict only led to mass killings, displacement of families from their homes and jobs, and devastation of infrastructure. These have had a severe impact on the country, weaving a distinct social fabric that is now perhaps the most crucial factor to the future development of Cambodia.

During the Khmer Rouge regime (1975-79), one to two million people died from torture, execution, disease, and starvation, virtually depleting the nation of its human resources. Many of those who died in the war had been in their prime work age and relatively well educated. Vast numbers of young adults lost their chance to attend secondary school during that period of turmoil, the missed opportunity manifested today by a dearth of individuals, especially males, in their prime working age (in their 30s) educated beyond the primary level. The long civil strife led to massive social displacement. Land mines that proliferated during the tumult have been held responsible for the large number of disabled people in the country today. Cambodia has one of the highest rates of handicapped citizens in the world with every 30 out of 1,000 persons physically disabled.

However, the country has made significant progress in improving the overall economic, social, and political situation since the formation of the RGC in late 1993. The Cambodian government has established a development and management framework for policymaking, implementation of sectoral strategies, and prioritization of investment. A number of institutional and economic reforms to complete the transition from a command to market-oriented economy are now underway. Private and public investments aided by foreign direct investment and donor assistance have increased with favorable impact on economic growth. The country also held its second general elections on 26 July 1998. The 3-month long deadlock over the formation of a post-election government has finally been resolved with the two major political parties finding a mutually agreeable formula for power sharing.

The Economy

For a nation emerging from a difficult period in its history, Cambodia has managed to chalk in respectable rates of economic growth (see Table 2.1). The economy performed particularly well in the years 1991, 1992, 1995, and 1996, when it grew by an average of over 7 percent per annum. Other macroeconomic indicators have also been very encouraging. Inflation, which averaged about 140 percent in 1990 to 1992, has dropped to single-digit levels. Total investment as a percentage of GDP increased from 14 percent in 1993 to 21 percent in 1996. Gross international reserves grew from \$71 million to \$235 million during the same period.

Table 2.1: Selected Macroeconomic Indicators, 1990-97

Particulars	1990	1993	1994	1995	1996	1997 Estimate
Population (estimated in millions)	8.6	9.66	9.96	10.2	10.7	11.1
Nominal GDP (in US\$ M)	1,115	1,923	2,385	2,923	3,113	3,339
Per capita GDP(in US\$)	130	200	241	284	291	286
Real GDP growth (% increase from previous year)	1.2	4.1	4.0	7.6	7.0	2.0
Real GDP share						
- Agriculture (%)	51.5	46.9	45.1	44.7	42.7	42.8
- Industry (%)	11.6	17.7	18.3	18.7	20.6	20.8
- Services (%)	36.9	35.4	36.5	36.6	36.6	36.4
Inflation rate (%)						
(on final quarter-basis)	152.3	31	20	3.5	9.0	6.0
(annual average basis)	151.5	N/A.	N/A.	7.9	7.1	7.0
Gross Official Reserves (in US\$ M)		71	100	182	235	271
Investments:						
Total investments (in US\$ M)		316.5	465.4	609.7	655.6	718.1
Public investment		96.5	130.4	205.7	204.5	226.2
- Domestic financed		9.0	30.5	23.1	30.6	45.5
- Foreign financed		87.5	99.9	182.6	173.9	180.7
Private investment		220	335	404	451	491.9
- Domestic financed		167	255	304	341	371.9
- Foreign financed		53	80	100	110	120
Total Investment (% of GDP)		14.1	19.5	20.9	21.4	21.2
- Public investment		4.3	5.5	7.04	6.68	6.67
- Private investment		9.8	14	13.82	14.74	14.51
Memorandum Items:						
- Office Development Assistance		327.83	346.90	472.98	491.56	550.00
- Of which Budget Support						
through the Treasury (in US\$ M)		N/A.	43.0	44.0	66.0	66.0
- Exchange Rate (Riel to 1 US\$)		2689	2545	2463	2634	3450
				(December)	(December)	(December))

Source: Economic Unit, MEF, and IMF estimates.

The country's overall budget deficit as a proportion of GDP likewise improved, dipping gradually from 7.7 percent in 1995 to 6.3 percent in 1997. While the country's external debt (which excludes short-term debt but includes obligations to the International Monetary Fund) amounted to about \$2 billion by the end of 1997, or approximately 65 percent of GDP according to IMF estimates, bilateral debt accounted for 86 percent of the total.

The positive performance of the Cambodian economy to some extent owes to the generous flow of external resources into the country in the form of foreign direct investment (FDI) and bilateral and multilateral loans and grants. With the revenue-to-GDP ratio steady at about 9 percent since 1993, some 40 percent of the national government's budget spending has been financed through project aid, budgetary support, and non-concessional loans. The flow of foreign investment also increased over the years with the FDI stock reaching 8.5 percent of GDP in 1995.³ Most of these funds have been channeled into labour-intensive garment production and the tourism industry, mainly in hotels. Tourism is now the most important foreign exchange earner of the country, accounting for almost half of the service sector's total receipts in 1996.

Another encouraging development has been the increased participation of private business in the economy in line with the government's policy of promoting the private sector as the "*prime engine of growth*." From 1993 to 1996, private investment rose from just 9.8 percent to about 14 percent of GDP. Its share in total domestic investment increased from 30 percent to almost 70 percent during the same period.

Overall macroeconomic progress in Cambodia suffered a setback in 1997, a year marked not only by financial turmoil in the Asian region but also by political crises and a worsening of the domestic security situation. The growth rate then was estimated to have dipped to just 2 percent, the lowest figure registered in recent years. By the second half of 1997, total public expenditure was already below the budgeted level, reflecting a squeeze in revenue collection and a decline in external flows. The riel depreciated in value vis-à-vis the dollar by about 27 percent in the second half of 1997 compared to 7.2 percent in 1996.

Poor weather and the Asian currency crisis coupled by lingering political uncertainty during most of the year have led to an economic downturn in 1998. The worsening rural poverty due to a drought, which damaged wet season crops (e.g. rice, vegetables, as well as cash crops), has been one of the major causes of the depression. Another is the cut in sales of Cambodia's leading industries brought about by a fall in global demand and currency devaluations by competitor countries. The regional crisis has also affected the tourism industry.

A comparison of selected data for Phnom Penh in August 1998 with that a year ago shows that consumer spending is drastically down while year-on-year inflation has risen to 13 percent with the price of basic foodstuffs (including rice) rising sharply. The law and order situation, meanwhile, has hurt private investment with most foreign aid now apparently on hold because of political uncertainty. While the official projection for economic growth this year is about 3 percent, some economists say that at this point, any growth would be welcome.

Structurally, Cambodia can be described as a predominantly rural economy that is largely based on agriculture. Eighty-five percent of the population live in the rural areas with 82.5 percent of the rural work force directly employed in the agriculture, forestry, and fisheries sector, which in turn provides direct employment to nearly 80 percent of the total labour force. In 1996, this sector accounted for the largest share of real GDP (42.7 percent), followed by services (36.6 percent), and

³ Toshiyasu Kato, Chan Sophal, and Long Vou Piseth, "Regional Integration for Sustainable Development in Cambodia: Challenges and Options", paper presented at ASEAN-ISIS Conference on Cambodia's Future in ASEAN, 19-20 February 1998, Phnom Penh, p. 5.

industry (20.6 percent). Recent studies in Cambodia show a higher incidence of poverty in rural areas than in Phnom Penh, the capital, and other urban areas.⁴ These indicators point to the importance of agricultural and rural development in achieving sustained economic growth, alleviating poverty, and building food security in Cambodia.

Within the agricultural sector, crops and rubber constitute the bulk of the total value of production (56 percent), followed by livestock (30 percent), fishery (7 percent), and forestry (7 percent). Small-sized farms occupying some 20 percent of the total land area concentrated around the Mekong and Tonle Sap flood plains characterize the local agricultural system. About 2.6 million hectares (M ha), or roughly two-thirds of the cultivated area, is devoted to lowland rice. The country's principal agricultural resources—and its main food supply—are rice and fish obtained from inland sources such as the Tonle Sap. Farmers also plant annual crops such as vegetables, fruit trees, and industrial crops in the uplands and perennial crops such as rubber, coconut, and sugar palms in other areas. Some lands, however, are simply left idle.

In annually cropped areas, productivity levels are often very low, and it is common for only one crop to be planted there in a year. The yield of wet season rice, which accounts for the bulk of crop production activity in Cambodia, for example, was only 1.67 metric tons per ha (mt/ha) in 1996-97. Although this had actually been an improvement over the 1.13 mt/ha recorded in 1992-93, it was way below the 2.7 mt/ha achieved by the country's neighbours. Apart from rice, rubber is another important crop. The current production level of rubber of about 40,000 mt per annum is roughly just a quarter of the peak level attained in 1967 (i.e., before the civil war). This is also less than 10 percent of the potential production of 500,000 mt per annum.⁵

Despite its importance in national income and employment, the agriculture sector has grown slowly in recent years. From 1991 to 1996, the sector grew at just 2.7 percent annually or slightly below the population growth rate of about 3 percent. Agricultural growth was particularly miserable from 1992 to 1994. Although growth in 1995 had been quite impressive at 6.5 percent, rates dipped to about 2 percent in 1996 and 1997, revealing the high performance years of 1991 and 1995 as aberrations. Slow growth and production instability were partly the consequences of low levels of irrigation development and structural constraints such as inadequate transport infrastructure, inefficient marketing systems, illegal taxation, and ineffective public sector support services.⁶

The main source of economic growth averaging about 6.2 percent annually from 1991 to 1996, therefore, has been the non-agricultural sector. Compared to the sluggish growth of 2.7 percent in the agriculture sector, the industry and services sector grew at an average rate of 12.2 and 8.1 percent per annum, respectively, during the same period. The low growth of agriculture plausibly accounts for the very modest decline in poverty (from 39 percent in 1994 to 36 percent in 1997) and the worsening income distribution in Cambodia.⁷

With regard to trade, traditional products such as sawed timber, logs, and rubber remained the dominant export items. But in recent years, nontraditional exports consisting of textile and garment products, which are covered under MFN and GSP statutes, as well as leather and furniture

⁴ Nicholas Prescott and Menno Pradhan, *A Poverty Profile of Cambodia*, World Bank Discussion Paper No. 373, Washington, D.C.: 1997; UNDP/Cambodia, *Cambodia Human Development Report 1997*, Expanded Version, Phnom Penh: November 1997; and James C. Knowles, "An Updated Poverty Profile for Cambodia – 1997: Technical Report", Ministry of Planning, Draft dated 20 March 1998. These studies report poverty estimates based on data from socio-economic surveys conducted in 1993-94, 1996 and 1997, respectively.

⁵ Asian Development Bank, *Country Economic Review: Cambodia*, October 1996.

⁶ Royal Government of Cambodia, *Socio-Economic Development Requirements and Proposals*, May 1997, p. 7.

⁷ Knowles, 1998, *op. cit.*

goods, have started to figure strongly in the trade scene. Exports of these items have grown rapidly because of direct investment by foreigners in the various industries.

Yet even with these developments, the value of domestic exports amounted to only \$298 million in 1996. This is equivalent to the total value of exports (\$659 million) less the \$361 million worth of re-exported goods consisting mainly of cigarettes, motorcycles, beer, and electronic equipment shipped to Vietnam, and gold to Thailand. Retained imports (i.e., net of the imports for re-exports worth \$361 million) amounted to \$749 million, leading to a trade deficit of \$459 million.⁸ Thailand and Singapore were the major destinations of Cambodia's exports.

In recent years, the export share of the European Union (EU), comprising mainly garments, has increased albeit at the expense of member countries of both the Association of Southeast Asian Nations (ASEAN) and the Asia-Pacific Economic Cooperation (APEC). Singapore has been the single largest source of imported products, supplying nearly half of the total in 1995 and 1996. It is followed by Thailand and Vietnam, the two largest neighbours of Cambodia. The share in recorded trade of Lao PDR, another Asian neighbour, has been very small, although substantial informal border trade possibly exists.⁹

Human Development

Human development is defined as a process of enlarging people's choices by expanding human capabilities and functioning.¹⁰ The concept of human development thus encompasses a broader set of human achievements than the ability to attain a certain level of consumption. While freedom from poverty is essential, "the ultimate goal of human development is for people to live long and healthy lives, to be educated, and to have access to resources needed for a decent standard of living."¹¹ The process of human development is, therefore, concerned not only with food security and the eradication of poverty but also with political freedom, human rights, collective well being, equity, and sustainability. Human development goes hand in hand with poverty alleviation. Indeed, enhanced human development is itself a vital ingredient in a meaningful anti-poverty strategy.

A popular yardstick for human development today is the Human Development Index (HDI) of the UNDP, which measures overall achievement of a country in terms of three basic dimensions of human development: longevity, knowledge, and a decent standard of living. The HDI is measured by taking into consideration life expectancy, educational attainment (adult literacy and combined primary, secondary, and tertiary enrollment), and adjusted income (real GDP per capita). The 1998 *Human Development Report* calculates an HDI value of 0.422 for Cambodia and a ranking of 140th among the 174 countries covered by the agency's study.¹² This is the lowest HDI score in Asia with the exception of Bangladesh, Bhutan, and Nepal.

A measure of human development tailor-made for Cambodia generated recently by the UNDP goes a step further by incorporating ten additional indicators of living standards in the

⁸ The World Bank, *Cambodia: Progress in Recovery and Reform*, Washington D.C.: 1997, Table 6.

⁹ The Services Group & International Economics-Washington, "Cambodia: Strengthening the Foundation for Trade & Industrial Development", Final Report Presented to the Asian Development Bank and the Royal Government of Cambodia, Phnom Penh: January 1998.

¹⁰ UNDP, 1998, *op.cit.*, p. 14.

¹¹ UNDP/Cambodia, 1997, *op.cit.*, p. v.

¹² UNDP, 1998, *op.cit.* This, however, represents an improvement over the HDI value 0.348 and HDI rank of 153 in the 1997 Report.

computation.¹³ Using 1996 household survey data, particularly relating to literacy rates, enrollment levels, and life expectancy, a revised HDI value of 0.427 was obtained using this measure. The new figure falls close to that previously reported by the UNDP but is much higher than the HDI value of 0.348 reported in the *Human Development Report 1997*. More interestingly, Cambodia's HDI level appears to be consistent with its per capita GDP.¹⁴

Cambodia has a relatively young population. Of the 10.7 million people recorded in 1996, children (zero to 14 years old) comprise about 44 percent of the total, while citizens between 15 to 65 years old and those over 65 account for the remaining 53 and 3 percent, respectively. Due to the effects of a protracted war, females now outnumber males (52 vs. 48 percent) while the proportion of female-headed household has shot up to about 25.8 percent. There is a particularly low ratio of males to females in the 40 to 44 year old age bracket (i.e., individuals who were in their early to mid-20s during the Khmer Rouge period).

Reports based on the 1993-94 and 1996 socio-economic surveys indicate that nearly four out of 10 Cambodians still live in absolute poverty, lacking adequate income to afford at least 2,100 calories of energy per person per day with some allowance for non-food consumption.¹⁵ An updated poverty profile of Cambodia using newly available data from the *1997 Cambodia Socio-Economic Survey* (CSEC) reports a modest decline in poverty from 39 percent as of 1994 to 36 percent in mid-1997. On a regional basis, the incidence of poverty declined significantly in urban areas outside of the nation's capital (from 37 to 30 percent) and modestly in rural areas (from 43 to 40 percent). Poverty incidence in Phnom Penh remained unchanged at 11 percent. The report also indicates that rural households, particularly those with agriculture as the primary source of income, continue to account for a huge majority of the poor in Cambodia (about 90 percent).

The adult literacy rate is estimated to be about 68.7 percent. This rate is greater in urban areas (80 percent) than in rural areas (67 percent) and significantly higher among males (82 percent) than females (58 percent). In a survey made in 1996, the number of years of schooling for those aged 25 years or older averaged 5.6 years in urban areas and 3.4 years in the rural areas, or a mean of 3.7 years for the entire country.¹⁶ School rates reflect a similar trend. Only 60 percent of school age children in rural areas and 72 percent in urban areas were reportedly enrolled in primary schools that year. For the poorest 20 percent, the enrollment rate was 50.3 percent. The gross enrollment rate at the secondary level was just 31 percent, a figure higher than in Laos (25 percent) but lower than in Vietnam (35 percent) or Thailand (37 percent).¹⁷

Meanwhile, for every 1,000 students who enroll in primary schools today, only 27 are expected to finish secondary school. Females generally have weaker access to lower and upper secondary school resulting in inequitable earning opportunities for women compared to men.

The lower rates of enrollment and years of schooling for the rural poor imply that most people in this sector are incapable of understanding material presented to them in written form, which is the typical method used in educational campaigns and training. Nor can they understand the

¹³ This includes access to water-sanitation, electricity, adequate housing, health services, the status of nutrition (e.g. weight for height of children), diarrhea incidence among children, and school enrollment rates.

¹⁴ UNDP/Cambodia, 1997, *op cit.*, p. 17.

¹⁵ In 1996, this required 35,500 riels, or \$ 18/person/month; see UNDP/Cambodia, *op cit.*, p. v.

¹⁶ Ministry of Planning, National Institute of Statistics, *Demographic Survey of Cambodia 1996*, Phnom Penh: October 1996.

¹⁷ Chan Sophal, Kato Toshiyasu and Long Vou Piseth, "Cambodia in the Regional Economy: A Cross-Country Study", paper presented at the Cambodia Development Resource Institute International Workshop Cambodia: Challenges and Options of Regional Economic Integration, Phnom Penh: October 27-28, 1997.

instructions and warnings on pesticide bottles, or follow simple instructions on the labels of medicine. This lack of access to information sets into motion a self-propelled mechanism for the perpetuation of poverty.

The labour force participation rate for those 10 years or older (i.e., the ratio of the economically active population to the total population) is likewise discouraging, at about 65 percent. According to the latest statistics, approximately 99 percent of the labour force are currently employed.¹⁸ There are indications, however, of underemployment where about 8 percent of those reported to be fully employed are actively seeking additional work. Of the total, unpaid family workers account for 45 percent while own-account workers represent 44 percent. Employees and employers constitute the remaining 10 and 0.2 percent of the total number of workers, respectively.¹⁹

Half of the population of Cambodian children aged zero to five years are malnourished. This is one of the highest ratios among countries in the South and Southeast Asian region and second only to Bangladesh where the comparable figure is estimated to be 60 percent. Of the poorest 20 percent in rural areas, roughly 55 to 65 percent of children within that age group are moderately stunted and underweight.

Malnutrition is prevalent across economic states. About one-third of the children numbering among the richest 20 percent of the urban population are moderately underweight while 21 percent are severely stunted. However, the pervasiveness and severity of malnutrition are still greater among the poor who lack in terms of both amount and quality of food. A large family size, low income, and lack of awareness of nutritional values make a nutritionally balanced diet difficult to achieve. Evidence suggests that while poverty is certainly a major factor, malnutrition might also be closely related to cultural and social factors (e.g. caring and rearing practices) and not just a lack of available food.

Mobility is difficult given present conditions in the country. Most Cambodians live within a kilometre (km) from a passable road. The primary means of transportation of the rural poor are bicycles and oxen carts. Bicycles are used mainly for commuting from village to town or local market, while oxen carts are employed in travelling to farms and forests. Motorbike taxis or car taxis are commonly used to shuttle between villages and provincial towns, as there are neither buses nor an organized system of public transportation. There are few regular transport services between districts and communes of rural provinces and those available are mostly privately organized and chartered. Many communes in remote provinces are often inaccessible during rainy seasons, making even emergency outreach missions difficult.

Fortunately, access to towns and markets of many communes and villages have improved noticeably in the last two to five years, particularly in the northwestern provinces where international aid agencies have targeted their assistance. The improvement is seen in the network of tertiary and secondary roads that have been built with the support of the World Food Programme (WFP) and the International Labour Organization (ILO). Once built though repairs and maintenance of roads become a problem since there is no effective mechanism for such activity.

Cambodians also have very limited access to health services. Only a fifth of the population have an operational health clinic or medical facility in their village. Another one-fifth has to travel five km or more to reach a health facility. Qualified health personnel attended to only 49 percent of

¹⁸ Ministry of Planning, National Institute of Statistics, *Socio-Economic Survey of Cambodia 1996, Volume I: Summary Results*, Phnom Penh: June 1997.

¹⁹ The SEDP has cautioned that the "unemployment figures revealed must also be seen in the light of the predominant family-orientation of businesses. Most family members are accommodated in such family units and thus escape being enumerated as unemployed whereas, in reality, their lot is that of underemployment." (Ministry of Planning, 1996, *op. cit.*, p. 13).

the births in Cambodia in 1990, compared to 95 and 71 percent, respectively, in Vietnam and Thailand. Eighty percent of Cambodian children under 12 months had access to immunization programmes in 1995 but only because of aid given by international humanitarian organizations.

One of the most serious health problems of Cambodia today is the high incidence of HIV-AIDS infection. In 1994, 1.9 percent of adults aged 15 and older tested positive for the infection, the second highest rate in the region next to Thailand (2.1 percent). In 1997, the total number of people infected with the HIV virus was estimated to be between 70,000 and 120,000. Considering the poor state of health services in Cambodia, this number is projected to rise between 500,000 to one million by 2006.

Access to other basic amenities, such as safe water, sanitation, fuel, and housing differs by income group and location. Only 13 percent of the population had access to safe water in 1994 to 1995, while just 14 percent had access to sanitation in 1990 to 1995. In rural areas, piped water and toilet generally do not exist. Even in urban areas, the poor often depend on unprotected wells and springs for drinking water and have no access to toilets. They use firewood for cooking and kerosene for lighting while the rich, particularly those residing in urban areas, have piped water and flush toilets in their homes and use electricity for lighting and charcoal for cooking. The rich typically have 12 square metres (sq m) of housing space per person compared to 5 sq m for the poor.²⁰

As a result of the food and nutrition inadequacy made worse by weak access to health services, water, and sanitation, Cambodia now has one of the highest infant mortality rates (IMR) in the world and one of the lowest life expectancies at birth. Cambodia's IMR of 90 is, along with Laos, the highest in East and Southeast Asia.²¹ The life expectancy at birth is 50.3 years for males and 58.6 years for females. The major causes of mortality or morbidity are malaria, acute respiratory infection, tuberculosis, and diarrhea.

The poor level of human development in Cambodia is consistent with its low per capita income. There are marked differences in the social and human indicators across income groups, provinces, and gender, but in general, the poorest 20 percent of the population suffer the worst possible outcomes. Poverty is concentrated among agricultural households with northeastern provinces and the provinces of Kampong Cham, Siem Reap, and Prey Veng often lagging behind.

Development Challenges and Priorities for Action

The single most important development challenge to Cambodia as correctly identified in the SEDP 1996-2000 is the reduction and eventual eradication of poverty. Massive destruction of physical and human resources and the dismantling of the economy and its institutions during the war might have damped chances for rapid growth, but the country still possesses adequate land, water, and forest resources that it can use to improve economic conditions.

The list of inadequacies in terms of development prerequisites runs long. The country lacks trained labour in all sectors of the economy. The quality of education, particularly at post-secondary levels, is very poor. Majority of the rural population lack access to roads, telephones, health and family planning services, safe drinking water, sanitation facilities, credit, modern agricultural technology, productive inputs, and markets. Low revenue collection limits the coverage and effectiveness of public sector support to private initiatives. Public servants' salaries are low, adversely affecting their motivation and efficiency. The financial system (mainly banks and finance companies) is still in the nascent stage. The nation, now in a multiparty democracy, has experienced several episodes of political crises and is still trying to evolve a stable and workable constitutional framework.

²⁰ UNDP/Cambodia, *op cit.*, p. vii; and Chan Sophal et. al., *op cit.*

²¹ IMR is measured in terms of number of children's deaths per 1000 live births.

The Cambodian government has yet to develop the skill for good governance, one that denotes an efficient, effective, transparent, accountable, and predictable state apparatus that allows private sector to play its part in development on a level playing field. It also needs to foster an environment where property rights are secure and the legal framework sound to facilitate private transactions.

A rapid and unregulated opening up of the economy has reportedly led to large tracts of land being leased out to foreign interests at nominal prices. Similarly, large-scale (illegal) logging has been facilitated. These are just examples of public policy and governance issues that Cambodia must face squarely as it marches ahead within a market-oriented policy framework and integrates into the world economic system. The country therefore faces the complex challenge of rehabilitation, reconstruction, and development, and the need to move on several fronts at the same time.

The nature of Cambodia's problems more or less dictates the priorities for public policy and action. The clear message of the various socio-economic indicators is that broad-based economic growth—the kind that generates jobs—must be achieved for sustained poverty alleviation. Economic progress, however, is an outcome of policies, institutions, internal conditions, and external circumstances. A few policy goals that can be used as guide in promoting growth with equity are as follows:

- *Human resource development.* The enhancement of human resources is critical to poverty alleviation. Education increases the value of labour time, the principal asset of the poor. It raises the productivity of both formally employed and self-employed workers and thus boosts their income earning potentials. Access to other social services such as health and family planning, safe drinking water, and sanitation should be improved because of their direct implications on productivity and incomes of the population.
- *Agricultural development.* Poverty being a largely rural phenomenon, agricultural development based on improvements in the productivity of small farms ought to be emphasized. In particular, the development of small irrigation systems owned and managed by farmers and the use of improved technology, inputs, and efficient marketing systems should be encouraged. Access to credit should also be improved.
- *Promotion of private sector participation.* Emphasis on private-sector led growth should continue. This trend can be strengthened through administrative and institutional reforms, provision of public goods, development of the banking system, and improvement of marketing systems and transport infrastructure.
- *Non-inflationary growth.* To protect the poor, the country's macroeconomic policy framework should strive for growth unaccompanied by an escalation of prices, particularly of basic items such as food, fuel, and shelter. To this end, principles that stress outward orientation and competitiveness should be in the blueprint when rebuilding the local economy.
- *SME promotion.* Small and medium agro-based and non-agricultural enterprises should be given due importance and given a niche in the economy. Such ventures can be promoted through the provision of credit, technical, and marketing support.
- *Support for targeted groups.* Appropriate programmes and safety nets targeted to selected groups should be designed and implemented. These can provide direct employment or transfer income to the poor to enhance their access to food, education, and other social amenities and to address poverty and food insecurity in both the short and long term.

Food Security and Poverty Issues

For over three decades, Cambodia has faced chronic food shortages and widespread malnutrition. Rice yields in the country have been one of the lowest in the world. Even today, modern cultivation practices are rarely adopted. Despite significant progress, rural infrastructure bears all the hallmarks of destruction, disrepair, and neglect that accompany a protracted war.

It is therefore perfectly understandable why poverty and food security continues to be a principal area of worry of local policy makers. Interest in such issues gained momentum only in the late 1980s with the dismantling of the socialist, command-type economy and the introduction of trade and structural reforms. The fear then was that complete withdrawal of government support in food procurement and distribution could curtail access to food, especially of the more vulnerable social groups. Until now, that anxiety remains.

This section provides an analytical review of the status of poverty and food security in the country at the national, provincial, and household levels, and attempts to thresh out the relevant issues. The discussion serves as basis for the development of an appropriate poverty alleviation strategy to be outlined in a succeeding chapter.

Defining Poverty and Food Security

Poverty is more than physical deprivation. It has social and psychological effects that prevent people from realizing their potentials. A concise and universally accepted definition of poverty is elusive. But despite many shortcomings, most analysts follow the convention of regarding poverty as a function of income levels. Therefore, the incidence of poverty is often referred to in terms of the portion of the population that does not have enough income to purchase a reference food bundle yielding a specified amount of calories per day and to accommodate a modest non-food allowance.

Food security, on the other hand, has been defined as a situation "when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food, and to meet their dietary needs and food preferences for an active and healthy life."²² The three ideas underlying this definition are adequacy of food (effective supply), ample access to food (i.e., the ability of the individual to acquire sufficient food or effective demand), and reliability of both supply and access.

From the above definitions, a close link between poverty and food insecurity is obvious. Poverty is the biggest cause of food insecurity. Although largely a result rather than a cause, food insecurity can contribute to the perpetuation of poverty by precipitating unsustainable survival strategies.

²² FAO, *Rome Declaration on World Food Security and World Food Summit Plan of Action*, World Food Summit, 13-17 November, Rome, Italy.

Poverty Incidence and Status in Cambodia

The database on poverty estimates and socio-economic conditions has improved considerably in recent years with the publication of results of three national household socio-economic surveys. This body of data has made it possible for researchers to estimate national poverty levels as well as to compute the HDI for the first time.

The definition of poverty and the method of estimation used to generate local poverty statistics are similar to those applied elsewhere in the region and are based on a calorie norm of 2,100 calories per capita per day. Constructing the poverty line and in turn determining individual "food poverty status" involves finding the value of a food bundle that can provide the appropriate level of calories (i.e., the bundle determined by the food composition pattern of the middle income quintile of the population) and then comparing this with individual income or expenditure. A similar method is used to estimate an "expanded" poverty line, only this time allowing for some non-food consumption.

Baseline poverty estimates are based on surveys detailing expenditure patterns and socio-economic characteristics.²³ In the 1993-94 *Socio-Economic Survey of Cambodia* (SESC), for instance, some 5,578 households were covered nationally. Using gathered data, values of the expanded poverty lines were computed separately for three geographical categories: Phnom Penh (1,578 riels/day), other urban areas (1,264 riels/day), and rural areas (1,117 riels/day).

The poverty analyses indicated a greater incidence of poverty in rural areas (43 percent) than in Phnom Penh (11 percent) or other urban areas outside of the capital (37 percent). Overall poverty incidence was estimated at 39 percent, a figure similar to that of Vietnam and Laos. Twenty percent of the population were classified as "food-poor" or incapable of meeting daily basic calorie requirements even if entire consumption were devoted to food.²⁴

The survey conducted in 1993-94 also showed that poverty incidence was highest among households headed by farmers (46 percent) but low for households headed by civil servants (20 percent). Poverty rates were revealed to be inversely related to levels of schooling. Female-headed households, meanwhile, were less likely to be poor than were male-headed households.

Inequality in consumption expenditure was seen to be greater in urban areas than in rural areas. In urban areas, the richest 10 percent of the population accounted for 30 percent of total consumption expenditure while the poorest 10 percent consumed less than 3 percent. The Gini coefficient (a measure of inequality based on the Lorenz curve) computed for Cambodia was estimated at 0.38, implying a low degree of inequality. This is near corresponding levels registered by neighbouring countries such as Laos (0.32), Indonesia (0.32), and Vietnam (0.34).²⁵

The 1997 CSES uses a similar sampling procedure as the 1993-94 SESC but includes more households and villages than the latter. About 6,010 households are covered in this survey. Using the latest data, the expanded poverty line for 1997 is estimated at 1,819 riels per capita for Phnom Penh, 1,407 riels for other urban areas, and 1,210 riels for rural areas.

²³ The truncated nature of the 1993-94 survey is regarded as an important feature affecting its comparability with subsequent surveys - see Knowles, 1998, *op. cit.*

²⁴ Nicholas Prescott and Menno Pradhan (1997), *op. cit.*, p. 22. Two caveats must be sounded at this stage: (a) the manner in which poverty has been estimated tells us what proportion of the population earns enough to meet minimum consumption needs, which may be quite different from the proportion *actually* consuming at or below that level; and (b) estimates of poverty are found to be highly sensitive to even small changes in the poverty line, suggesting that the margin of error may be wide. One implication of this is that the bulk of the poor are concentrated very close to the poverty line, suggesting that even modest income transfers will have a large impact on the poverty situation.

²⁵ Prescott and Pradhan (1997), *op. cit.*, pp. 13-14.

Poverty estimates indicate both positive and negative trends over a three-year period, from 1993-94 to 1997 (see Table 3.1). For Cambodia as a whole, the head count index fell by 3 percentage points based on the expanded poverty line. The largest decline occurred in urban areas apart from Phnom Penh in which no improvement happened. However, the measures that are sensitive to income shortfalls as well as to the distribution of living standards among the poor (i.e., poverty gap and poverty severity), changed very little or remain unchanged. However, given the problems of comparability in the data sets for the two periods (due primarily to differences in geographical coverage, especially for rural areas), not too much should be made of these small changes.²⁶

The 1997 poverty estimates indicate persistence of rural poverty, particularly for households with agriculture as the primary source of income. Such households now account for 90 percent of Cambodia's poor. The estimates also confirm earlier findings with respect to the important role of educational attainment of the household head in determining economic status and show that three-fourths of the poor are self-employed.

Table 3.1: Poverty Estimates, 1993-94 and 1997

	Head Count (%)		Poverty Gap (%)		Poverty Severity (%)	
	1993-94	1997	1993-94	1997	1993-94	1997
<u>Food Poverty Line</u>						
Phnom Penh	6.2	3.4	1.3	0.5	0.4	0.1
Other Urban	19.6	15.4	4.4	3.3	1.4	1.1
Rural	21.9	20.0	4.0	3.9	1.1	1.2
Total	20.0	17.9	3.7	3.5	1.1	1.1
<u>Expanded Poverty Line</u>						
Phnom Penh	11.4	11.1	3.1	2.2	1.2	0.6
Other Urban	36.6	29.9	9.6	7.5	3.6	2.7
Rural	43.1	40.1	10.0	9.7	3.3	3.4
Total	39.0	36.1	9.2	8.7	3.1	3.1

Source: James C. Knowles, "An Updated Poverty Profile for Cambodia – 1997: Technical Report", Ministry of Planning, Draft dated 20 March 1998.

The SESC and CSES data point to some improvements in real consumption expenditure across income groups (see Table 3.2). Real per capita consumption increased by 8 percent in Phnom Penh, by 16 percent in other urban areas, and by 8 percent in rural areas.

These gains, however, were not proportionately distributed across income groups. In contrast to a 1.7 and 4.2 percent uptick, respectively, in consumption per capita for quintiles 1 and 2 (i.e., the poorest 40 percent), per capita consumption of quintiles 4 and 5 (i.e., the richest 40 percent) grew by about 11 and 18 percent. Moreover, the gap between real per capita consumption of the richest 20 percent and the poorest 20 percent widened from 1993-94 to 1997. These findings signal a worsening income distribution, particularly in the nation's capital and in rural areas.²⁷

²⁶ Knowles, 1998, *op. cit.*, p.28, has pointed out "...the poverty estimates... including the qualitative conclusion of an overall decrease in poverty, are quite sensitive to certain key assumptions made..."

²⁷ Interestingly, the share of food in total consumption expenditure also increased at a higher rate for the richer quintiles than the poorer quintiles, a finding generally inconsistent with the Engel's law but not implausible if the income elasticity of demand for higher-priced quality food is high in Cambodia.

Table 3.2: Per Capita Consumption by Quintiles, 1993-94 and 1997

Quintile	Real per capita consumption (riels/day)		Food share as a proportion of total consumption	
	1993-94	1997	1993-94	1997
1 - Poorest	963	979	0.75	0.75
2	1356	1413	0.71	0.73
3	1721	1849	0.69	0.70
4	2307	2557	0.66	0.68
5 - Richest	4962	5852	0.57	0.62

Source: *ibid.*

Table 3.3 further reveals deterioration in income distribution in Cambodia. Data show that the share of the poorest 10 percent of the population in consumption expenditure actually declined while that of the richest 10 percent increased. Therefore, the overall Gini coefficient increased by about 10 percent. The inequality widened in Phnom Penh and rural areas while it remained unchanged in other urban areas. These results imply that the rich appear to have benefited more than the poor have, a finding quite consistent with the 1950s development literature where increased inequality was hypothesized to be but a natural consequence of growth.²⁸

Table 3.3: Inequality in Consumption Expenditures, 1993-94 and 1997

	Gini coefficient	Share of bottom 10 %	Share of top 10 %
<u>Phnom Penh</u>			
1993-94	0.39	2.5	31.2
1997	0.46	2.6	40.3
<u>Other Urban</u>			
1993-94	0.44	2.7	36.7
1997	0.44	2.7	37.6
<u>Rural</u>			
1993-94	0.27	4.4	22.9
1997	0.33	3.7	27.1
<u>Total</u>			
1993-94	0.38	3.4	32.8
1997	0.42	3.0	35.3

Source: *ibid.*

Characteristics of the Poor

A clear understanding of the underlying causes of poverty is important in designing appropriate strategies and policies to combat this scourge. Available information indicate that households or individuals fall below the poverty line and stay in that unfortunate position because of poor education, lack of employment opportunities, and poor access to markets and credit due to infrastructure or institutional weaknesses.

Studies have as well highlighted distinct circumstances that often accompany poverty. Understanding these variables could provide equally valuable insights on how to improve the lot of

²⁸ The validity of this hypothesis has been seriously questioned with considerable empirical evidence showing that a trade-off between growth and equity is not inevitable.

the poor. At the very least, gleaning relationships could aid in identifying and targeting vulnerable groups.

In the following paragraphs, summary data of demographic characteristics and asset holdings based on the 1997 CSES are compared across income or socio-economic groups (i.e., quintiles). This is done to highlight the possible correlation between these variables and a household's economic status (see Table 3.4).

Table 3.4: Social Indicators by Per Capita Consumption Quintiles, 1997

	Quintiles					
	1 - Poorest	2	3	4	5 - Richest	All
Household size	5.8	5.4	4.9	4.6	4.2	4.9
Children per family	2.8	2.4	1.9	1.7	1.4	2.0
Elderly per family	0.3	0.3	0.3	0.4	0.4	0.3
Disabled	2.32	2.17	2.00	2.38	2.58	2.30
Age of head	42.9	43.1	44.0	44.9	45.1	44.1
Female head (%)	20.7	21.7	21.0	25.6	26.1	23.3
Adult Literacy (%)	56.2	61.9	66.2	70.5	74.4	65.9
Education, adults (yr.)	2.7	3.2	3.7	4.2	5.0	3.8
Bicycle (%)	55.4	60.4	58.0	58.9	54.1	57.3
Motor Vehicle/cycle (%)	8.7	13.0	16.4	25.6	38.8	21.8
Access to piped water (%)	19.5	18.6	18.5	22.8	32.6	22.9
Toilet in house (%)	4.0	10.4	13.0	22.5	37.3	18.7
Electricity (%)	3.3	6.5	10.8	19.1	35.6	16.3
Radio (%)	27.7	32.9	36.9	43.8	56.1	40.7
TV (%)	3.0	4.8	7.0	12.7	35.9	20.6

Source: *ibid.*, constructed from data in Table 7.1.

Household Size and Characteristics of Household Head

Poor households tend to be larger and have more children. There does not appear to be any variation across socio-economic groups or expenditure classes in terms of the distribution of aged or disabled members. This pattern is seen in both SESC and CSES data.

Household heads are generally less likely to be female but more so for poor households. Of the poorest 20 percent of the population (quintile 1), a little over a fifth of the total number of households are headed by women compared to 26 percent in the richest 20 percent (quintile 5). Female heads of poor households also tend to be younger than female heads of rich households.

Education and Literacy

There are very significant differences in educational levels and years of schooling across per capita consumption states with a tendency for the gaps to widen over time. Adults in the poorest 20 percent of the population had 2.7 years of schooling on average compared to five years for those in the richest 20 percent. Significant gender differences in literacy are not evident across socio-economic groups.

Housing and Consumer Durables

Housing characteristics are a good indicator of socio-economic status as this varies sharply across socio-economic states.²⁹ The extent of access to piped water and conveniences such as toilets within the house and electricity also diverges across economic groups, leading some observers to claim that these amenities could be used as indicators to target the poor.³⁰ Applying such variables as a gauge, however, might not be appropriate since most of the observed differences are actually due to sharp rural-urban differences. Hence, while these factors could serve to locate the urban poor, their efficacy in locating the rural poor is very limited.

Significant improvements in terms of ownership of items such as radios, televisions, and motorbikes have occurred from 1994 to 1997 for all socio-economic groups with the richest segment of the population enjoying the largest gains. Again, these indicators are more useful in locating the rich and the non-poor rather than the poor.

Nutrition

Malnutrition rate differentials appear to be high between rural and urban areas although gender differences are insignificant and differences across socio-economic groups mild. The incidence of child malnutrition is significant even in the richest 20 percent of the population, suggesting that malnutrition is actually caused by an interplay of several factors, including social and cultural norms.³¹

There are significant provincial differences in the incidence of malnutrition. Nine provinces account for 75 percent of severely malnourished children. The highest rates of occurrence are in Kompong Cham, Kandal, Takeo, Prey Veng, Siem Reap, and Kompong Thom.

Food Security: Macro Issues

Supply and Demand Scenario

The growth rate in rice production has picked up considerably in recent years. Yields rose from about 1.3 mt/ha in 1993-94 to 1.8 mt/ha in 1997-98. The area planted with rice also increased somewhat (from 1.82 to 1.88 M ha over the same period) although total acreage today remains well below the pre-Khmer Rouge period. Thus, despite a high population growth rate of around 3 percent, a small rice "surplus" emerged during the three-year period since 1993.

Table 3.5 shows that despite year-on-year variations, the country achieved an overall rice "surplus" in 1995—the first time in decades—and this was sustained for roughly two years. The current crop year 1998-99 though is a different story.

²⁹ This refers to living space and construction material of roof, walls, and floor.

³⁰ Knowles, 1998, *op. cit.*, p. 41.

³¹ Thirty-four percent of children from this group were found to be moderately under-weight and 21 percent severely stunted, see UNDP/Cambodia, 1997, *op. cit.*

Table 3.5: Rice Surplus and Deficit in Selected Years

Period	Gross Production (unhusked rice '000 tons)	Net Available (milled rice '000 tons)**	Requirement (milled rice '000 tons)	Surplus/Deficit (milled rice '000 tons)
1993-94	2,383	1,356	1,539	-183
1995-96	3,448	1,817	1,588	229
1996-97	3,458	1,779	1,618	162
1997-98	3,414	1,757	1,653	104

Source: Ministry of Agriculture, Forestry, and Fisheries.

** In calculating net availability, a 17 percent allowance is made for leakage (e.g., gross production for seed and animal feed, and post-harvest losses), and a milling ratio of 62 percent is used. The estimate of requirement assumes per capita consumption of 151.2 kg per annum. Actual consumption, however, can differ from this norm depending on the changes in price and income.

Despite having been in a comfortable position with respect to rice availability in "surplus" years, many Cambodians lack access to food supply due to insufficient purchasing power, poor transport systems, and marketing constraints. Moreover, the agricultural production system in Cambodia remains highly vulnerable to weather shocks and pest damage. Farmers who reside in regions with greater uncertainty in rainfall have had to contend with drastic fluctuations in yields. In addition, internal security problems have created groups that are vulnerable to food insecurity (e.g. internally displaced or disabled households).³²

Moreover, despite a snug situation on a national level, performance at the province level varies considerably (Table 3.6). While a number of provinces suffer from perennial food deficits (e.g., Kandal, Kompong Cham, Kompong Speu, and Koh Kong), some generally tend to be in a surplus (e.g., Prey Veng, Takeo, Svay Rieng, Siem Reap, and Battambang). Only a few have experienced very rapid growth (Prey Veng and Takeo) while the others have typically stagnated. Although a number have managed to transform themselves from deficit to surplus areas (e.g., Pursat, Kompong Chhnang, and Kampot), some provinces continue to suffer from chronic shortfalls (Banteay Meanchey and Ratanakiri).

While this is almost self-evident, it must be emphasized that availability of food supply is a necessary condition for food security though it is not a sufficient one. Further, a situation of steady supply is clearly preferred to stabilize food prices and inflation and improve real incomes of the poor.

Cambodia's success in attaining a degree of self-sufficiency despite weak infrastructure, low adoption of modern technology, and a rapidly increasing population points to considerable potentials of the agricultural sector. With the already high levels of per capita consumption, realizing these possibilities will ultimately be determined by the country's ability to expand exports and diversify the agricultural system.

³² Ministry of Agriculture, Forestry and Fisheries, 1996, *op. cit.*

Table 3.6: Per Capita and Total Food Surplus/Deficits by Provinces, Selected Years

(Total Surplus/Deficit in '000 mt)											
		1992-93		1993-94		1995-96		1996-97		1997-98	
Province		Kg/cap	Total	Kg/cap	Total	Kg/cap	Total	Kg/cap	Total	Kg/cap	Total
Phnom Penh	U	-152.1	-112.8	-155.8	-141.8	-141.4	-	-141.9	-127.7	-141.5	-118.9
							121.0				
Kandal	D	-33.0	-29.3	-36.6	-32.5	-18.1	-17.5	-24.0	-23.7	-42.0	-42.4
Kompong Cham	D	-59.7	-86.0	-41.9	-59.2	-38.1	-57.6	-9.5	-14.3	-43.9	-69.0
Svay Rieng	S	38.6	16.7	27.8	12.2	87.1	41.3	99.7	49.4	72.0	35.2
Prey Veng	S	-5.7	-5.4	1.1	1.0	141.3	139.9	103.8	103.4	75.1	74.3
Takeo	S	79.4	55.2	117.0	73.3	154.8	116.6	149.2	111.0	233.4	182.9
KompongThom	D	16.6	7.8	-20.6	-10.1	2.3	1.3	6.5	3.8	-30.2	-18.4
Siem Reap	S	16.1	9.5	26.8	16.0	8.9	32.4	1.9	13.0	20.0	14.1
Battambang	S	-53.9	-33.5	24.8	15.6	65.9	47.2	32.7	23.4	14.0	9.9
B. Meanchey	M	15.2	6.1	29.6	12.3	-7.5	-4.1	31.8	17.1	-1.1	-0.6
Pursat	S	-58.5	-21.1	-23.1	-6.7	19.7	6.4	26.7	8.9	55.8	20.0
Kg. Chhnang	S	31.3	10.0	-0.5	-0.16	76.1	26.6	51.3	19.0	81.4	31.4
S.Ville	U	-83.5	-6.7	-91.9	-7.6	-71.1	-6.4	-83.9	-10.6	-100.7	-13.6
Kep		NA	NA	NA	NA	-65.6	1.7	-70.4	-1.9	-73.2	2.1
Kampot	S	-6.0	-2.7	-14.6	-6.6	67.9	35.1	55.6	29.5	87.8	48.0
Koh Kong	D	-87.1	-4.1	-112.8	-7.7	-94.1	-7.0	-102.6	-10.5	-92.6	-9.1
Kg. Speu	D	-75.8	-35.5	-57.6	-27.2	11.3	6.3	0.2	0.1	-41.6	-23.3
Preah Vihear	D	-98.0	-9.8	-4.0	-0.4	77.3	0.9	-45.1	-4.8	-39.7	-4.4
Stung Treng	D	-27.5	-1.6	2.21	0.1	16.7	1.2	-10.4	-8.7	-61.3	-5.0
Rattanakiri	M	-108.4	-7.0	-41.7	-2.9	4.0	0.3	-11.7	-1.0	31.3	2.6
Monduliri	M	-41.5	-0.9	-55.4	-1.3	43.3	1.1	-25.0	-0.7	20.7	0.6
Kratie	D	-26.8	-6.1	-40.4	-9.3	-49.1	-11.2	-55.3	-13.1	-32.2	-8.0
Total		-27.3	-257.1	19.3	-183	21.8	229.4	15.1	161.6	9.5	104.1

Note: Figures are based on MAFF estimates, which are generally higher than FAO/WFP estimates (MAFF, various years). Key: S = surplus, D = deficit, M = marginal, U = urban

Consumption

Basic consumption refers to the adequacy of food intake levels. In the context of a country like Cambodia, the question of adequacy can be examined in terms of the conventional calorie norm of 2,100 calories per capita per day (adopted by the FAO) that should ideally be availed.

According to the 1993-94 SESC, all income groups except for the poorest 40 percent in urban areas are consuming more than the FAO calorie norm on average (see Table 3.7). The level of calorie intake per capita across income strata is higher in rural areas (ranging from 2,135 calories for the poorest quintile to 2,659 calories for the richest quintile) than in urban areas (1,892 calories for the poorest 20 percent to 2,657 calories for the richest 20 percent).

There is greater divergence across income groups in urban areas than in rural. However, calorie intake variations are drastically reduced for both urban and rural areas if the richest fifth is not considered (see Table 3.7). It can also be observed that variance in the quantity of rice consumed by different socio-economic classes is almost negligible. Available micro-level evidence lends additional support to these findings.

A recent study on rural food security based on village surveys, for example, concludes that there is "a lack of a systematic and clear difference in total calorie consumption across social groups," and that "this suggests that a static estimate of calorie-intake may not be a good indicator of poverty in the Cambodian context, and may well confound (direct) poverty measures based on food-energy norms."³³

³³ K.A.S. Murshid, "The Status of Food Security", paper presented at a conference on rural food security, Phnom Penh: 1997, p. 11.

Table 3.7: Average Daily Per Capita Calorie Intake in Rural and Urban Areas by Expenditure Quintiles, 1993-94

	1- Poorest	2	3	4	5- Richest	All Households
<u>Rural</u>						
Total calories	2,135	2,150	2,379	2,326	2,659	2,330
Calories from rice	1,621	1,578	1,705	1,645	1,738	1,664
<u>Urban</u>						
Total calories	1,892	1,950	2,052	2,215	2,657	2,153
Calories from rice	1,381	1,333	1,290	1,300	1,403	1,359

Based on UNDP/Cambodia (1997), Table IV.5.

The UNDP report comes to a similar conclusion in pointing to a decline in the share of food expenditures of the poorest 20 percent of the population (from 72.6 percent to 65.6 percent) between the years 1993-94, and 1996.³⁴ "Since this is the economic group most likely to suffer from food insecurity and inadequate consumption, the fact that this group experienced a decline in its food share suggests that the food consumption of the poorest Cambodians was probably not inadequate to begin with," the report noted. The relative lack of variation by class categories is likewise consistent with findings in other countries where income elasticities of demand for nutrient intake are revealed to vary little across income groups.

On average, calorie intake in Cambodia appears to be adequate in terms of the standard FAO norm save for the poorest 40 percent in the urban areas. (It should be noted that averages imply that there are significant numbers below this level as well). Hence, adequacy of rice consumption is not an important issue at the moment. It could be even argued that rice consumption is actually "excessive," accounting for over 70 percent of calories and representing about 40 percent of food expenditures.

The predominance of rice in the local diet is in fact a major issue concerning malnutrition, especially of young children, and pregnant and breast feeding women. One reason is that rice has low caloric density such that these vulnerable groups might not be able to consume enough calories to meet their energy needs. Another is that rice taken alone lacks important nutrients such as iron, thiamin, and vitamin A. Women and young children are particularly susceptible to diseases like anemia and beriberi associated with deficiency in these vitamins. This suggests that even with adequate rice consumption, malnutrition may still prevail.

The pervasiveness and severity of malnutrition are undoubtedly greater among the poor because they lack in terms of both the amount and quality of food. As mentioned above, the poor generally have large households with many young children. Households in the poorest group spend 73 percent of their meager income on food. Having a small budget makes diverse food combinations difficult—being poor, the first aim is to fill the family up with the lowest priced food possible. Rice is the cheapest and most filling. The main non-rice food consumed is fish or fish-paste because of a relative abundance in the country. Fruits and vegetables are consumed infrequently and in very small quantities.³⁵

³⁴ UNDP/Cambodia, 1997, *op. cit.* p. 30. Recently available data from the 1997 CSES show that food share has reverted back to the levels of 1993-1994 for all quintiles, revealing the essentially sensitive nature of food consumption, in this case, perhaps to a sense of heightened political instability (see Table 3.7).

³⁵ UNDP/Cambodia, 1997, *op. cit.*, p.

The issue of food security is particularly relevant for small and landless farmers in Cambodia. Among small farmers with landholdings of 1 ha or less, only a few can produce food enough to last the whole year, even a good one. Consumption needs of a family of five are estimated to translate to about 1,300 kilograms (kg) of paddy using the WFP norm of 160 kg of rice or 260 kg of paddy per year for each person. The average yield of rainfed rice is about 1.2 mt/ha or less in many areas where the soil is of poor quality. Even discounting post-harvest losses, and even if a portion of the yield is not kept aside as seed for the next season, this amount is barely enough to meet a family's consumption needs.

Most small farmers often have to endure rice deficits for a period of one to six months in a year.³⁶ The "lean" months come between June to October or the stretch between planting time and the new harvest. In order to bridge these moments, many families borrow money from local moneylenders, often at high interest rates. This way, debt becomes a cyclical problem for many small farmers, further eroding future food security.

While outright destitution is not widespread, a hard core group of between 5 to 15 percent of households can be described as facing food insecurity with another 15 to 20 percent managing to attain minimum consumption levels albeit at a high cost—indebtedness and recourse to risky coping strategies.³⁷ Thus, from a dynamic point of view, what matters is not just attaining adequate consumption levels but determining to what extent this adequacy is sustainable and at what cost it is achieved. A point to note here is the high dependence of many households on commercial rice given inadequate and uncertain production. Village studies have reported that market purchases constitute between 25 to 90 percent of total rice consumption depending on agro-ecological and socio-economic circumstances.³⁸

The composition of non-food expenditures has serious implications for food consumption because of the potential tradeoff between the two. There is strong evidence that the single most important component of non-food expenditures is health, which alone accounts for over 50 percent of total non-food expenditures or equivalent to about a quarter of total food expenditures.³⁹ These proportions are even higher in poor households. Next in importance is repayment of debt comprising mostly loans used for consumption or to meet medical bills.

Factors Influencing Food Security

Factors influencing the socio-economic state of households can be quite diverse. In Cambodia, conditions leading to food insecurity include chronic poverty, rapid population growth, weak access to arable land, stagnant growth of per capita food output, poor infrastructure, inadequate nutritional knowledge, presence of ecological constraints, prevalence of disease, poor water and sanitation conditions, and political conflict. To simplify matters and to aid policymaking, one can compress these determinants into three broad categories: ownership or access to resources crucial to food production, income opportunities of individuals, and participation in markets.

³⁶ WFP Poverty Mapping Report 1995 indicates the average landholding in "food insecure" areas lacking food 3 months or more in year to be 0.75 ha.

³⁷ K.A.S. Murshid, "Food Security in a Transitional Economy – The Case of Cambodia", CDRI-UNRISD, Phnom Penh-Geneva: 1998.

³⁸ See Murshid (1998) *op. cit.*; Helmers et. al. "An Evaluation of the Participation of Poor Households in World Food Programme Food for Work Projects in Cambodia" and "Poorer Cambodian Rural Households Participating in Food for Work", 1997; FAO, Reports of Rapid Rural Appraisal in Ta-Om Sar, Kok Russey, O-Ta, and Krasa Thom, Phnom Penh: 1995.

³⁹ See Murshid, 1997, *op. cit.*, p. 12 and Helmers et. al., *op. cit.*

Review of available literature, field investigations, and consultation with people involved in relevant fields suggest that the most critical factor of production in Cambodia—one that is typical to any agrarian economy—is access to and ownership of agricultural land. But since there are a number of households relying on non-agricultural sources of income, the generation of opportunities for gainful employment and a strengthening of access to markets and credit are equally important in ensuring the poor their rightful share to a decent life. This section discusses the crucial factors that determine the level of food security in Cambodia.

Ownership and Access to Land

Most Cambodian families have control over land for rice cultivation, even if only for small plots. Large landholdings are relatively uncommon. Land ownership in rural areas varies by region with the size of the property ranging between 0.5 to 1.0 ha per household. The average land size for the 2 million farm households in Cambodia is about 1 ha, but in areas identified as high risk in terms of loss of food security, the average size is 0.75 ha.

Although nationwide data on the distribution or extent of landlessness is not readily available, the proportion of landless households is believed to be generally low in Cambodia. According to the WFP's 1996 poverty mapping, only 8 out of 100 communes surveyed had a rate of landlessness of 20 percent or greater. There are regions where landlessness is believed to be prevalent, however, such as the northwestern part of the country where there is reportedly a high count of rebel returnees and internally displaced people.

There are also indications of considerable inequity in land distribution.⁴⁰ Forced evictions and sales have been reported in Phnom Penh and other urban centers noted for tourism such as Siem Reap, Sihanouk Ville, Kam Pot, and Kep, and in areas desired because of profitable concessions and for commercial exploitation in the northwestern part of the country. Taking advantage of a weak regulatory framework, poor enforcement of property rights, and widespread rent-seeking, large landowners that include the army or individual officers, international agribusiness conglomerates, and other such powerful groups have reportedly taken over vast tracts of both agricultural and forestlands over the past few years. These groups are said to be motivated primarily by the profit potentials of timber extraction and land speculation.

Under a regime of economic liberties, central authorities have reportedly awarded a number of large commercial concessions, specifically in the mountainous northeastern area of the country where the soil is fertile and the forests rich. These actions are said to be in conflict with the indigenous people's customary rights of ownership. Several concessions had already been signed without the knowledge of existing communities and without offering a venue for consultation. Pending timber concession areas span 1.4 M ha in the Northeast Cambodia covering most of Ratanakiri's forest area, home to 75 percent of that province's population. Many of these pending projects are expected to result in eventual relocation of indigenous communities.⁴¹

Clearly, the landless are particularly vulnerable to food insecurity. Aside from the victims of vested interests, many of the landless in Cambodia today belong to groups of special circumstance that altogether missed out on the land distribution process. These are the people who had fled to border camps, the Khmer Rouge captives, those who had been subjected to forced labour or conscripted by the Pol Pot regime, and other displaced individuals and families who were never able to receive private housing plots or establish rights to agricultural land.

⁴⁰ See Murshid (1998) *op. cit.* Based on a sample of households drawn from three regions in Cambodia, the top 10 percent accounted for 33 percent of the land while the bottom 10 percent owned only 3.7 percent. The associated Gini coefficient was 0.47, a figure that is closer to South Asian standards rather than Southeast Asian standards.

⁴¹ Sarah Colm, "Options for Land Security Among Indigenous Communities: Ratanakiri, Cambodia", Non-Timber Forest Products Project, Banlung, Cambodia: May 1997.

The window of opportunity for land ownership had opened during the downfall of the Khmer Rouge regime in 1979 when local authorities began allocating land and houses on a wide scale. The maximum size of agricultural land per family was then pegged at 5 ha with decisions about size based on household size and composition. Private ownership of land was legally reintroduced in Cambodia in 1989, when it was declared that all Cambodians could own, use, and inherit land granted by the government and guidelines governing the initial distribution of land rights were issued.

The State of Cambodia Land Law, which provides a broader framework for ownership, transfer, and registration of land, was passed in 1992.⁴² Although this legislation does not recognize claims to property rights made before 1979, it allows citizens to acquire ownership rights over land they have peacefully occupied for five straight years. This method of establishing ownership applies to those whose holdings of land have not been recognized by a certificate granted under the 1989 decree. The five-year period begins the day the commune chief makes a written record of the application although it is not clear if this requirement is always implemented in practice. Official recognition of occupancy and family use of land generally appears to be sufficient. Temporary possessors, meanwhile, are entitled to transfer some or all of their rights to the property by succession, will or contract.

The process of land titling and registration in Cambodia is a bit cumbersome though. So far, only 10 percent of the applicants have been granted certificates of ownership, and until now these land title certificates are still of a temporary nature. According to the government's Land Title Department, these certificates need to be tied to cadastral surveys and maps before final titles can be issued.

The main benefit of a land title is that it gives the holder access to formal credit and security of future tenure. As the role of credit widens in the future, the lack of formal land titles can become a major constraint to investment in land improvement and productivity. This early, it is already emerging as a major obstacle to commercial land development in and around urban areas and, in the context of a free economy, to the growth of land markets in general. While it is not a problem of the farming community at present, land disputes are bound to multiply with increasing commercialization, urbanization, and competition.

Income Flows

The ability of a household to ensure food security depends on the level, structure, and stability of its income flows. In Cambodia, an overwhelming majority depend upon agriculture, fishery, and forestry as the major source of livelihood with most local farmers reliant upon subsistence farming and foraging. The average peasant household obtains food and generates income through a combination of activities such as farming, hunting, fishing, and gathering of wood. Other supplemental sources of livelihood are livestock raising; primary processing of agricultural, forestry, and fishery products; odd jobs; and vending.

The sources of livelihood vary considerably across regions and socio-economic states. Research by the Cambodia Development Resource Institute on food security reveal that the relative importance of agriculture varies dramatically across area types (see Figure 3.1).⁴³

In areas benefiting from rapid agricultural growth and a surplus (production above consumption requirements), for instance, agriculture accounted for around 50 percent of total incomes with labour earnings coming in second, and non-agricultural sources third. Income derived

⁴² Josh Sondheimer, "Land Law and Land Disputes", Training Materials, Cambodian Court Training Project, 1995-96.

⁴³ Murshid, 1997 and 1998 *op. cit.*; and Chim Charya et al, "Learning from Rural Development Programmes: Comparative Analysis", Learning from Rural Development Programmes Conference, Ministry of Rural Development and Cambodia Development Resource Institute, Phnom Penh, 17-18 March 1998.

from common property resources such as natural water bodies and forests fell closely behind, proving these subsistence activities to be just as important a source of income in that their contribution to earnings was just about equal in size to that of male wage labour.

But in deficit areas enduring large fluctuations in yield or in deeply flooded regions where fishing is combined with rice production, agriculture accounted for just a minor share of total incomes (about 16 to 18 percent). These levels are near female labour earnings or income derived from common resources.

For the poor, specifically the land poor, income is generated based on a diversified portfolio that typically involves the sale or exchange of labour (especially for females), petty trading, retailing, and processing activities. The poor earn from the daily buying and selling of goods such as fish, homegrown vegetables, edible leaves from the forest, palm sugar, and firewood transported between villages and markets. It is the women who are mainly involved in vending consumer goods. They do this on bicycles, travelling from village to village, typically earning between 2,000 to 5,000 riels per day. Animal raising is not a popular source of livelihood due to a high incidence of livestock mortality.

In rural areas, a number obtain their food and livelihood from common territories such that fish and other aquatic foods account for much of the protein intake. A 1994 study by the UNICEF on family food production showed that in Cambodia, 87 percent of rural households were engaged in the harvesting or gathering of fish, crabs, frogs, snails, and green leaves, and 14 percent hunted wild animals and insects such as birds, snakes, and beetles.⁴⁴

While hunting and gathering might yield significant benefits for people in various socio-economic states, these have become a vital source of food and income for the poor. Such dependence is worrisome given the high degree of uncertainty that characterizes such activities. The reliability of hunting and gathering as livelihood source, after all, depends heavily on access to forests and fishing grounds and the agro-ecological character of the area.⁴⁵

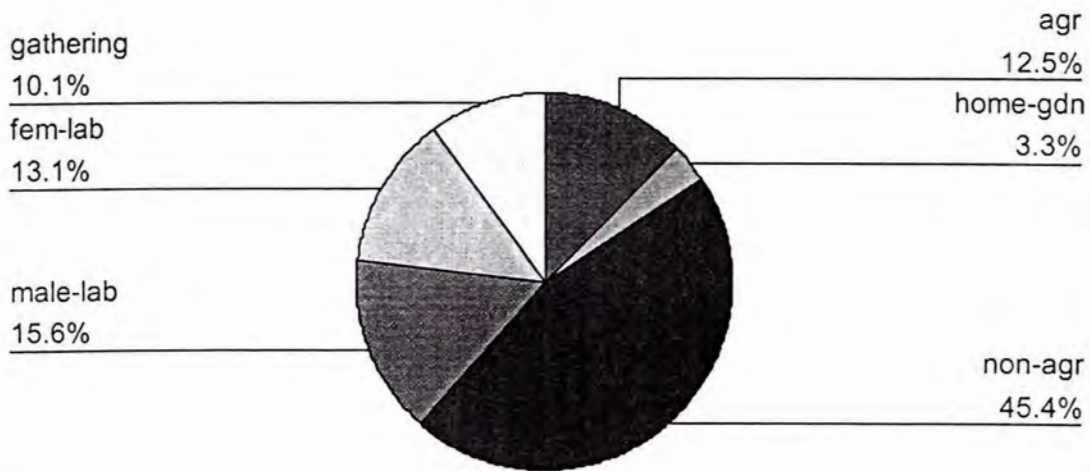
⁴⁴ UNICEF, "Report on Food and Nutrition Surveys in 1993-94", UNICEF - Family Food Production. Phnom Penh: 1994, p. 19.

⁴⁵ Helmers et al., 1997, *op cit.*

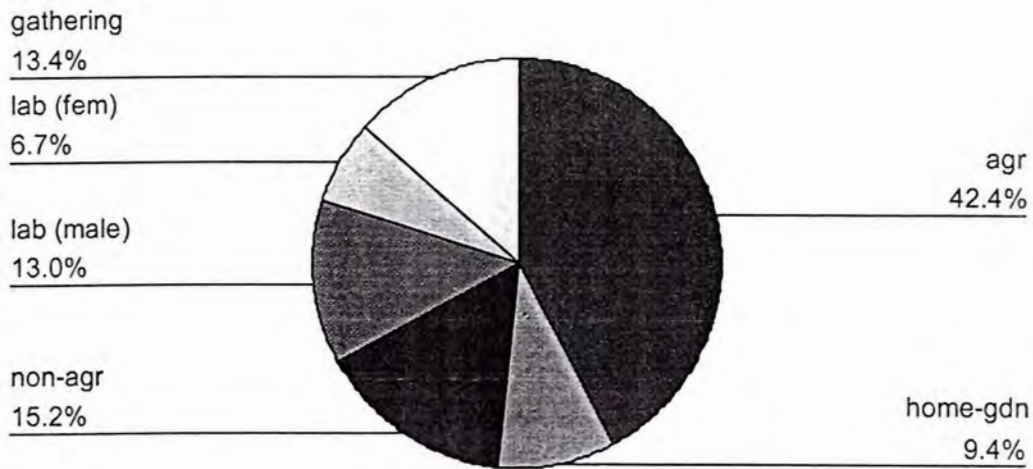
Figure 3.1

Income Shares by Source

Deficit Area



Income Sources: Surplus

Source: Murshid, 1998, *op. cit.*

Opportunities to earn farm wages (which vary from 1,500 to 3,000 riels/day) are similarly limited. Although small and landless farmers can easily find work during the rice-planting period, jobs are scarce outside farming season. Other employment opportunities available are casual jobs in mong bean and lotus farms, fishing lots, and village kilns, and pond digging.

Because there are not enough jobs to go around, unemployment is often high during the dry season. People are forced by circumstance to migrate seasonally to Phnom Penh or to other provinces, or to smuggle themselves into Thailand. Many sell their cattle and land to pay middlemen who can help them across the border. The minimum daily earnings in Thai farms just across the border are two to three times what local farmers can earn at home assuming they are lucky enough to find a job.

Farm incomes can hardly be described as stable under present conditions. While direct household level data on the variability of agricultural incomes are not available, sharp fluctuations in yield particularly in areas without water control (i.e., irrigation and drainage systems) and where cropping systems are not diversified point to a high level of uncertainty of income flows. Earnings derived from common property resources, meanwhile, show higher instability as livelihood source compared to returns from wage labour, which are relatively constant. Uneven access to land has generated sharp inequalities in agricultural incomes, but earnings from the labour market to some extent offset these discrepancies.

Market Participation

Food security also depends on a household's ability to participate in markets and engage in a complex set of social and economic relationships that characterize exchange. These dynamic aspects of food security presented are presented below in terms of the country's asset, labour, and credit markets.⁴⁶

The Asset Markets

Land

There is significant land market activity in Cambodia, but principal players in this market are mostly groups that have managed to corner vast tracts of land through rent-seeking behavior and because of a poor system for the protection of property rights. In recent years, large-scale land grabbing by these entities has created a unique pattern in rural areas with two distinct features: a peasant-subsistence sector and a nascent commercial sector believed to be very large and growing. Yet despite its size, the latter has not been able to channel substantial investments into land development, as the principal motivation has been profitability of timber extraction and land speculation.

Quite surprisingly, volume and turnover of land transactions involving the peasant sector have not been insignificant, though in a negative sense. In the past five years, 11 to 13 percent of total land available changed hands. The rich and well off were the net buyers while the poor were the net sellers. From this perspective, it appears that the poor are gradually losing access to the most important factor that determines food security.

Livestock

There were 2.8 million cows and 700,000 buffaloes in Cambodia in 1996, according to the Department of Agriculture.⁴⁷ On average, nearly half of the households in a village have a pair of draft

⁴⁶ The discussions in the following sections have drawn substantially from Murshid 1998, *op.cit.*

⁴⁷ Department of Agriculture, *Battambang Provincial Agriculture Profile*, Battambang Province, 1997.

animals, mainly cattle. Families also keep small livestock such as chicken, which are kept largely for home consumption, and pigs, which are raised for both home consumption and cash. Nearly all households have chickens while about 30 percent raise pigs even though these are often unprofitable. Contagious diseases are widespread among livestock with several thousands of pigs and chickens lost to sickness each year. Only cattle are covered by preventive vaccination services from the government.

Ownership and trade in cattle and pigs seem to be concentrated in the hands of the better off households. In terms of market share, the rich account for over 80 percent of market purchases and sales. Poor households, particularly those headed by females, are mostly restricted to the ownership and trade of chickens and ducks. The value of sales are generally found to be higher than that of purchases, indicating that profits accrue mostly to the non-poor. The livestock market, therefore, does not appear to be a significant source of income or profit for poorer households, basically small-scale operators.

Lease/Rental

One possible way for the poor to overcome the disadvantages of having inadequate resources is to participate in the lease or rental market for land, animals, and trees. Although significant activity has been reported in these markets, transactions mostly benefit the non-poor who are the primary players.⁴⁸

The Labour Market

The rural labour market is complex, heavily segmented, and rapidly changing. Wages are paid on a workday or job-contract basis with evidence of gender differences in wage rates. Payments for contract labour are in cash or kind (e.g., a share of the harvest) for a specified volume of work. Farmers also exchange labour with their neighbours, friends, and acquaintances. This is an extremely important form of labour sharing in that it is predominantly—though not exclusively—performed by women. Variants include exchange of labour (typically female labour) for credit or exchange of labour for draft animals. The central element of such exchanges is reciprocity which, depending on the parties involved, can be very specific in terms of mutual obligations or very vague.

Despite significant differences in labour market conditions, some trends can be identified. The most salient one is the increasing dependence of the poor on wage labour as a source of income. When local labour demand conditions are adequate, "out" migration becomes noticeably small. This is true for surplus areas where introduction of modern rice cultivation has increased the demand for labour, raised output, and heightened economic activity. In contrast, migration emerges as the attractive option in the face of inadequate or dwindling labour demand.

Other developments that have reinforced dependence of the poor on the formal labour market are increasing pressure on common property resources because of greater exploitation, adverse shifts in the pattern of commonly accepted rights over these common resources, and growing inequality in land and asset holdings. These trends have also begun to alter the traditional division of work between males and females and have ushered in more formal wage contracts in the labour market, replacing older practices such as labour sharing and mutual exchanges.

The Credit Market

The nature and extent of financial intermediation is of particular interest to rural households. Financial markets possess a crucial role in smoothing consumption and ensuring food security given uncertainties inherent in agricultural production, wide fluctuations in income, a high incidence of

⁴⁸ The animal rent market is an exception, providing some benefits to poorer female-headed households.

shocks such as illness and accident, and a paucity of reserves in the form of savings and food stocks especially in poor households.

There is a high incidence of participation in credit markets reported in Cambodia with participation rates invariably greater for poorer households. Overall, the percentage of households that reports outstanding debt ranges from 63 to over 90 percent. For poor households, the incidence is much higher at 89 to 94 percent.

Currently, people living in rural areas have limited access to capital. Commercial banking institutions are virtually nonexistent in most rural areas, the state-run provincial banking system (with only 21 branches) practically moribund. The absence of rural banking facilities and staff with experience in rural finance is considered a major institutional constraint to progress in the agricultural sector.⁴⁹

With limited access to financial services, people in rural areas are forced to rely on moneylenders to purchase essential inputs and meet short-term exigencies. The cost of credit in the informal money market is normally high with nominal interest rates ranging anywhere between 10 to 30 percent per month (although there is some degree of interest-free borrowing and lending among close relatives). There is also a clear and systematic difference in rates charged to rich and poor households, varying from 53 percent for the rich to as much as 170 percent for the very poor.

In large part, the high cost of credit can be traced to the nature of the borrowing with the predominance of distress loans for emergency rice purchases or to treat illnesses. For the poorest households, 95 percent were borrowers in the preceding four months (from the time interviewed), 70 percent claimed they needed the money to purchase rice, while 20 percent invoked health-related circumstances as the primary reason.

Crises and Coping Strategies

A number of trends with regard to coping mechanisms have been identified at the village and the household levels. These are best thought of as responses to external developments affecting the rural economy.

Liberalization has sped up the introduction of new technologies (e.g. new rice varieties, irrigation, and chemical fertilizers) which in turn has affected the pattern of agricultural labour demand. Profound changes appear to be unfolding in the structure of the labour market. There has been a move away from labour exchange to wage labour with cash paid on a daily or piece-rate basis; traditional gender roles with respect to work have started to break down as more and more women engage in heavy labour such as earth-work and construction; and migration has been on the rise as both men and women leave their homes in search of jobs. At times, their desperate situation leads them to venture to dangerous areas. For example, in the wake of the drought-induced food shortages of recent months, dozens of hungry people searching for food in the forests of northwest Cambodia were reportedly maimed by landmines while several died from eating poisonous tubers.

There is also mounting pressure on common property resources as poor households attempt to stabilize consumption and income by intensifying efforts to generate food and cash (e.g., travelling greater distances to collect firewood or wild-vegetables, a larger number of full-time collectors and hunters, use of more sophisticated traps and equipment).

Perhaps the most worrisome sign in the horizon is the rising inequality in asset ownership, which is closely related to identified trends of migration, labour market transformation, and increased

⁴⁹ FAO, *Cambodia Agricultural Development Options Review, (Phase 1)*, Annex 1, Investment Centre, Rome: April 1994, p. 9.

pressure on common resources. The ability of households to face and respond to crises cannot be seen in isolation from these broader patterns of change in the national and rural economy.

The Structure of Crises

The structure of crises is roughly similar irrespective of area or region. Problems typically encountered are crop failures, illnesses, accidents, death of a household member, death of animals, loss of an asset, indebtedness, and losses due to swindling or cheating.

Complaints regarding health and illnesses are the most common. Illnesses often reported are "serious fever," asthma, tuberculosis, malaria, typhoid, dengue fever, and hypertension. In numerous cases, illnesses hasten distress sale of food stocks (paddy), land, or animals, and encourage borrowing at high interest rates. The cost of ill health and sickness cannot be assessed merely in terms of expenditures and the manner in which these are financed but also in terms of the considerable opportunity cost of workdays lost and earnings foregone.

In addition to the above, households face a variety of hazards including theft of animals, gambling loss, fire, and accident. However, it is important to note the kinds of crises faced more regularly or which are more threatening to a given household. Not surprisingly, the predominant type of problem in the short term relates to health. Even within a five-year period, majority of households identified health emergencies as the most critical, followed closely by crop failures.

The ability of a household to respond to adverse forces depends on its capacity to command resources. For poor households, this is an obvious constraint since they have to choose from a narrow set of alternatives. In the absence of savings and other resources, they depend mainly on labour assets (which is why migration is often resorted to), increased efforts in gathering and hunting activities, on distress sales of assets (if any), and borrowings. Frequently, the labour, credit, and grain markets can become interlocked, forcing the poor to undersell their labour (especially of females) just to repay consumption loans. The rich tend to respond by reducing their savings, selling jewelry, or at worst disposing of an animal.

The fact that all groups report high levels of support from relatives and friends as well as access to interest-free credit though suggests that rural social and kinship bonds are not only alive and well but also thriving.

Targeting the Poor: An Operational Question

The advantage of targeting as a policy tool for poverty alleviation is obvious. Success, however, depends on the ability to identify the poor in an efficient manner. In view of the costs and benefits of alternative modalities of targeting for poverty alleviation, choice of an appropriate method is important. The criterion should be achieving the greatest poverty reduction for a given budget or at the least cost for a specified reduction target.

Geographical targeting can be a cost-effective means of reaching the poor if poverty is geographically concentrated and targeting based on a means test (e.g. income) becomes costly due to administrative limitations. As such, there have been attempts recently to provide poverty estimates disaggregated at the provincial level using data from available household surveys.

There are four sources of provincially disaggregated data that can be used for targeting purposes: the Cambodia-specific HDI, provincial information on child malnutrition, rice surplus-deficit status reports, and the commune level ranking of poor areas by the WFP in its "food-for-work" projects. Considering the limited number of observations available at the provincial level from the household surveys, however, the disaggregated estimates of poverty should be treated with caution in a statistical sense. Nevertheless, they are the best estimates available and are useful for designing programme

interventions. Among the four sources of data, the WFP database appears to be the best in terms of selecting poor communes and villages.⁵⁰

The Cambodia-specific HDI has been estimated by UNDP for all provinces from data gathered during the 1996 SESC.⁵¹ This measure is based on the aggregation of ten different indicators of living standards (compared to four in the case of the conventional HDI), facilitating the design of policy interventions in the short run by capturing a wider dimension of social, human, and economic characteristics of the population.

The ten provinces with the lowest HDI ranking in Cambodia are Monduliri, Siem Reap, Kompong Thom, Stung Treng, Koh Kong, Kep Ville, Ratanakiri Pursat, Banteay Meanchey, and Prey Veng. Half of these (Monduliri, Ratanakiri, Stung Treng, Koh Kong, and Kep Ville) are remote provinces with low population densities. Three have modest population densities (less than 24 to 64 persons per sq km), namely, Siem Reap, Kompong Thom and Pursat. Only Banteay Meanchey in the far north and Prey Veng have large densities.

Further examination of province level data from other sources mentioned above shows that the degree of overlap for the three different measures (child malnutrition, rice surplus-deficit status, and WFP ranking) is not high. Only one province, Kompong Thom, is included in all three indicators. One can argue that provinces that perform poorly in at least two out of the three province level indicators and which number among the ten provinces with lowest HDI rankings in Cambodia deserve to be included in a priority list. These are Kompong Thom, Prey Veng, Siem Reap, Banteay Meanchey, Ratanakiri, Monduliri, and Stung Treng. Three provinces in the UNDP ranking (Koh Kong, Kep Ville, and Pursat) and Kompong Cham, Kandal, Kompong Speu, and Kratie performed poorly in two of three indicators mentioned above. These provinces can be included if the net is extended further.

The actual and final selection of target areas will depend heavily on the type of intervention suggested as well as the character and economic potential of the target areas. From the viewpoint of cost-effectiveness, more densely populated vulnerable provinces may be selected first. Another important consideration is that targeting devices should be designed to be "incentive compatible" such that only those who are truly poor benefit. This maximizes resources by preventing leakage to the non-poor (i.e., those who do not "need" external aid). In addition to geographical targeting, self-selection mechanisms can be employed, for example, by generating employment that attracts only the poor or subsidizing foods consumed only by the poor.

Food Security and Poverty: Critical Issues

In terms of calorie intake, consumption levels in rural Cambodia appear to be adequate though highly unbalanced in terms of other nutrients. However, for the poor, this state can only be described as precarious, sustained by risky coping behavior such as sale of labour and assets in times of distress, increased participation by women in the formal labour market, migration, and borrowing at high interest rates. An agricultural and rural development-oriented strategy aimed at poverty

⁵⁰ The WFP methodology and targeting exercise has been fine-tuned over a number of years. The targeting exercise was conducted in 558 communes (i.e. 43 percent of communes) in 16 out of 21 provinces (including the provinces identified above). The targeting index is based on five sets of variables: crop production and landlessness, diversity of income sources, personal wealth, avoidance of risky coping strategies, and village assets. Targeting by MRD/WFP is a geographically based ranking exercise with allocations (of food-aid) targeted to communes with the lowest rankings in terms of the index. In addition, food-aid is given to technical support projects, TB and leprosy patients (with MOH/WHO collaboration), and supplemental programmes (e.g. birth spacing, literacy programmes, rehabilitation projects).

⁵¹ See UNDP/Cambodia, 1997, *op. cit.*, pp. 20-21.

alleviation and food security must therefore address a number of underlying concerns. Some of these are just means to achieve an end while others are ends in themselves. These include:

- *Inequity.* There is growing evidence of emerging inequality in asset ownership and of consequent marginalization of agricultural households, making access to productive resources a major issue. To make matters worse, traditional access to common property or open access resources has been rapidly eroded. Although such developments are expected of a market-oriented economy, the evolution of an equitable society is no less desired, as there is growing empirical evidence showing that equitable distribution of income is crucial for achieving sustainable economic growth.
- *Low productivity.* Productivity in agriculture remains one of the lowest in Asia despite improvements in recent years. Production is also subject to wide fluctuations leading to instability of agricultural incomes with grave consequences for food security.
- *Poor health.* The problem of ill health and morbidity deserves to be singled out as a separate category as it causes loss of income for the poor due to missed labour days and can lead to highly unequal credit relations, asset loss, migration, and perpetuation of the poverty cycle. Coexistence of a high incidence of malnutrition with poor health and hygiene conditions in Cambodia (and the complex interactions between these factors) indicate the need to address these issues together rather than separately and to closely link the solutions to the country's agricultural development strategy.
- *Nutritional imbalance.* The Cambodian diet is overly dominated by rice although some nutritional diversification is achieved through hunting and gathering activities engaged by households. This vital source is already under threat, however, because of intensified hunting and gathering efforts and adverse changes in the property rights regime. In any case, such activities are not reliable or desirable mechanisms for attaining a balanced diet since they are not only risky but can lead to excessive exploitation of natural resources. Alternative means of livelihood to ward off food emergencies at the household level have yet to be identified and promoted.
- *Weak infrastructure and institutions.* Another concern is the basic weakness in infrastructure, human resources, and institutions. It is therefore necessary to invest in roads and communications, skills training and education, and institutional development. Strategies put forward should be pragmatic, taking into consideration constraints in terms of implementation and execution.

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VIII. Economic Policies and the Institutional Framework

Macroeconomic Policy

Though the process of rebuilding started immediately after the Pol Pot regime had been overthrown in 1979—with modest attempts at reforms initiated in 1985—the Cambodian economy remained predominantly a centrally planned economy until the signing of the Paris Peace Accord in 1991. Economic reforms gathered momentum only in the early 1990s when the IMF began to support the country under the Systematic Transformation Facility and later under the Enhanced Structural Adjustment Facility (ESAF). But since then, the drive for change has remained vigorous with major reforms widely expected to continue. The country is presently implementing a number of stabilization and structural adjustment measures under the Policy Framework Paper for 1997-99 agreed with the IMF.

Within the broad development objective of achieving a just, fair, and peaceful society and raising the living standards of its citizens, the Cambodian government presented through the 1996-2000 SEDP an integrated medium-term programme for national development within the context of a market economy. In this economic blueprint, the main agenda for socioeconomic development in the country was identified to be the establishment of the rule of law and of an impartial judicial and enforcement system; the creation of an effective, transparent, and accountable bureaucracy; and the pursuit of policies that promote economic progress, sustainable growth, equity, and social justice.⁵²

In addition to articulating national development objectives, the SEDP outlined programme goals that must be met by 2000 as well as sectoral strategies that should be followed. To further implement these strategies, a "rolling" three-year investment programme (the PIP) was prepared listing the priority investment needs of the country for the periods covered within the National Public Investment Management System (NPIMS).⁵³

As part of the reform process, Cambodia took big steps towards liberalizing the economic environment. The reform programme had four major thrusts: (1) to transform the economy from a highly regulated to an open system; (2) to reduce the role of government in economic activities; (3) to promote a market-based economy with private sector as the driving force; and (4) to stabilize macroeconomic aggregates. The agenda involved, among others, the deregulation of foreign exchange markets (to allow the riel to find its equilibrium value), the adoption of anti-inflationary monetary and fiscal policies, the liberalization of trade, and the opening up of the economy to local and foreign private investment.

Various policies to increase public and private investment, improve the efficiency of resource allocation, and enhance Cambodia's competitiveness are in place or have already been proposed. These include tax and administrative reform, privatization, legal and regulatory changes, human resource development measures, proposals to restructure the banking and finance system, and the creation and rehabilitation of critical economic and social infrastructure.

⁵² Ministry of Planning, 1996 *op.cit.*, p. 2.

⁵³ Royal Government of Cambodia, 1997, *op. cit.*

Reforms were primarily aimed at encouraging rapid output growth by removing constraints to the efficient use of resources and by making Cambodian products more competitive via the introduction of improved technology and management and the creation of a policy environment that rewarded investors and private entrepreneurs. While no less noble a motivation, the Cambodian government also undertook these changes to pave the way for the country's entry into the ASEAN and the ASEAN Free Trade Area (AFTA).

These initiatives have led to steady movement towards a more open and liberal system. There has been phenomenal growth in private sector activity both in the agricultural and non-agricultural sectors over the past several years. The economy responded favorably to the change, attaining an average economic growth rate of 6.2 percent per annum from 1991 to 1996. Growth, however, had been mainly driven by the garments and services sectors and small industries and not by traditional sectors such as rubber and timber. The contribution of the agriculture sector to overall growth was disappointingly less than 3 percent.

Against this backdrop, the medium-term macroeconomic objective has been to achieve a sustained growth rate of 7 percent with continued reform in various economic sectors. The government intends to follow conservative monetary and fiscal policies and encourage direct foreign investment by adopting non-discriminatory policies. In addition, the current policy framework emphasizes progress in public and private resource mobilization to finance investment, strengthening of factor markets to boost efficiency of investment, enhancement of the human capital base, and improvement in the pace and consistency of reform.

With respect to poverty alleviation, supposedly the SEDP's central thrust, the strategy that has been adopted is to actively support self-employment and job training. Participation of local and international NGOs in this respect is encouraged given the fiscal limits in the provision of social support services. Further, the Cambodian government intends to develop an effective and sustainable rural credit system to create an atmosphere that allows income- and employment-generating activities to flourish.

Agriculture and Rural Development Policies

Agricultural Policy and Reforms

The government's food security policy emphasizes sustained growth in farm production, processing and marketing activity. The main elements of this policy are: (1) technology development, which includes dissemination of information to help farmers adopt improved farm technologies and apply new techniques in the management of soil, water, and natural vegetation; (2) ensuring availability of quality inputs at fair market prices via a competitive private sector-dominated supply and distribution system; (3) ensuring availability of financial services (lending and saving) at market interest rates to farmers; (4) creation of a positive policy environment that encourages private sector investment; (5) provision of needed infrastructure such as water supply systems for rural communities, and irrigation and flood control systems; (6) provision of agricultural extension services; and (7) establishment of production zoning. Complementary to this, trade policy supports an increasingly open system that prescribes uniform tariffs, discourages bans and quotas, and seeks to raise the quality of export products.

The agriculture sector has witnessed far-reaching policy reforms beginning 1994 with the ESAF and continued under the Agriculture Sector Programme Loan of the Asian Development Bank (ADB), which became effective in October 1996. Bit by bit, subsidies and protective measures have been removed and restrictions on marketing withdrawn. Major policy changes include a lifting of the ban on rice exports, removal of the guaranteed procurement or support price for cereals, and

withdrawal of the subsidy element in fertilizer prices offered by the government-owned Central Company for Agricultural Material (COCMA) to ensure fair competition with the private sector.

The private sector now supplies 80 percent of fertilizer sold to farmers. There are no restrictions, regulations, or taxes slapped on private sector trade or on the pricing of fertilizer and pesticides (although the MAFF tests the quality of all imported fertilizers). The price of fertilizer supplied by the Government is fixed but mainly based on the market rate. Preparations are meanwhile underway to create the Agricultural Input Company (AIC), a reformed COCMA.

The policy of cost recovery is now also being implemented in the context of irrigation systems via the creation of water users' associations. Under the ADB Sector Programme Loan, the Cambodian government has committed to divest of state-owned rubber estates, revise and rationalize land laws, and finalize rural credit strategies and policies.

The Cambodian government encourages private sector participation in the domestic marketing of agricultural commodities. There are no restrictions on interregional movement or on the pricing of agricultural goods. The private sector, state marketing boards, and even farmers are free to buy and sell the items in any quantity, any place, at any price.

There are no quantitative restrictions on exports of agricultural or forestry products except for rice, round logs, and unprocessed timber, nor are there minimum export prices applied. There are similarly no prohibitions on the import of cereals into Cambodia. Both import and export tariffs consist only of ad valorem duties while import-licensing requirements cover a small number of products.

To complement these market-oriented reforms, the government implements rural credit programmes in collaboration with international agencies and NGOs to assist the rural poor. The loans are provided to farmers at interest rates of 4 to 5 percent per month compared with about 10 percent charged by moneylenders. The maximum amount a farmer can borrow from these sources is around 60,000 riels, but small traders can borrow from 600,000 to 1 million riels. The government intends to develop a private sector led rural banking system in Cambodia. It also encourages the establishment of rural saving mobilization mechanisms, including saving clubs and loan associations.

Yet despite moves toward a freer economy, subsidies and assistance schemes continue to exist. Irrigation water from surface schemes is still provided free of charge. Each year, farmers receive interest-free loans in the form of 3,000 to 4,000 mt of rice seeds and 1 to 2 million liters of fuel for pumping water from canals. In special cases, the Department of Agronomy provides farmers with free pesticides to fight pest and insect infestation at request. To assist farmers facing supply shortfalls, financial hardship, or calamities, the government occasionally procures rice and seed at market prices and distributes subsidized fertilizers.

Given the present policy, an individual exporter or company can export up to 3,000 metric tons of rice under a license issued by the Ministry of Commerce, which is valid for two months. Although the ban on rice exports had been lifted in 1995, a special inter-ministerial working group on rice (comprising the Ministers of Commerce, Economy and Finance, and Agriculture and Rural Development) is charged with monitoring demand and supply of rice and recommending the quantity of rice exports to be allowed in a year. Its other functions are to analyze market access conditions for Cambodian rice exporters and design measures to improve the quality of Cambodian rice.

The government also maintains a strategic food stock equivalent to four days consumption of Phnom Penh (0.2 percent of total consumption). A strategic stock equivalent to 5 percent of consumption is considered the desirable amount.

Challenges of Regional Integration

The major trade issues in Cambodia lie in relation to the country's imminent entry into the AFTA Common Effective Preferential Tariff (CEPT) scheme following its membership in the ASEAN, where it currently has observer status. Entry into this scheme is both a challenge and a window of opportunity. Joining AFTA will require the country to reduce tariffs towards the agreed target of zero to 5 percent within ten years and to remove non-tariff barriers such as quotas and licenses. This will not only open up the country to cheap imports but can also have a negative impact on tariff collections on which the Cambodian government heavily relies for revenues. On the other side, an active role within the ASEAN can usher in foreign direct investment into Cambodia especially by countries in the region that extensively produce manufactured goods for export.

The CEPT process requires governments to allocate all tariff lines or categories into three lists: (1) the inclusion list, which includes goods for which CEPT rates will be reduced; (2) the temporary exclusion list, comprising goods viewed to be too sensitive for immediate rate reductions; and (3) the general exclusion list, which is intended to include a small number of goods for which trade is restricted for safety or cultural reasons. In 1994, new categories of unprocessed agricultural products were included under the CEPT. Reductions in the tariffs of these products will not be implemented immediately but still have to be included in the inclusion list. It is therefore vital for Cambodia to formulate an appropriate strategy to deal with the emerging changes in the external trade environment.

Under a task force chaired by the Ministry of Economy and Finance (MEF), several working groups are currently identifying commodities to be placed in the inclusion and temporary exclusion lists. The major problem is the lack of clarity about Cambodia's competitive advantage due to a paucity of data and information on current status of the country as well as its potential improvements.

An analysis based on the index of revealed comparative advantage for exports of the top ten commodities in Cambodia and other ASEAN countries (excluding Lao PDR) in 1991-92 indicated that Cambodia's comparative advantage was primarily in the production of natural resource-based commodities (e.g., rubber, wood, timber).⁵⁴ This study also stated that while the country is richly endowed with agricultural land and freshwater resources, few agricultural and fishery products save for fresh and frozen shellfish rank among the ten major commodities of the country.⁵⁵ This lay in contrast to Thailand and Vietnam, which possessed similar endowments but boasted a number of agricultural commodities with strong comparative advantage. Given existing low productivity and poor product quality, Cambodia will surely face stiff competition from its larger neighbours.

Currently, yields of most crops remain far below regional standards while input costs tend to be high. Even labour wages in Cambodia are reportedly steeper than in Vietnam. According to field reports, local farmers are finding it harder to compete with cheap imports of raw materials and processed agricultural goods including vegetables, fruits, processed fish, and pigs from neighbouring countries. Substandard inputs such as fertilizers and pesticides have also started pouring in from abroad, taking advantage of a lax regulatory environment. Thus, Cambodia has been unable to emerge from its traditional dependence on exports of raw, unprocessed goods (mainly fish, timber, rubber, and occasionally rice) where it enjoys static comparative advantage.

It is possible, however, that Cambodia has potential comparative advantage in several agricultural products but which are yet untapped. This could be true considering that there is little support to agriculture in terms of access to quality inputs, technology, marketing and distribution, infrastructure, and credit compared with Thailand and Vietnam. Whatever dynamic comparative advantage the country may enjoy, there is concern that an unprepared and hurried entry into the

⁵⁴ Kato et al., *op. cit.*, Table 2.6.

⁵⁵ Kato et al., 1998, *op. cit.*

regional free trade area could engender permanent and irreversible damage to chances of realizing its potentials. This is a critical research issue requiring urgent attention.

Yet, it is also clear that if the agricultural sector fails to improve productivity and competitiveness, Cambodia could eventually become a net importer of agricultural products. Reaping the benefits of potential comparative advantage requires substantial investment in infrastructure development and technology to improve yields and stimulate marketing and processing activities in sectors where Cambodia might actually have a competitive edge.

Rural Development Policy and Programmes

Rural development is recognized to be the only effective way to alleviate and eventually eradicate poverty in the nation.⁵⁶ It is also considered important in keeping rural-to-urban migration within manageable levels. The broad strategy for improving the well being of the people in rural areas is reflected in the National Programme to Rehabilitate and Develop Cambodia (NPRD) and the SEDP which provide policy directions for the development of medium- to long-term sectoral objectives, strategies, and action plans. Improving rural living standards by promoting rural development as a central feature of the RGC's development priorities is one of the five development targets of the SEDP.

Rural development strategies follow four broad principles: (1) to embrace both social and economic dimensions and employ an integrated approach that is area-based and multi-sectoral in nature and coverage; (2) to pay special attention to disadvantaged and displaced groups; (3) to encourage people's participation in the identification, design, and implementation of programmes; and (4) to promote "bottom-up" planning or decentralization of organization and management development efforts.⁵⁷

The Ministry of Rural Development (MRD) is the government agency that coordinates rural development efforts. Within the overall framework of the SEDP, the MRD's core programmes include institutional strengthening and human resource development, improvement of rural roads and transport, generation of clean drinking water and environmental sanitation, expansion of small-scale irrigation, promotion of household food security, and development of rural credit to promote small businesses.

One of the major thrusts of rural development is to create local level institutions to plan and execute development activities, and this policy has been fleshed out at the provincial, district, commune, and village level in the form of development committees. By 1997, about 1,500 Village Development Committees (VDCs) were already in existence as against the target of 7,500 functional VDCs (covering 60 percent of all villages) by year 2000.

Achievement of the target depends on the availability of considerable resources mainly from government, donors, and NGOs for the training of local people and extension agents and to support initial investment in social infrastructure and institution building. The UNDP-supported Cambodia Resettlement and Reintegration (CARERE) programme, for instance, is supporting some 500 VDCs. Sustainability of this effort though will ultimately depend on success in mobilizing internal and external resources and in engendering true participation at the grass-roots level.

Another important thrust of the Cambodian government's rural development policy is to establish an effective rural credit system operating under the overall supervision of the National Bank

⁵⁶ Ministry of Rural Development, *The National Programme Framework for Rural Development of the Ministry of Rural Development*, Phnom Penh: October 1997.

⁵⁷ Royal Government of Cambodia, *Socioeconomic Development Requirements and Proposals*, Phnom Penh: May 1997.

of Cambodia (NBC) as an integral part of the financial sector. Currently, people living in rural areas have limited access to capital because of a scarcity of commercial banks and a weak state-run provincial banking system.

To fill this gap, government and NGO micro-credit programmes have expanded rapidly in Cambodia since 1991. By 1994, rural credit services had reached over 40,000 households. Although current statistics on the extent of rural credit are largely unreliable, latest reports indicate that the total amount of loans outstanding is now approximately \$15 million, serving 225,000 households or families. This represents more than a fivefold increase over the last three years, and coverage of approximately 12 percent of the rural population.⁵⁸

Rural credit surveys report that up to 20 percent of households wishes to borrow an average of \$300 for agriculture and small entrepreneurial needs. This suggests that the market demand for rural credit could be as high as \$102 million.⁵⁹ But as of end-1997, total loans outstanding including agricultural lending by the commercial banking sector was only about \$23 million. Thus, total credit from both formal and semiformal credit institutions is considered woefully inadequate.

With limited access to financial services, people in rural areas have relied on moneylenders for investment capital. With nominal interest rates anywhere between 10 to 30 percent per month, rural economic growth is severely constrained as extremely high interest rates undermine the borrower's ability to achieve an adequate return on his or her investment.

Against this backdrop, the Credit Committee for Rural Development (CCRD) formulated policies and strategies to promote and regulate rural credit institutions and to evolve sustainable financial systems based on market interest rates. The RCG also decided to establish the Rural Development Bank (RDB) with start-up capital financing from government revenues derived from the privatization of state-owned enterprises. The RDB was formally established in 1998 under the MEF by appropriating 10 million riels (approximately \$2.8 million at current exchange rate) as initial paid-up capital for the bank.

Whether or not the RDB is able to mobilize sufficient resources rests on donor support, the bank's ability to mobilize deposits, and on its capacity to absorb the existing rural credit schemes implemented by the EU/PRASAC and the Ministry of Women's Affairs with funding support from United Nations Children's Fund (UNICEF). The donor community, including the World Bank, the ADB, and UNDP, had earlier proposed that a feasibility study be conducted before establishing RDB given the many failures of state-run development banks around the world. NGO credit operators, in a position paper in 1996, similarly argued that the proposal to institutionalize rural credit through the establishment of a rural development bank was premature considering the economic and human resource limitations of the country.

Rural Institutions and Support Services

Three principal players are involved in the provision of services to farmers and the rural population in general: the private sector, the public sector, and international organizations (IOs) and NGOs.

The private sector plays a very important role in providing goods and services to the rural population. It is perhaps the best provider (i.e., its services more widely used) in that it is responsive

⁵⁸ National Bank of Cambodia, "Microfinance in Cambodia", a paper presented during the National Seminar on Royal Government of Cambodia Policy on Microfinance, 26-28 March 1998.

⁵⁹ David Lucock, "Draft Report: Terminal Evaluation of the CCRD Component", 1997, p. 2.

to users' needs, is easily accessible, and has a comparatively more efficient delivery system. However, private services often do not come with knowledge and information service packages and often comprise only merchandise. For example, while farmers can purchase fertilizer and pesticides from private dealers, the latter hardly advise them on the appropriate application rates and the correct and safe procedures for their application. Usually, such information is provided to farmers by the government's agricultural extension system.

The public sector's capacity to provide material inputs and transfer knowledge to rural areas, in contrast, is very limited. Government is constrained by financial resources and lacks the logistics to reach out to the grass-roots level. Thus, outreach programmes have been rare, mostly responding to emergencies. Village people get to see government health representatives on a regular basis only during annual visits for the vaccination of children and cattle; such programmes do not cover important livestock such as pigs and chicken.

The only other significant agricultural extension service offered by government is provision of emergency fuel for water pumps during prolonged droughts. However, this type of assistance tends to be rather ineffective as it is either delivered too late or is inadequate. However, with greater aid received from various donors recently, government departments have fast-tracked the channeling of funds to implement programmes in prioritized communities. They now also assist these institutions in their fieldwork.

Still, most government agencies lack external support such that state outreach programmes are often manned by unmotivated and underpaid staff. Government agencies have also failed to fully benefit from staff training provided by NGOs and IOs because state employees trained by these institutions are not given the opportunity to serve in extension programmes because of labour shortage.

IOs and NGOs hold a special role in that they bring in the expertise and funds needed to reach out to communities and conduct extension programmes. External agencies contribute greatly by bringing in new technologies, innovations, and allied technical expertise although assistance by these groups (especially the UN agencies) are largely aimed at institutional capacity building and infrastructure development.

NGOs, on the other hand, substitute for government in the provision of services to rural areas and a number of them now conduct important agricultural development services. They extend technical assistance and resources to the rural population and help improve the community's knowledge, skills, and awareness. NGOs have played a particularly significant part in bringing knowledge and materials directly to the village level. Today, the knowledge base and new innovations at village levels in the areas of farming, fish culture, health, skills training, and rural credit are mainly attributed to NGO work. Unfortunately, the number of villages covered by such groups has been relatively small.

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VIII. Development Potentials and Constraints

In a country rich in resources such as Cambodia, excellent opportunities for economic expansion abound.⁶⁰ For a largely agricultural society, such opportunities can be turned into real growth by revitalizing the farm sector. Progress achieved this way is likely to have pronounced effects on food security, as poverty is concentrated mainly in rural areas.

But before an effective strategy or appropriate policy framework can be crafted, development potentials of the country as well as its constraints first have to be cataloged to ensure that scarce resources are used in the wisest possible manner.

Such a process reveals that the country's growth prospects are inextricably linked to progress in infrastructure development (irrigation and drainage systems in particular) and farm technology, and improvements in the policy arena. Areas with bright potentials in terms of raising incomes and yields include the production of rice and certain cash crops, feeds, and rubber; and the establishment of a vertically integrated agribusiness system.

Among the major constraints to agricultural growth, meanwhile, are the absence of a clear policy framework and investment strategy, lack of a market for rice and other food crops, poor market support infrastructure and services such as farm-to-market roads and transport facilities, low crop productivity, and institutional problems. These are discussed in full below.

Potentials of Agricultural Growth

Irrigation

Irrigation offers the best opportunities for agricultural growth in Cambodia. The level of irrigation development in the country is still very low with irrigated land representing only about 16 percent of the total area under food crop production. In 1994, rice yield levels and cropping intensities in the lowland rainfed areas averaged only about 1.3 mt/ha and 100 percent, respectively (or annual productivity of about 1.3 mt/ha). Therefore, there are bright potentials for substantial increases in unit area productivity through improvements of irrigation systems and, in the process, water control and management. (Annex B summarizes the potentials, opportunities for, and constraints to irrigation development presented in their order of priorities for development.)

Extensive and good shallow aquifers, which span an estimated 4.8 M ha, underlie most of the arable areas of Cambodia. (see Table 5.1 below and Figure A.4 in Annex A). Even if these estimates of shallow well areas are cut by half, most of the areas planted with rainfed lowland rice, flood recession rice, and annual upland food crops can still be irrigated.

⁶⁰ See Annex A: Basic resources for a detailed description.

Table 5.1: Regional and Provincial Estimate of Shallow Well Areas (in thousands of ha)

Province	Total Land Area	Shallow Well Area	% Shallow Well to Total Area
Delta Region			
Kandel/Phnom Penh	385.8	347.2	90
Kompong Cham	979.9	392.0	40
Svay Rieng	296.6	266.9	90
Prey Veng	488.3	439.5	90
Takeo	356.3	285.0	80
Sub-total	2,506.9	1,730.6	69
Lake Region			
Kompong Thom	1,381.4	621.6	45
Siem Riep	1,527.1	381.7	25
Battambang	1,043.3	521.6	50
Bantay Mean Chey	993.7	447.1	45
Pursat	1,269.2	317.3	25
Kompong Chhnang	552.1	331.2	60
Sub-total	6,766.8	2,620.5	39
Coastal Region			
Kampot/Kompong Son	607.7	151.9	25
Koh Kong	1,116.0	-	0
Sub-total	1,723.7	151.9	9
Mountain/Plateau			
Kompong Speu	701.7	140.3	20
Preah Vihear	1,378.8	-	0
Stung Treng	1,109.2	83.2	8
Ratanakiri	1,078.2	-	0
Mondul kin	1,428.8	-	0
Kratie	1,109.4	110.9	10
Sub-total	6,806.1	334.4	5
Total	17,803.5	4,837.4	27

Adapted from Briese, 1996.

Hence, shallow tube-well (STW) irrigation, a system suitable to most regions where crops are grown as well as to small-scale agricultural production (i.e., land holdings of 0.4 ha or larger), can serve as a good engine of growth in the farm sector. Manually operated tube-wells (MOT), on the other hand, can be ideal for watering home gardens and livestock and as source of potable water. In areas with shallow flooding, the use of such a device in elevated beds can guarantee a year-round supply of vegetables and potable water.

There are areas, however, where small, low-lift pumps (LLPs) might be more suitable. LLPs are advantageous in that they are portable, cost-effective, quite simple to install and operate, and capable of drawing water from diverse sources including rivers, streams, colmatage canals, lakes, farm ponds, and small bunded reservoirs. LLPs can also be used to control water regimes (i.e., useful for both irrigation and drainage) in flood recession rice areas. When used in conjunction with colmatage canals, LLPs help intensify and diversify cropping systems. The prime movers or engines of these devices can also be used to power boats, hand tractors, and other farm machines. In recent years, LLP irrigation has been the most popular mode of irrigation. Promoted primarily with private sector and individual farmers' initiative, it has been the quickest and cheapest means of expanding irrigated areas.

Studies show that the prospects are bright for this type of irrigation given the adequacy of river water sources. An analysis of the long term-flows from the Mekong river at Kratie, Kompong Cham, and Khrouy Changvar (prior to the confluence with Tonle Sap river) reveals a dependable monthly flow of at least 5 billion cubic metres (about 1.9 M li/sec) in each of these gauging stations. A dependable monthly flow of at least 2 B CM (0.76 M li/sec) during the dry season is also available at the Tonle Sap river at Prek Kdam.

A study by Halcrow and Partners, Ltd. (1994) similarly shows that there are about 0.54 M ha of land that can potentially be irrigated (e.g., by gravity and/or pump irrigation systems) using water from small- and medium-sized rivers scattered all over the country. These include some of the smaller catchment areas that are not part of the Mekong river basin. Hence, there are sufficient surface water resources to irrigate an area of at least 1.0 M ha by LLP, small run-of-the river, and colmatage canal irrigation systems during the dry months.

In contrast, there is very little hope for the development of large run-of-the-river irrigation systems, pumping stations, and storage dams in the short to medium term. Gravity systems have wider service areas but are more expensive and difficult to operate and maintain. As correctly pointed out in many reports the associated costs of such systems are very high and management difficulties are almost insurmountable. Moreover, it is extremely difficult to develop adequate institutional capability at all levels to efficiently plan and maintain such systems.

Rice Production

Rice is the major crop in Cambodia. It accounts for about 17 percent of GDP and 75 percent of local per capita food intake. Approximately 2.15 M ha or 86 percent of the total cultivated food crop area spanning 2.15 M ha was planted with rice in 1996-97. Total production of paddy rice amounted to 3.46 M metric tons of paddy rice in 1996-97, exceeding local demand for consumption and seeds by about 7 percent (Agricultural Statistics, 1996-97).

There are six rice production systems which have evolved as a result of variations in flood regimes, degree of water control, and type of soil, namely: (1) rainfed lowland rice (84 percent of total rice area); (2) irrigated lowland rice (1 percent); (3) dry season flood recession rice with supplemental irrigation (7 percent); (4) deep water floating rice (6 percent); (5) dry season lowland irrigated rice (1 percent); and (6) upland rice (1 percent). Soils found in a little over half of the total area planted to rice (about 53 percent) are considered medium to high productivity soils. (see Table 5.2)

There are good short- and medium-term potentials for increasing rice yield levels, cropping intensity, and unit area productivity in the different rice ecosystems (see Table 5.3).⁶¹ Maximum productivity potentials can be achieved by developing appropriate irrigation facilities (e.g., STWs and LLPs) for double-cropping in lowland areas. Irrigation can increase both yield and cropping intensity especially in areas with medium to high soil productivity where an average annual unit area rice productivity of 5.4 t/ha—or double the present productivity level—is feasible (see Table 5.4).

⁶¹ It should be pointed out that the potential productivity level estimates are those of the Mission. These are deemed realistic and lower than the levels achieved in the on-farm yield trials reported by the Cambodia-IRRI-Australia Project in 1997.

Table 5.2: Proportion of Rice Ecosystems Under Low, Medium, and High Soil Production Potentials

Rice Ecosystem	Potential Area in 1000 ha	Soil Production Potential		
		Low	Medium	High
Wet season Lowland a) Proportion in percent b) Area in 1000 ha	1,910*	56 1,070	21 400	23 440
Deep Water Flooding a) Proportion in percent b) Area in 1000 ha	400*	18 72	10 40	72 288
Upland a) Proportion in percent b) Area in 1000 ha	40**	55 22	34 14	11 4
Dry season (flood recession and irrigated lowland) a) Proportion in percent b) Area in 1000 ha	180*	20 36	14 25	66 119
Total Area in 1000 ha	2,530	1,200	479	851
percent of Rice Growing Area		47	19	34

Source: Rice Production in Cambodia, Cambodia-IRRI-Australia Project, 1997.

* Based on 1966/67 rice areas

** Based on 1996/97 upland rice area.

Table 5.3: Short- to Medium-Term Potentials for Increasing Productivity in Rice Ecosystems

Rice Production System		Yield Level t/ha				Rice Cropping Intensity (percent)	
Ecosystem	Cropping Pattern	1992-93	1996-97	Potential (5-10 years)		Present	Potential (5-10 years)
Lowland	a) Wet season 1) Rainfed, wet season 2) Irrigated, wet season	1.13 1.04 1.80	1.67	2.0 2.50	- -	90** 100	95 100
	b) Dry season, irrigated	2.40	2.50	-	3.0	100	100
	c) Irrigated, double cropping 1) Low soil potential 2) Medium and high soil potential	- -	- -	2.4 2.7	2.7 3.5	100 100	180 180
Flood Recession	1) Dry season, Dec.-April Supplemental Irrigation 2) Dry season, Colmatage Canal with LLPs	2.4 n.a.	3.50 n.a.	- *	4.0 4.0*	100 100	100 100***
Deep Water Flooding	Floating, wet season	1.21	1.20	1.30	-	100	100
Upland		1.21	1.20	1.40	-	100	100

Source: Mission estimates

- With secondary food crops in canal front slope
- n.a.- information not available
- ** Less than 100percent due to floods, droughts, pests, etc.
- *** Excluding secondary food crops on canal front slope.

Table 5.4: Sample Calculations of the Increase in Rice Area Unit Productivity with Appropriate Irrigation Development

Rice Production System		Present Productivity Level, t/ha			Potential Productivity Level with Irrigation , t/ha			Increase in Unit Area Productivity	
Ecosystem	Potential Area (1000 ha)	Yield (t/ha)	Cropping Intensity(perc ent)	Productivity (t/ha)	Yield (t/ha)	Cropping Intensity(perc ent)	Productivity (t/ha)	t/ha	percent
Lowland rice									
a) Medium to high soil potential	840	2.4 ¹	100	2.4	3.0 ³	1.8	5.4	3.0	125
b) Low potential	1,070	2.0 ²	100	2.0	2.5 ⁴	1.8	4.5	2.5	125
Flood recession rice									
a) With shallow bund	180	3.5	100	3.5	4.0	100	4.0	0.5	14
b) With shallow bund and LLPs		3.5	100 ⁵	3.5	4.0	100 ⁵	4.0 ⁵	0.5 ⁵	14 ⁵

¹ Assumed to be average of dry and wet season irrigated lowland rice.

² No available information, the average for rainfed and irrigated area in 1996-97 was 1.67 t/ha

³ Average of wet (2.7 t/ha) and dry (3.5 t/ha) seasons potential yield level estimates.

⁴ Average of wet and dry seasons potential yield level estimates.

⁵ Non-rice crops on elevated channel backslopes are not taken into consideration.

There is room for expanding present yields in flood recession rice areas, in particular, by building irrigation and water management facilities (see Table 5.5 for a summary of potentials and constraints). With the establishment of colmatage canals and LLP irrigation and drainage facilities, for instance, there is scope for increasing rice output as well as producing secondary food crops (e.g., on elevated canal backslopes).

Table 5.5: Summary of Potentials and Constraints to Irrigated Rice-Based Farming Systems

Opportunities/Potentials	Constraints/Requirements
• Doubling of rice production by utilizing available land and water resources. • Reduction of rice production risk and doubling of unit area productivity in lowland rice ecosystems via the development of farmer-controlled STW and LLP irrigation systems. • Huge rice surplus making crop exportation feasible. • Farming systems diversification (e.g. rice-fish, rice-corn, and rice-soybean) and increased family income with greater degree of water control achieved by through STW and LLP irrigation. • Greater private sector involvement in irrigation development and provision of farm inputs and services.	• Need to develop a globally competitive rice export industry. • Need to assure farmers of entitlement over land and other production resources, as the land tenure problem inhibits farm improvement and innovations. • Need for improved support for infrastructure and facilities such as roads and post-harvest facilities. • Need for improved and effective support services including seed production pest control, water management, and soils and fertilizer management. • Lack of credit. • Need for appropriate farm mechanization especially in female-headed farm households. • Rice price collapse with increased rice surplus. • Risk and political instability in some areas.

Evidently, there are opportunities for dramatically increasing rice production. Considering the vast water resources and the large tracts of idle arable land, it is possible to sustain growth in rice production through an expansion of irrigated rice areas. It is estimated that for every 100,000 ha increase in irrigated (lowland rice) areas with medium to high soil productivity, rice production can rise by as much as 300,000 mt. Even in areas where soil has low productivity, output levels can similarly be expanded by about 250,000 mt. These increases amount to 8.7 percent and 7.2 percent, respectively, of 1996-97 rice production. With the potential for a substantial surplus, the possibility of exporting rice (and other crops, given farm diversification) is no longer remote.

Other Field Crops (Food and Cash Crops)

Food and cash crops other than rice include corn (cultivated on 50,000 ha of land), soybean (29,000 ha), mong bean (28,000 ha), peanut (12,000 ha), cassava (14,000 ha), sweet potato (11,000 ha), and vegetables (46,000 ha). Assorted industrial upland crops such as sesame, tobacco, sugarcane, and jute are also grown on some 32,000 ha of land.

At present, Cambodia seems to have some competitive advantage over neighboring ASEAN countries in the production of corn, soybean, and mong bean. With irrigation and introduction of

improved production technologies, it can be competitive in the production of other crops as well. Its major advantages are its favorable man-to-land ratio and low agricultural wage rates.

Although the country exports some of the basic ingredients of feeds for hog, poultry, and fish production (e.g., fishmeal, rice bran, corn, and broken rice) to Thailand and Vietnam, it has been importing formulated feed concentrates and meat products. There is considerable scope not only for reversing this sort of trade but also for exporting these goods to other ASEAN countries when production efficiency has improved and with increased investments in commercial-scale livestock production by local and foreign investors.

Table 5.6 lists the opportunities and constraints to the production of field crops in Cambodia. The listing draws heavily from the background papers of a recent workshop on priorities for research and development.⁶²

Table 5.6: Opportunities and Constraints to Field Crop Production

Opportunities/potentials	Constraints/requirements
- Increased yields and cropping intensities through the setting up of irrigation facilities in areas planted to field crops. - Promotion of dry season crops in irrigated lowland rice ecosystems. - Comparative advantage of corn, soybean, and mong bean as an export boost. - Development of corn for feeds as a viable import substitution crop. - Establishment of livestock and fish feed processing facilities. - Greater private sector participation. - Wider scope for the diversification of farm products (and their by-products). - Contract production of livestock, where inputs, credits, and technology are supplied by processors, as an offshoot of vertical integration of production.	- Low level of present farming technology. - Lack of good quality seeds. - Inadequate farm machinery for production and post-harvest operations. - Large price fluctuations. - Competition with rice for high potential soils. - High input and marketing costs. - Stringent drainage requirements. - Labour shortage necessitating certain degree of farm mechanization.

Rubber, Fruit Trees, and other Commercial Crops

Rubber has traditionally been Cambodia's export crop. It is one of the few crops in which the country appears to have comparative advantages in terms of production. The rubber industry has a tradition of high output and export levels, and until today, processing capacity of rubber factories far exceeds the supply of raw materials.

But there is still room for improvement in terms of harvesting techniques and in the quality of processed products, which can in turn help raise local prices (currently equal to merely 60 percent

⁶² Ministry of Agriculture, Forestry and Fisheries, Cambodia Agricultural Research and Development Priorities Workshop, Phnom Penh: March 1988)

of world prices). Output can also be hiked in the medium and long term by expanding the area under cultivation, increasing tree density (up to 350 per ha), and improving the productivity of individual trees. Unit area rubber production is relatively low; the present tree density is only about 250 trees per ha with 65 percent of the trees over 30 years old while annual production per tree is estimated at 4 kg.

The area planted to rubber today is estimated to be in the order of 62,000 ha of which about 41,000 ha are being tapped. The country has an estimated 330,000 ha that are highly suitable to rubber production, with a potential output of 600,000 mt of dry rubber. Availability of suitable lands is clearly not a constraint to an expansion of rubber production. Given the right incentives and policy environment, the private sector is in the best position to invigorate the industry.

Accurate data regarding production and the size of land devoted to fruit production are not available. MAFF estimates, however, a total of 36,000 ha being utilized for banana, mango, citrus fruits, pineapple, cashew, longan, rambutan, and durian production nationwide. The present levels imply low per capita consumption of fruits. In such case, there is room (and reason) to expand areas under cultivation to meet domestic requirements for balanced nutrition.

Meanwhile, there are also possibilities of increasing the production of cashew and coconuts for export, and coffee as an import substitute. The country used to export coffee in the 1960s, but production today is practically zero. Agro-climatic conditions are particularly suitable for the cultivation of coconuts, which are currently produced primarily for fresh nut consumption. There are opportunities in diversifying into coconut-based products that can cater to local and international markets.

Livestock

Livestock raising is an integral part of Cambodia's farming systems. Backyard pig and poultry production are major sources of cash income for most rural households despite the fact that production inputs are minimal and mortality rates high. The livestock industry accounts for about 15 percent of GDP today. Of the total value of livestock production estimated at US\$200 million, swine and poultry account for approximately one-half.

Clearly, there are opportunities to be found in increasing the efficiency of backyard livestock production with emphasis on animal health services and nutrition. This is particularly true given success stories of how, in most areas, growth of village veterinary services has brought down deaths among farm animals.

In the long term, the prospects for contract growing of pigs and poultry with food conglomerates and agribusiness corporations as investors are also bright given the entry of the country into AFTA. ASEAN entrepreneurs and multinational corporations can provide the capital, technology, and management inputs as well as the potential export market while their rural partners can provide land and labour.

There are likewise compelling reasons to increase large animal production not only for meat and dairy products but also to meet draft power requirements of a growing crop sector. At present, draft animals provide about 90 percent of the power needed for tillage and transport in fields. A relatively inexpensive way to achieve this goal of promoting livestock such as cattle and buffalo is to use vast shrub-lands and open areas as feeding ground but taking into consideration the environmental impact of such activities.

In the context of increased agricultural output, there is a large potential for the development of a vertically integrated agribusiness system based on local crops, livestock, and fishery products. The integration progresses from small- to medium-scale feed crop productions systems; to animal

feed and fishmeal processing plants; to swine, poultry, and fishery production using locally formulated feed concentrates; and all the way up to fish and meat processing. The country can have a competitive edge over other ASEAN countries in such ventures since it is a low cost producer of raw materials for fish and animal feeds processing.

Fisheries

The fisheries industry contributes significantly to the Cambodian economy, its share of GDP estimated to be from 3.5 to 4.5 percent.⁶³ About 1 million people depend directly on fisheries for their livelihood with fish and fishery products believed to account for 40 to 60 percent of the local population's protein intake.

In the 1970s, annual fish consumption per capita was in the order of 20 to 25 kg. Due to an increasing population, stagnating fish catch, and political upheavals, this figure fell to 13 to 16 kg in 1991.⁶⁴ Achieving the 1970 annual per capita consumption level of 20 kg, which is the desirable level, requires production of about 210,000 mt of fish to approximate such demand today.

Commercial fishery production from all sources in the past three years averaged about 110,000 mt per year. This comprised fish gathered or raised through inland capture (70,000 mt), marine capture (31,000 mt), or aquaculture (9,000 mt). Subsistence production by small fishermen from inland sources was estimated to account for half of total commercial production or about 35,000 mt. Thus, total fish production approximates to about 145,000 mt today, which translates to an annual shortfall of about 65,000 mt from the desired level of 20 kg per capita per year.

Inland fish capture grew by 0.2 percent annually from 1982 to 1992. During the same period, marine and aquaculture production increased at an annual rate of about 92.5 and 48 percent, respectively. Both inland and marine captures have stagnated, however, since 1992.

The performance of inland fisheries, which accounts for about two-thirds of total fish production, is cause for alarm since the population prefers freshwater fish. In fact, the present level of commercial inland fisheries production is only about half the 130,000 mt recorded in 1957. The decline in inland capture has been blamed on the high level of exploitation, conversion of inundation forests into flood recession rice areas, poor management, and continuing environmental degradation, among others.

In this case, the only chance for significant growth in inland fishery production in the future is through the expansion and improvement of rice-fish farming in the lowland rice areas and aquaculture. Better management and steps to protect aquatic resources from overexploitation and arrest the dwindling fish stock in inland water bodies should, however, accompany these productivity-enhancing activities.

Under present circumstances, improving the lot of small farmers and fisher-folk, which are the target groups in fishery development, can be best accomplished by developing rice-fish farming and aquaculture technologies. This is because commercial fishing lots now dominate a large part of inland coastal areas (with about 80 percent of the lake shoreline under fishing concessions).

Rice-Fish Farming

Based on official statistics, fish production in lowland rice areas contributes very little to total inland fish capture. The bulk of available information indicates annual production levels of at

⁶³ Mekong River Committee, *Fisheries in the Lower Mekong Basin*, Bangkok: 1992.

⁶⁴ *Ibid.*

least 25 kg/ha for capture fisheries within or near rainfed lowland rice regions.⁶⁵ With the use of trap ponds to gather fish that escape capture within the rice paddies, the harvest can plausibly be doubled. There is therefore a potential for annual fish production in the order of 50,000 mt in lowland rice fields.

In a number of countries in Southeast Asia, the culture of fish in rice fields is already a well-established practice. In this system, fingerlings are introduced into the rice fields, their natural food at times supplemented with feed concentrates. Trap ponds are provided within or near the rice paddies to serve as refuge for fish in the event that the fields start to dry.

Rice-fish culture with trap ponds requires little investments (e.g., digging of the pond and canals, purchase of fingerlings, and some feed supplementation) and income from fish and other aquatic animals can exceed that from rice cultivation. Annual fish production is usually in the order of 200 to 400 kg/ha or four to eight times higher than that of capture fisheries. Output is often higher in irrigated areas and when farmers have greater control over their irrigation facilities. This further highlights the potentials of small-scale systems.

Aquaculture

Aquaculture, especially inland pond culture is relatively new to Cambodia. In 1975, aquaculture production totaled 5,000 mt (or less than 5 percent of total fish production). This activity was interrupted during the Khmer Rouge regime but was reintroduced in 1984 in the areas surrounding Phnom Penh City, Tonle Sap Lake, and the Mekong regions. From 1,600 mt in 1984, aquaculture output steadily increased to 8,600 mt in 1997. With such capacity for progress, there are obviously good chances of a rapid expansion in the industry, which is currently based on cage culture (accounting for 45 percent), pen and cage culture (22 percent), and pond culture (33 percent).

Forestry

Cambodia has valuable forestry resources. With a sound forest policy framework, effective control of forest resources extraction activities, and proper management and conservation practices, the industry can generate sustainable government revenues of at least US\$100 million annually.⁶⁶

A rough estimate of the sustainable wood product yield of forests in Cambodia is in the order of 1 million cubic metres (M CM) per year. The demand for firewood is about 6 M CM, approximately half of which come from forests. In addition, 25,000 to 30,000 mt of charcoal are produced annually.

The present rate of wood extraction from concession areas is placed at about 1.5 M CM; it has been estimated that illegal loggers outside of concession areas extract as much timber each year. The current rate of extraction is approximately seven times the sustainable level and can decimate much of the remaining commercial stand within the next 10 years. Valuable non-wood forest resources (e.g., rattan, bamboo, wildlife, and food crops) are also being diminished at a rapid rate.

Clearly, long-term benefits from the country's forest resources can only be optimized through proper conservation and management, which have beneficial hydrologic and environmental impacts (i.e., reduction in the frequency and severity of floods, soil erosion, siltation of waterways, and degradation of inland fishery resources). Sound forest management also serves the people living in or near forested areas who depend partly on forests for food, fuel wood, and other non-wood products such as rattan and bamboo.

⁶⁵ R. Gregory, *Rice Fisheries Handbook*, Cambodia- IRRI-Australia Project, Phnom Penh: 1997.

⁶⁶ World Bank, UNDP, and FAO, *Forest Policy Assessment - Cambodia*, Washington D.C.: 1996.

Constraints to Agricultural Growth

Cambodian agriculture faces numerous constraints to development, many of which are common across regions, provinces, and to a certain extent, agricultural sub-sectors. The nature of these barriers range from the natural and the physical, to the technological, to the political and institutional. These obstacles must be surmounted for the agriculture sector—and with it, the entire Cambodian economy—to shift to a more rapid growth track.

Absence of a Clear Policy Framework

Typical of a nation still in the process of building the basic structures for development, there is yet lack of a clear policy framework. Investment strategies for the development of resource- and technology-based production systems including agro-industries have likewise not been developed. There is also a need for a more solid legal framework and clearer regulatory guidelines governing the allocation, protection, and management of resources, particularly with regard to institutional control and responsibility.

Undeveloped Market for Rice and Other Food Crops

The biggest obstacle to an expansion of areas under crop agriculture and intensification of cropping systems in irrigated areas is a lack of a market for rice and other food crops. Cambodia has been self-sufficient in rice and other food crops over the past three years; considering the level of cereal consumption, there is not much scope for greater domestic absorption of incremental production. Unless export possibilities are enhanced, the potentially negative effect of increased production on output prices (i.e., lower prices leading to reduced profitability) will continue to serve as a disincentive to greater investment for and efforts towards improvements in farm productivity.

Barriers to Export Growth

Deterrents to Legal Exportation

The exportation of most agricultural products is carried out illegally. There are no taxes, records, or control mechanisms in these transactions. Legal exportation of rice is a problem, as purchasers in importing countries reportedly do not honor certificates issued by Camcontrol. Many rice millers and wholesalers in the northwestern part of Cambodia complain about the difficulty and high cost of obtaining an export license. Moreover, there are still many regulations that make legal exportation unattractive. The response of large millers and wholesalers in the country has been to sell to Thai rice traders at the border, avoiding expensive and time consuming paperwork, but placing Thai traders in a better bargaining position.

Inferior Product Quality and Lack of Trade Information

A major hindrance to export promotion is the failure of a number of agricultural products to meet international standards in overseas markets. When it comes to the formulation of policies and intervention measures, meanwhile, scarcity of records relating to imports and exports emerges as the biggest drawback. This signals a clear need to establish a network that can collect needed information.

Poor Infrastructure and Support Services

Infrastructure, facilities, and institutional mechanisms for the handling, processing, and export of food grains are still undeveloped. Essential market support infrastructure and services such as farm-to-market roads, transport facilities, power supply systems, and quality control facilities and

services are grossly inadequate. Marketing and transactions costs remain high due to bad road conditions, poor security, high transport costs owing to a collection of ad hoc road fees, and shabby conditions of city and local markets.

The poor condition of transport infrastructure has been particularly worrisome because it is a major constraint to the marketing of rice and other basic foods. Years of destruction and lack of maintenance have left most of the country's roads in a bad state and in need of repair. The local road network consists of some 3,000 km of national roads, another 3,000 km of provincial roads, and 28,000 km of tertiary roads.

Even with recent reconstruction and rehabilitation efforts, about half the length of national roads today needs major improvement. Most provincial and tertiary roads are in poor condition with many impassable during the rainy season. It is estimated that several thousands of small bridges are in need of replacement.⁶⁷

Inadequate Post-harvest and Processing Facilities

Facilities for minimizing post-harvest losses and for the secondary and tertiary processing of agricultural products and by-products that are needed to achieve efficiency and diversify and improve output are inadequate. This is true even for rice, which is the country's major food crop. Rice harvest and post-harvest losses of about 30 percent have been reported. The head rice recovery in milling, for example, ranges between 60 to 65 percent compared to feasible levels of 66 to 70 percent using more efficient mills (e.g., using rubber rollers). Cheap, small-scale but appropriate feed and food processing equipment are unavailable in many areas. There is, in addition, a lack of drying, bulk handling, and storage facilities for product quality management.

Weak Institutional Capacities

The institutional capacity for regulating and supporting the private sector as it carries out its marketing functions is weak. The newly established Agricultural Marketing Office (AMO) within the Department of Planning, Statistics, and International Cooperation (DPSC) of the MAFF still lacks capable and experienced staff. The same problem is encountered in the MoC, where assistance is also needed to build the institutional capacities of a newly opened unit for export promotion as well as the existing Camcontrol.

At present, there is no national marketing institution. Only the Market Information Service (MIS) under the MAFF, which is receiving some assistance from the FAO, seems to be carrying out marketing activities in any significant sense. However, essential services and functions such as the assessment of overseas market signals, the establishment of internationally accepted norms and product standards, and the introduction of modern storage and packaging materials and techniques are only given lip service.

Low Crop Productivity

Current yield levels and cropping intensities in rice ecosystems are very low compared with those under similar ecosystems in many Southeast Asian countries (see Table 5.2). In addition, production of other field and cash crops has been weak, hindering the development of agriculture-based processing industries. Clearly, export potentials of the agricultural sector can only be fully tapped if surpluses are consistently achieved and product variety (and quality) attained.

Mediocre performance in terms of productivity primarily traces to poor soil fertility, inadequate facilities for greater water control (e.g., small-scale irrigation and drainage), and slow adoption of

⁶⁷ World Bank, "Cambodia Agricultural Sector Memorandum", May 1996.

suitable farm technology. The inadequacies of existing irrigation facilities, in particular, have discouraged the diversification of farms into production of other field crops apart from rice.

Poor Soil Fertility and Other Natural Constraints

Poor soil fertility is a major production constraint in most of lowland areas that has to be addressed by suitable soil and fertilizer management technologies (see Table 5.2). Nearly half of the soil types found in rice growing areas can be classified as being of low productivity—mainly, deep sandy soils, shallow-sand-over-clay, and soils of the depressions. This is compounded by weather uncertainty and recurrence of devastating floods and drought.

Inappropriate Irrigation and Water Control Systems

The low level of irrigation development in the country coupled with the poor performance of existing irrigation facilities discourages diversification of the local farming system. Without good water management and control, farming remains a highly risky activity. Farmers are hence unable to take full advantage of modern farming technologies (e.g., seeds, seedlings, soil, fertilizer, and pest management).

Focus on large-scale gravity irrigation systems, which do not give individual farmers control over the management of irrigation water, has resulted in irrigation systems that favor rice monoculture. Because of this, the production of other field crops such as corn, peanuts, and vegetables, which require more stringent drainage and on-farm water management, are currently not feasible. In addition, many of these facilities, the popularity of which had started in 1950s, are beyond the capabilities of the concerned public and private organizations to properly operate and maintain and, are hence unsustainable.

Existing schemes—mostly gravity-dependent systems—are performing poorly today. An analysis of 841 of the 920 existing schemes studied by Halcrow and Partners (1994) showed that only 21 percent were fully operational. Moreover, the areas that these irrigation systems covered were found to have low cropping intensities and unit area productivity (rice yield levels range from 1.8 to 2.4 mt/ha).

Many of the existing facilities perform sub-optimally as a result of poor planning and design, with some grossly underutilized because of inadequate planning and insufficient hydrologic data required for proper operation and maintenance. The poor performance has been partly traced to lack of operating funds; absence of a system for cost recovery from users; inadequate technical capability for improvement, repair, and operation; and narrow experience with the formation of viable water users associations.⁶⁸

Lack of R&D and Suitable Farm Technologies

There is currently a paucity of knowledge of new farming technologies appropriate to the local farm setting. Limitations in both the availability of technology and the capability to identify, test, and adopt promising technology. These are mainly rooted in a lack of funding for research and development (R&D) activities.

The government does not have the means to plan and finance, much less manage a comprehensive agricultural research programme. Whatever limited R & D activities there are have been fragmented, carried out by independent organizations without the benefit of coherent planning and coordination, and rarely reflect actual farming conditions.

⁶⁸ FAO, *Cambodia Agricultural Development Options Review (Phase 1)*, Investment Centre, Rome: 1994.

Intended end users have very little input in R & D and extension delivery systems. Research and extension linkages are very weak, and technology demonstration activities often commodity-oriented and seldom geared towards a diversification of farming systems.

With their resources focused on lowland rice improvements, concerned state agencies and NGOs are unable to inject into farming villages much needed technologies (e.g., quality seeds) for non-rice crops on a regular and timely basis. Headway made by these agencies in the form of improved rice varieties and breeding techniques has yet to make a significant impact as low crop productivity is still partly attributed to the persistent use of low-yielding, traditional varieties.

Research on irrigation and on water management in farms are practically nonexistent. The same can be said of other high impact technologies such as those pertaining to the intensification and diversification of farming systems, processing of agricultural products and their by-products, aquaculture, and enhancement of terrestrial and aquatic ecosystems.

A case in point is the dearth of suitable processing equipment and technologies mentioned above. Affordable feed and food processing equipment are not available in many areas because of a lack of relevant R & D activity. Consequently, only large national and multinational corporations, which have the resources to import equipment and technologies, are engaged in agricultural processing industries today.

Labour Shortage

As women head about a quarter of the total number of farm households in Cambodia, there are serious labour constraints to certain farm operations such as land preparation. There are also seasonal labour shortages for certain labour-intensive operations such as rice transplanting, harvesting, and post-harvest handling. Without appropriate farm mechanization, it will be difficult to intensify the cropping systems in many of the farm holdings.

Institutional Problems and Financial Constraints

There are serious gaps and overlaps in the mandates of institutions in support of agriculture, fishery, and forestry. At all levels, there is a shortage of skilled technical manpower in the government institutions in support of agriculture.

Public institutions encounter not only severe technical manpower shortfalls but also financial constraints. The government has very meager budgetary resources and weak access to development finance. Without external assistance, public institutions can only pay the salaries of the employees and provide for about 10 percent of the rest of their budgetary requirements.

These institutional weaknesses have resulted in a lack of a systematic assessment of the developmental potentials of the country's resource base (e.g., water resources) and of baseline information for planning, programming, and implementing agricultural development projects. They have also hampered the construction of sorely needed infrastructure. Among others, the results are cumulative neglect of the repair, operation, and maintenance of infrastructure such as roads and irrigation facilities; limited interactions among farmers and extension agents; and weak dissemination of new technologies.

Inadequate Extension Services

The institutional arrangements and mechanisms for the effective delivery of agricultural support services such as extension programmes are either not in place or are inadequate. Agricultural extension services are very weak, and a fully functioning system for extending support services—and more importantly, of spreading technology—to the rural population has yet to be established.

Technical information is mainly conveyed through informal channels that include neighboring farmers, NGOs, agricultural technicians, and distributors of farm inputs. Farmers have very limited access to improved technologies, with existing agricultural extension services unsupported by R & D. State institutions are unable to focus and effectively deliver on a timely basis essential services and functions in support of highly productive, intensive, and diversified farming systems. As a result, farmers have little knowledge, experience, and skill in the use of modern technology, which is a concern given the low yields that characterize traditional farming systems.

Agro-industrial extension services are similarly absent. Ideally, such services should include technical assistance on the design and specifications of processing facilities and processes. This partly explains the lack of small- and medium-scale farm products and by-products processing facilities.

Limited Access of Farmers to Production Resources

Land

There are vital issues surrounding the empowerment of small farmers and fisherfolk. The most crucial among these pertain to instability and uncertainty of land tenure. Land titling is important for the sake of building a sense of security; it serves as a farmer's ticket into the formal credit market (i.e., as acceptable collateral) and as an incentive to invest in improvements such as irrigation and soil conservation.

There have been improvements in legislation regarding land rights in the last decade. Two decrees were passed in 1989 reintroducing individual land ownership while the state land law was promulgated in 1992. The latter provided for acquisition of ownership rights over agricultural and urban lands after five years of continuous and peaceful occupation as well as leasing of forestlands on concession. While this law presented a broader framework for the ownership, transfer, and registration of lands, it was ambiguous in many aspects. It did not preserve nor abrogate the 1989 decrees thus becoming a source of confusion and legal conflicts.

Under present laws, access to land of certain groups (e.g., returnees and people displaced by fighting and land mines, female-headed households, and elderly people) has been extremely difficult. Land disputes have multiplied as speculative transactions rapidly take place in certain areas in the country. And although a mechanism has been established for people to apply for ownership and possession of lands, issuance of certificates has been very slow: Only 10 percent of the applicants have so far received ownership certificates (480,000 certificates issued out of 4.5 million applications).

Common Property Resources

An issue critical to poverty alleviation and food security is securing (equitable) access to common property resources such as forestlands and inland water bodies. Marginalized rural dwellers, for example, are unable to secure tenure over both forestlands and trees as access to these is through timber concessions and fishing permits.

Inputs and Credit

Farmers and fisherfolk have weak access to credit and quality agricultural inputs such as certified seeds. Although the Cambodian government accords top priority to increasing farmers' access to rural credit, the expansion of such services in the country is constrained by the absence of rural banking facilities and lack of personnel with experience in rural finance.

Peace and Order Problems

The continuing conflict in some parts of the country, the presence of land mines in some 200 thousand ha of agricultural land, and the peace and order problems caused by infighting among political parties and plain banditry in many areas contribute to the instability in farming communities. Meanwhile, most farmers are unwilling to join farmers groups or rural institutions mainly because of decades of war and social upheavals resulting in dislocation of the labour force. Private institutions and entrepreneurship in most farming villages are in their nascent stage.

V.

VI.

VII.

VIII. Strategic Framework for Agricultural Development

IX. Focus on Food Security and Poverty Alleviation

After enduring nearly three decades of war, Cambodia is left with the enormous task of healing and rebuilding a fractured economy. Like all developing countries, it aspires to create a stable society that is governed peacefully, where poverty is eradicated, and where every citizen lives without hunger, empowered to shape her own future and fulfill her potentials.

The nation fully recognizes that economic growth is vital to realizing these aspirations, as overall progress is crucial to alleviating poverty and achieving food security. Cambodia has decided to face the challenges of development head on within a market-oriented framework. It has already put into place the necessary reforms to transform its economy from a centrally planned to a privately led system.

Given the nature of Cambodian agriculture (i.e., small farm holdings, low level of technology, and lack of security of tenure), the end view of any socioeconomic and agricultural development plan should be the promotion of a farm sector that is dynamic, productive, and competitive—one that takes advantage of technological innovations, stretches its development potentials, and is environment friendly, guided by sound principles of management technology for sustainable growth. Emphasis of such a plan should be the entitlement of small farmers and fisherfolk over production resources and the availability of opportunities to choose from a range of farming options.

Unstable output and poor productivity rates in the agriculture sector are mainly due to the low level of irrigation development (only 16 percent of arable land is irrigated), poor soil quality, slow adoption of farming technology, high incidence of flooding, and fickle weather. The slow growth rate of the sector can be blamed on five major obstacles: (1) lack of a market for rice and other agricultural products; (2) lack of essential infrastructure and facilities such as roads, irrigation systems, and post-harvest facilities; (3) lack of security of tenure or entitlement of farmers and fisherfolk over land, water, and other basic resources; (4) lack of control by the farmers and fisherfolk over their production environment; and (5) inability of both public and private sectors to inject appropriate technology and deliver effective agricultural services into farming villages. Addressing these problems is essential to an effective strategy to reducing poverty and food insecurity.

General Strategy

An assessment of the situation in Cambodia points to a two-pronged strategic framework that embraces rapid, sustained, and equitable agricultural growth as well as empowerment of the poor. The main thrust of the growth-mediated approach is to invigorate the agriculture sector, generate employment, enhance household incomes, and improve access of the less privileged to food. Among others, this calls for the maintenance of a consistent macroeconomic and agriculture policy framework that promotes an environment conducive to increased private sector participation in

agricultural development and encourages public and private sector investment in essential infrastructure, provision of public goods, and human resource development.

Such a strategy seeks to promote rapid and sustainable increases in production through the adoption of technologies that boost productivity and reduce costs and the establishment of small-scale private irrigation systems and similar infrastructure appropriate to small farms, which are the norm in Cambodia. To maximize household income and improve nutrition of the poor, the strategy emphasizes intensification and diversification of farm enterprises, greater control of farmers over their production environment, provision of effective agricultural support services, enhancement and protection of environmental resources, and strengthening of downstream linkages with agro-processing industries and the agribusiness sector.

Due to differences in resource endowments, agro-climatological conditions, and institutional settings, it is unlikely that all communities and individuals will benefit equally from accelerated agricultural growth. In this context, the second thrust of the two-pronged framework highlights the need for an entitlement-mediated approach to enhance the ability of the rural poor and vulnerable groups to participate in the growth process. The focus of this strategy is to improve these groups' access to land, water, and other production resources and freedom to choose what technology to apply, which commodity to produce, and when and to whom to sell their output. The underlying goal is to expand income and employment opportunities and improve health and living standards.

Even in areas where prospects are good, "trickle-down" benefits from the growth process may not be adequate—or rapid enough—to ensure food security in less privileged communities. Hence, intervention measures or programmes specifically targeted to underprivileged communities and individuals are needed. These measures should also seek to address the issue of transitory or short-run food shortages (such as food deficits in a lean season or in a year of crop failure) as even temporary shortfalls can push those near the poverty threshold into the poverty trap.

The success of the strategies described above hinges on the government's continued drive for economic liberalization, human resource development, good governance, judicious utilization of public resources, and an efficient provision of public goods. It depends as well on the adoption of a more participatory and people-oriented approach to growth.

Principles for Setting Priorities

Given the myriad problems facing Cambodia, it is tempting to evolve programmes and measures that address a scattered range of activities, areas, technologies, sub-sectors, commodities, and institutional settings. But often, the database needed for planning and implementing such activities is inadequate and cannot be generated in the short and medium term. Moreover, the implementation of such activities might not be properly financed, managed, and monitored given available resources.

It is therefore important to opt for fewer but clearer priorities. The setting of such priorities must be based on a clear understanding of what is doable, and on a full appreciation of the developmental potentials and constraints (including the tightening fiscal bind of the country) and the foreseeable challenge of adjustment to rapid changes in the national and regional environments.

From this perspective, this study recommends the following principles or considerations for prioritizing agricultural development efforts:

- *Food security and poverty alleviation.* The aim of agricultural growth should be to maximize rural welfare. Public funds must be channeled to provision of public goods with the largest social return such as farm-to-market roads and village water supply systems. Livelihood generating strategies such as intensification and diversification of farming systems and development of farming enterprises based on agricultural products and their by-products

should likewise help ensure that agricultural growth contributes to food security and rural welfare.

- *Global competitiveness.* The policy goal should be the development of an efficient, dynamic, and globally competitive agriculture sector. Given the changing global trade scene, the country must strive to establish a competitive edge in agriculture, fishery, and forestry. This would imply the following actions: (1) provision of suitable and cost-effective infrastructure; (2) development and adoption of productivity-enhancing technologies; (3) proper management and optimal use of natural resources; and (4) human resource development.
- *Equity.* The principle of equity should be preserved with regard to access to land and production resources (including technology) and the distribution of benefits. This calls for a rationalization of land laws, accelerated implementation of land and property titling programmes, and speedy resolution of land disputes. Also required is a proper setting of development priorities and targeted programmes to improve the access to production resources and technologies by those below the poverty line. Among others, this suggests the following measures: (1) development programmes in which the broadest cross-section of farmers and fisherfolk participate (e.g., rice-fish farming in lieu of inland capture fishery, backyard livestock production, and community or participatory agro-forestation); and (2) entitlement of the poor to forestry lands suitable to crop agriculture and agro-forestry (i.e., long-term lease).
- *Irrigation development.* For growth to be rapid and sustained, any crop production strategy must have as its cornerstone irrigation development and greater degree of water control by farmers. Only with irrigation, good water management, and effective agriculture support services can farmers have a great degree of control over their production environment and flexibility to choose judiciously from a range of farming options. Without irrigation and support services, the opportunities for maximizing cropping intensities and optimizing yields through various technologies (e.g. fertilizers, hybrid seeds, and pest management) are effectively diminished.
- *Cost-effectiveness and simplicity.* Emphasis should be placed on simple, small-scale facilities and infrastructure that are cost-effective, easy to construct, and within the capabilities of farmers, communities, and NGOs to repair, operate, and maintain. In the case of irrigation, for example, there are opportunities for the development of extensive shallow tube-well and low-lift pump systems. Such irrigation schemes are simple to install, affordable, conducive to crop diversification and intensification, and can easily be privatized. In contrast, existing gravity systems, while they cover larger service areas, are more expensive and difficult to construct, operate, and maintain.
- *Sound investment criteria.* In choosing the type of infrastructure or technology, sound investment criteria should be applied. These should include opportunity for (operations and maintenance) cost recovery, suitability, and sustainability. Greater private sector participation and gradual removal of subsidies (e.g., on irrigation and fuel for the operation of irrigation pumps) are also implied.

Key Components of the Strategic Framework

Based on these principles, the strategic framework focuses on ten key components:

- *Maintenance of an appropriate macroeconomic framework* and a favorable agricultural policy and institutional environment.
- *Accelerated and sustainable irrigation development* including a greater degree of water control (and drainage) by farmers.
- *Development of highly productive, and diversified farming systems* through, among others, soil, pest, and seed management, and appropriate farm mechanization and post-harvest technologies.

- *Accelerated programme for land titling and land distribution.*
- *Strengthening essential agricultural support services* including marketing, input distribution, extension programmes, research and development (R & D), and credit.
- *Provision of essential social services and public goods* such as village water supply systems, transport and communication facilities, and storage and warehouse facilities.
- *Expansion of livestock production* with emphasis on animal health services, nutrition, and range management; and focus on small-scale poultry and swine production, large animal husbandry, and establishment of feed processing plants.
- *Improved management of appropriate technologies* for rice-fish farming and aquaculture.
- *Promotion of community-based forestry, agroforestry, and agroforestry-livestock farming systems*; sustainable production of fuel wood; and protection and management of critical watersheds.
- *Direct support and protection to the poor* through targeted programmes.

Implementation Strategies for Key Sectors and Components

Prior to presenting in detail the key measures that must be implemented, two caveats that guided the crafting of this strategy must be presented. The first is the realization that success of any strategy is closely linked to the existence of a favorable policy environment—and institutions supporting that environment—where even the smallest farmer can secure land and gain access to technology, credit, markets, and institutions.

The second is that it is equally important to ensure that incentives offered do not conflict with the country's commitments under international agreements and its possible entry into the ASEAN and World Trade Organization (WTO), and that policy initiatives taken foster an environment conducive to the development of a modernizing and vibrant rural economy, one that boosts the country's export potentials. In accordance with the macroeconomic framework emphasizing market-orientation of the Cambodian economy, these initiatives should comprise the following policy directives:

- *To preserve and maintain a liberal and market-oriented trade environment* characterized by uniformly low tariffs and export taxes, and free of bans and quotas;
- *To deregulate further the exportation of agricultural products*, remove unnecessary internal regulatory constraints, minimize licensing, and remove capacity limits;
- *To develop product quality standards by encouraging private sector investment* in appropriate infrastructure and equipment for post-harvest handling, storage, and processing (e.g., milling, cleaning, and drying); and
- *To legislate and enforce appropriate commercial laws and institutional arrangements* for efficient and cost-effective conflict resolution and to enhance transparency and accountability and reduce transaction costs.

Irrigation Development

The primary strategies for achieving rapid and sustained agriculture growth in the short-term are to jump start the development of cost-effective irrigation technologies (e.g. shallow tube-well and low-lift pump systems) and boost the performance of existing irrigation facilities through minor repair, proper operation and maintenance, better water management, and improved delivery of essential support services.

This is especially true given that a prerequisite to crop intensification and diversification (which in turn lead to a diversification of agricultural enterprises) is the development of farmer-

controlled small-scale irrigation facilities which give farmers greater degree of control over their production environment and their choice of crops and crop mixes.

Medium- and long-term strategies should hence include the following: construction of small-scale irrigation systems that are private sector-led; improvement and expansion of areas covered by medium-size and large-scale irrigation systems as institutional capacity for the planning, construction, and operation of such systems is enhanced; optimization of benefits from irrigation development; and creation of a comprehensive water development plan. These strategies, in their order of priority, are listed and discussed below.

A. Accelerated Development of Small-Scale Irrigation Systems

Cost-effective, short-gestation, and farmer-controlled irrigation facilities must be immediately developed. These systems, feasible in most areas where crops are grown, include motorized shallow tube-wells (STWs), low-lift pumps (LLPs), and manually operated tube-wells (MOTs). Such systems are extremely conducive to crop intensification and diversification (not to mention privatization), especially given adequate policy support. In addition to improving yields, use of groundwater irrigation systems can also increase the supply of potable water in most farming villages.

Specific implementation modalities are as follows:

- **Shallow tube-wells.** Installation of STWs should be initiated by the private sector. The government in collaboration with private entities including NGOs can provide support in the form of credit, training, extension services, technology demonstrations, and research. The initial focus should be on the provinces of Takeo, Kandal, Prey Veng, Svay Rieng, and Kampong Cham which have an estimated aggregate shallow well area of over 1 M ha. There are good medium and long-term prospects for STW irrigation development in other provinces (e.g., Kampong Thom, Siem Reap, Battambang, Banteay Meanchey, Pursat, Kompong Chhnang, and Kampot).
- **Motorized Pumps.** Use of small, axial flow or centrifugal pumps powered by 3-8 horse power (Hp) engines for pumping water from rivers and other open water sources and for greater water control (e.g., drainage and irrigation) should also be promoted where appropriate via the private sector. This can involve conjunctive use with colmatage irrigation and rice-fish farming systems to increase water availability. As in the case of STWs, the government and private entities can collaborate in providing essential support services. The use of engines for multiple purposes (e.g., powering boats, tillers, trailers, and threshers) should also be encouraged to ensure the optimum use of the engines which constitute the bulk (about 65 percent) of the cost of most farm machines.
- **Hand and treadle pumps.** Promotion of hand and treadle pumps for the irrigation of home gardens and as source of water for domestic use (e.g., in homes, for feeding livestock, and for small fish ponds) should likewise be promoted through the private sector. MOTs are feasible in most provinces, and can provide a yearlong supply of vegetables and other secondary food crops to rural households. It is particularly useful for homes in the upland and lowland rain-fed areas, in elevated beds or "surjan," and in flood recession rice areas.
- **Financing.** To fast track the development of STW, LLP, and MOT systems, grants from international donors should be tapped. The feasibility of sourcing funds from ongoing programmes and projects such as CARERE should also be explored. Grants must be earmarked or given directly to the target communities, where they can serve as revolving funds by which continuing investments in the irrigation schemes can be financed. This allows full investment cost recovery for participating farmers.

- **Action Plan.** An action programme is needed for effective and large-scale implementation of irrigation systems. For better targeting of beneficiaries, a systematic procedure for delineating STW and LLP areas and identifying beneficiaries is needed. The following procedures are recommended for this purpose.
 - *Identification of target or priority communities.* From the various reports, it is possible to delineate the communities in order of priority (e.g., based on relative incidence of poverty or magnitude of food gap).
 - *Generation of relevant base maps for STW and LLP irrigation and superimposition of base maps to delineate possible areas where LLP and STW irrigation are feasible.* A base map charts the attributes of an area that are relevant to the development of STWs and LLPs (e.g., topography, drainage patterns, and shallow aquifer properties, food supply and demand situation).
 - *Rapid appraisal to delineate the areas in target communities where the two modes of irrigation are feasible.* This should be achieved within about 80 to 90 percent certainty.
 - *Consultations and dialogues between and among local government units and target communities (e.g., provinces, districts, and village development committees).* This should be done to gauge the willingness and readiness of rural households to participate in the proposed irrigation development scheme. These consultations should also include an assessment of relative capabilities of the government units to operate and maintain the irrigation facilities.
 - *Pilot installation and operation of feasible systems in the target communities.* STWs should be given priority as these are less vulnerable to droughts, watershed degradation, siltation, and natural calamities. In the case of STWs, expertise as well as suitable, low cost well-drilling and well-development equipment might initially have to be brought in from countries which have had successful experience with this mode of irrigation. These activities should be carried out in the earliest possible time.
 - *Formation of small self-help groups.* Although the priority is individual ownership of STWs and LLPs, farmers with small landholdings can band together to put up these systems and share the benefits. Self-help groups with two or more members can be formed in such arrangements where STW and LLP schemes serve more than one farmer.
 - *Enhancement of the capacity of farmers' groups, private entities (e.g., local drillers and village artisans), and local government units to design, install, and operate the irrigation systems.* This can be achieved through on-the-job training, study tours, and demonstration of appropriate technologies. In the case of STWs, the demonstration may include local fabrication and operation of motorized drilling rigs; proper well design, drilling, and development given different geologic formations; selection, matching, repair, operation, and maintenance of pump sets; conveyance and on-farm management of irrigation water for intensive and diversified irrigated agriculture; and integrated crop cultural management packages.
 - *Pilot implementation of new and improved technologies.* This can be in the form of improvements in integrated water systems, soils and fertilizers, pest and disease management, seed management, and farm mechanization.

A. Improvement and Selective Rehabilitation of Existing Irrigation Systems

Even though many of the existing irrigation systems are technically inefficient, performing sub-optimally as a result of poor planning and design, there can still be a strong case for improvement, repair, and selective rehabilitation of existing irrigation systems. With minor repair,

design changes, and a rectification of operation and maintenance oversights, a number of these systems can still be made fully operational.

Such efforts, however, should be limited to irrigation and flood control systems that are functional and which local governmental units and farmers groups can operate and maintain effectively and efficiently. These include some small- to medium-scale flood recession or inundation schemes, colmatage canal systems, reservoirs, and river-based systems with low diversion dams. The emphasis here is on systems that have the potential to support the intensification and diversification of cropping systems, especially in depressed areas with chronic food shortages.

A. Development of Small Storage Reservoirs and Colmatage Canals

Apart from technical feasibility, criteria for the choice of such irrigation systems should include cost-effectiveness, affordability (with focus on technologies with investment cost below \$2000/ha), sustainability, and simplicity of operation and design such that they are within the capacity of farmers or farmers' groups to repair, operate, and maintain.

These systems should be promoted in food deficit areas where potentials for crop intensification and diversification exist and where farmers' participation, control, and willingness to bear the full cost of operations and maintenance can be ensured. Careful planning and analysis are needed to ascertain that appropriate design criteria are developed and that negative environmental effects characterizing previous irrigation projects are minimized.

A. Optimizing Benefits of Irrigation Development

Even in areas with fertile soil, irrigation development brings rice yield levels to only about 3 mt/ha. To bring yields up to their estimated potential levels of 4 to 6 mt/ha requires parallel development in other aspects of irrigated crop production. It is therefore important to promote new and improved technologies (e.g., integrated irrigation water-soils, fertilizers-pest, diseases-seeds, and seedling management; and suitable farm mechanization), accompanied by technology demonstrations by competent trainers.

Improving Farming Systems

There are excellent opportunities and potentials for improving existing farming systems. Unfortunately, these cannot be fully harnessed because of an unfavorable policy environment, lack of full appreciation of the nature of such opportunities, and inappropriate development strategies. Such opportunities and potentials exist in crop production as well as in the livestock and fisheries sectors. Appropriate changes in policies should enable farmers and fisherfolk to take advantage of these opportunities.

A. Crop Intensification and Diversification

Crop intensification and diversification (and increased value-added through secondary and tertiary processing) will not only increase farm incomes but also bring underprivileged groups into the mainstream of agricultural development. High-impact intervention areas include the following: improved water regime control (i.e., field drainage); R & D and subsequent field testing demonstrations of appropriate technologies (e.g., new crop techniques, farm mechanization, balanced fertilization, integrated pest management, and improved land preparation techniques); and effective support services for intensive and diversified farming systems.

The development of an export market for rice and other food crops must go hand in hand with the promotion of crop diversification in rice-based cropping systems. The public and private

sectors should work together in promoting the intensification and diversification of farming systems to produce a number of desirable results:

- *A wider range of technology options.* Farmers are given a broad range of options in terms of technology, farming systems, crop mixes, and cropping patterns, allowing them to take advantage of a favourable production environment and better farm gate prices.
- *Economical use of water.* Water used for one purpose can be re-used for another (e.g., for inland fishery and irrigation) in such technologies as rice-fish farming widely practised in Southeast Asia.
- *Improved nutrition.* In addition to improving fish production, diversification of farming systems can also encourage the production of nutritionally valuable crops such as field legumes and vegetables.
- *Stable food supply.* Production of certain food and feed crops can be spread out within a crop year. Not only will this smoothen out seasonal fluctuations in food supply and farm gate prices but will also increase the level of utilization of post-harvest facilities rendering investment in such facilities economically attractive.
- *Higher yields and potential for import substitution.* Field trials have shown high yields of vegetable, corn, and soybean with use of HYV seeds and improved technology. Potential for import substitution is particularly high for farm products such as vegetables, feed grains, and feed concentrates.
- *Enhanced ecological stability and soil productivity.* The threat from pests and diseases associated with rice monocultures are minimized by diversified cropping systems. Certain crops and crop cultural practices should also be integrated into the farming systems to minimize the danger of depletion of major and minor soil elements.
- *Farm product variety, higher value-added, more jobs.* Crop diversification offers excellent opportunities for diversification of farm products and their by-products and opens up opportunities in the secondary and tertiary processing industries creating higher value-added in this sector apart from generating more jobs. It can, for instance, spur the production of fish, corn, soybean, cow peas, sweet potato, and other feed crops, which can encourage the processing of animal feeds and fishmeal, which in turn can be used by the community in raising fish, hogs and poultry.
- *Vertical integration, feeds production, and sustainability of agriculture.* Development of associated industries will eventually lead to a production system orientation that will, in turn, lead to vertical integration of agricultural production activities (i.e., from irrigation, to appropriate farm mechanization, to primary post-harvest operations, to secondary and tertiary processing of farm products, to utilization of farm products and their by-products by related agro-industries). This will allow the agricultural system to become self-sustaining.

A. Expansion and Improvement in Livestock Production

Livestock production should be expanded and improved primarily to benefit the majority of the rural poor. Emphasis should hence be on backyard production of poultry and swine. To a certain extent, large animal production should also be encouraged to meet the growing need for suitable draft animals and meat and dairy products.

The thrust in the poultry and swine industry should be to increase production efficiency through improved animal health services and nutrition. Among others, this requires improved veterinary services at the village level—mainly vaccination and disease control.

The strategy for large animal production, meanwhile, should combine raising of draft animals in backyards and draft and dairy animals in ranges and pastures. The possibility of utilizing shrub lands and open areas for cattle and buffalo production should be explored, but possible adverse impacts such as soil erosion should also be carefully studied.

The feed industry should be developed, and opportunities harnessed to set up integrated animal and fish feed processing plants. These can concentrate on small- to medium-scale feed crops production (e.g., corn, mung bean, soybean, and root crop production where the country has a competitive advantage), feed and fish meal processing, and swine, poultry, and fish production using locally formulated feed concentrates. Small-scale feed plants require equipment like dryers, mills, and mixers. If such machinery can be designed and produced locally, the country will have a competitive edge over other ASEAN countries.

Contract growing of pigs and poultry should similarly be encouraged where agribusiness corporations provide the capital, technology, and managerial know-how and small farmers and rural folks provide land and labour. There is currently no large-scale investment in the raising of pigs, cattle, and poultry though. The government should encourage such inflows, possibly from ASEAN entrepreneurs and multinational agribusiness corporations, especially upon the entry of the country into the AFTA. Large agribusiness conglomerates can open doors to export markets given there is surplus production.

A. Improved Management and Appropriate Technologies for Rice-Fish Farming and Aquaculture Schemes

Practices that are already well established in many Asian countries should be introduced through technology demonstrations and allowed to take root with the training of recognized leaders in farming and fishing communities. In most of these practices, fingerlings are introduced into the rice fields, their natural food supplemented with feed concentrates, and trap ponds built within or near the rice paddies to serve as refuge for the fish if the fields start to dry up.

LLP and STW irrigation systems and chemical-free pest management methods, the lack of which presents major constraints to productive and sustainable rice-fish farming, should be applied. Adoption of these two methods allows for better water quality management,

Given the potentials for rapid growth, aquaculture (e.g., inland pond, pen, and cage fish culture) can be introduced throughout the country. The long-term goal should be the expansion of commercial aquaculture enterprises.

Community-Based Forestry and Agroforestry

It is not too late to establish a forest policy framework that adequately takes into account the food security and poverty alleviation considerations. An effective policy on forest resource utilization must have these two broad goals: optimization of benefits to rural communities through community-based forestry, agroforestry and agroforestry-livestock farming systems, and sustainable production of fuel wood; and preservation of positive impacts of forests on stream flows, surface water quality, and aquatic resources through proper management of critical watersheds.

Rational and sustainable use of forest resources by rural communities, in most cases, can best be achieved through the establishment of long-term leases or land ownership. Without the security that such arrangements provide, users are unlikely to initiate improvements in forest areas or even strive to protect these resources. Hence, the first step to promoting a truly community-based agroforestry should be to transfer control of forest areas from the state to communities or individuals.

The development of agroforestry must be planned in harmony with the development of crop agriculture. It is imperative that community-based forestry, agroforestation, and agroforestry-livestock farming systems be planned in such a way as to strike a balance between preserving the beneficial hydrologic role of forest ecosystems and increasing food production. The emphasis on

watershed management protection should be on erosion control, watershed protection, reforestation, and water resource enhancement.

Clearly, long-term benefits from the country's forest resources can only be optimized through better conservation and management. It is in this sense imperative that the government come up with a coherent set of policies to address problems surrounding forestry management and conservation, and strengthen its political resolve to effectively implement these policies.

The 1996 Forest Policy Assessment Report of the World Bank, UNDP, and FAO proposes a forest policy reform agenda that incorporates the basic issues. Several studies supported by these three institutions are also underway to help guide government's efforts in formulating an appropriate forest policy framework.

Land Tenure and Titling

Land tenure and titling are becoming increasingly important issues, particularly so in light of growing need to strengthen the legal basis for market-driven agricultural development as well as to resolve a growing number of land disputes. Evidently, quick steps must be taken to correct the situation.

To this end, existing land and natural resource laws should be rationalized. A thorough review has to be undertaken (and the necessary clarifications and amendments made) as relevant provisions in various legislation concerning these resources are often complex and unclear.

At the same time, relevant public institutions should be strengthened at all levels. The present judicial system—from municipal and provincial courts to appellate courts—is ill equipped to deal with land disputes. As pointed out by the World Bank (Cambodia Agricultural Sector Memorandum, May 1996), bolstering the ability of the judicial system to handle land disputes through reorganization and retraining should be a priority goal in institutional development. Technical and administrative capability of the Department of Land Titling, the state agency charged with processing land titles, similarly needs to be enhanced.

A land use code should also be crafted immediately. This ideally embodies sound planning, allocation, and regulation of property. Such a code can serve as a blueprint for zoning in the country, where zones are determined according to the economic and environmental uses of available land (e.g., agricultural, industrial, and municipal uses based on appropriate socioeconomic and environmental criteria). Military landholdings, which include potentially productive agricultural lands, however, must not be exempted from the zoning process.

Allocation of additional land to farmers who missed out during the initial phase of the land distribution process or whose land holdings are very small should be considered. Special measures, meanwhile, might need to be implemented to secure land tenure for vulnerable groups (e.g., new settlements and ethnic groups subsisting on forestlands). These could consist of long-term leases or permits from national and regional government units, the support of local authorities, and their collaboration with military chiefs in such areas.

Ethnic communities, which subsist on what they gather or hunt from common property resources such as forest and fresh water resources (e.g., flood recession rice cultivators and cash crop growers along the Tonle Sap Lake flood plain), should be given security of tenure over the use of these resources. These areas are now slowly being taken over by commercial enterprises, but the rights of these traditional users have been left unprotected amid the development. The most acceptable means to safeguard the rights of traditional users is to give them long term stewardship contracts with concerned government agencies. Such contracts can eventually be transformed into private ownership depending on the quality of stewardship exhibited over these resources.

Strengthening Essential Agricultural Support Services

There should be renewed efforts to provide timely and effective agricultural support services in the form of marketing assistance, input distribution, extension programmes, skills training, technology demonstrations, credit support, product standardization and testing, and quality control and monitoring. The capacity of the private sector to eventually perform most of these essential functions should be enhanced. This requires clear-cut policies and guidelines, a clear (legal) framework defining the role of the private sector vis-à-vis the state, institutional reform, and closer collaboration among the public and private sectors, farmers, and fisherfolk.

Marketing

Marketing is one the major constraints to agricultural growth and diversification in Cambodia. Some of the important issues that should be addressed immediately are the poor state of roads and bridges, collection of ad hoc road fees, poor physical condition of markets, inadequate market information, weak linkages with export markets, and institutional incapacity to regulate and promote market development. The following recommendations are offered towards improving agricultural marketing in Cambodia:

- *The government should continue to mobilize donor support to rehabilitate Cambodia's road infrastructure.* At the same time, it is imperative that the country mobilizes its internal resources to enhance national capacity to plan and implement provincial and local roads rehabilitation projects. The government should identify important roads for priority consideration.
- *The government should intensify its efforts to curb illegal road taxation.* The road fee was formally removed after July 1997 but is still illegally practiced in some areas.
- *Existing wholesale and retail markets in the cities, as well as district and town level facilities and services for trading, should be improved.* Upgrading should include cleanliness and drainage to improve efficiency of movement and reduce losses and the risks to the consumer from poor hygiene. The provision of storage and post-harvest facilities at farm and market levels will also cut down on post-harvest losses.
- *The capacity of public institutions to improve essential agricultural marketing services and functions should be enhanced.* The MAFF and the MoC should cooperate strongly and provide leadership in the development of agricultural marketing. These institutions should develop strong partnerships with private trade associations and NGOs in devising a national programme for market development. The programme should be based on a clear consensus on the roles and responsibilities of government, the private sector, and other stakeholders; and the norms and standards that must be followed to ensure regular supply of safe agricultural products to consumers and agro-industries at a fair price.
- *A viable export promotion scheme should be developed and export procedures rationalized to promote legal export.* As Cambodia increases rice production, there will be a need for a more organized approach to rice export promotion if the country is to compete effectively with other major rice exporters. Such initiative should come initially from the MoC, perhaps in collaboration with the Phnom Penh Chamber of Commerce and rice exporters. The plan should include a detailed assessment of the international rice market, provide Cambodian traders and producers alike an understanding of quality and variety potentials, bulking requirements for optimal consignment, and appropriate international trading practices. The government must act quickly to reduce or remove all internal regulatory constraints as well as to establish a network that can pool essential trade information.
- *Credit facilities for all participants in the marketing chain should be established.* Marketing development requires financial services for traders, wholesalers, and retailers to move the produce through the marketing channel. With the expected increase in marketable surplus, credit assumes an increasingly important role in market

development. The government should thus enact appropriate banking legislation that facilitates the opening of private sector banks geared to the needs of traders and processors in urban and rural areas; and mobilize financial resources or provide credit lines required by the private sector to establish much needed post-harvest, storage, and processing facilities.

- *The government should support the Market Information Service (MIS) to ensure that its operation is maintained even after completion of external aid.* The MIS, which is currently receiving assistance from the FAO, tracks prices as well as supply and demand conditions and has thus fulfilled an important and necessary function that has been used to good advantage by producers, traders, consumers, and relevant government institutions.

Research and Development

The government should target its limited financial and technical resources into research that will enable the country to harness its developmental potentials. This implies formulating a comprehensive research agenda that focuses on location-specific problems and opportunities and places a premium on coordination, collaboration, and concerted effort.

There is also a need to depart from the traditional commodity-specific outlook and move towards an integrated production systems or resource-based orientation which can support vertical integration of agricultural production activities (i.e., from irrigation to farm mechanization, to primary post-harvest operations, up to tertiary processing of farm products and their by-products).

For accelerated and sustained growth of agriculture, a comprehensive R & D programme for developing irrigation systems should be formulated and relentlessly pursued. The packaging and implementation of parallel R & D programmes along key components of the proposed agricultural development strategy should likewise be accorded top priority. This implies greater investment in the training of R & D personnel and improvement of facilities that support the agenda. Greater participation of intended end users is also implied if R & D activities are to be attuned to the needs of diverse farming communities.

Delivery of Extension Services

In 1995 the Department of Technique, Economics, and Extension (DTEE) in Phnom Penh and the Offices of Technique, Economics, and Extension (OTEE) in the provinces were established for the purpose of strengthening the institutional arrangements for the delivery of agricultural extension service. The overall role of the DTEE is still being formulated together with a national extension policy framework that is being developed with assistance from the Cambodia-Australia Agricultural Extension Project.

The guidelines in drafting the framework embody a farming systems development approach to extension. Extension programme packages for farming systems are developed for each province. In the draft extension policy, the extension delivery system will be focused on the district level. District level extension agents are given responsibility for developing and managing extension programmes for their district while subject matter specialists from the MAFF technical departments are supposed to provide technical support to these agents. It is assumed that the district extension agents will be regularly fed with the quality research outputs and other information for dissemination to farmers and for planning extension programmes.

The proposed delivery system, however, may not be appropriate in the face of financial, technical, and institutional constraints. In the short and medium term, it would be more appropriate to disseminate information through existing channels or media. The institutional mechanisms or arrangements for the shared responsibilities of the DTEE and the MAFF technical departments, meanwhile, should be made explicit, with an eye to strengthening these linkages.

The processes connecting research and extension should also be strengthened. Since it is not feasible to supply the extension system with location-specific research in the short and medium term, the initial focus of research and extension services should be on the identification, testing, and adaptive modification of promising technologies developed outside of the country. This is especially true in the case of agro-industrial extension services (e.g., assistance on the design and specifications of post-harvest and processing facilities). Such services have been sorely neglected, which partly explains the current shortage of small- and medium-scale processing facilities for farm products and their by-products.

Input Supply and Distribution

A national seed programme with greater private sector participation must be developed. The relatively poor distribution of inputs can also be improved through a rehabilitation of the local road system. There should be greater effort exerted in the monitoring of both quality and quantity of inputs.

Credit

The critical issues facing the financial sector in Cambodia touch on the need to strengthen human resource and institutional capacity and formulate an appropriate regulatory and legal framework; the provision of loan capital; and the assessment of the feasibility of the newly established Rural Development Bank (RDB). Support to the sector should, therefore, be focused on the following areas:

- *Training for National Bank of Cambodia (NBC) officials, other government policy makers, and credit operators.* For NBC officials and policy makers, the training should include exposure visits to other Southeast Asian countries where they can study the policy and regulatory environment for microfinance. For credit operators, training is essential in diverse fields such as best practices and methodologies, record keeping, sustainability planning, savings mobilization, and financial intermediation.
- *Technical assistance to develop and refine credit policies and legislation and create an appropriate regulatory framework for microfinance institutions.* Technical assistance is needed in the feasibility study of the RDB, research that should include identification of the demand for the bank's services and an assessment of its operating plans. For most credit operators, technical assistance must be focused on mentoring nascent rural credit programmes of local NGOs. The more mature operators will require assistance in the area of transforming these credit schemes into formal microfinance institutions.
- *Mobilization of loan capital for the expansion of the sector.* Greater emphasis should be placed on mobilizing domestic savings rather than depending on external grants or loans.

Other activities that can support the development of the microfinance sector include the establishment of a Credit Operators Association that could be used as a vehicle for capacity building, coordination, and self-regulation; and the formation of Technical Working Groups among credit operators to communicate with the NBC on specific technical issues such as performance and reporting standards as well as licensing procedures.

Farm Mechanization

Low wages, small farm sizes, and lack of credit and available technical knowledge (e.g., to repair and maintain farm machinery) do not generally favor mechanization in Cambodia. However, recommended intensification and diversification strategies for farming systems and the existing paucity of draft animals indicate the need for selective mechanization in areas with acute farm labour shortages.

At present, approximately 12 percent of Cambodia's rice-growing area is plowed using four-wheel tractors. Mechanical rice threshers, mostly of Vietnamese design, have become the fashion in most provinces. Recently, the use of irrigation pumps has similarly gained popularity in many areas.

For Cambodian conditions, a combination of four-wheel and hand tractors should appropriately supplement the traditional methods of using animal-drawn plows and carts for field preparation and farm transport. As a matter of principle, mechanization should not be pushed in Cambodia; it should rather be demand-driven based on the realities of labour demand and supply conditions in relation to the cropping cycle. Public institutions can facilitate appropriate mechanization through provision of technical advice to farmers and bankers on the choice of machinery.

For the long-term, a national mechanization plan should be formulated. Such a plan should be based on in-depth analysis of the mechanization needs of a modernizing agriculture, the capability of local machinery manufacturers, the availability of raw materials for fabrication, the feasibility of machinery pooling, and the need to strengthen after-sales service of farm machinery. Analysis of mechanization needs should be oriented towards farming or production systems to fully exploit the multiple use of machines or their components.

For instance, the multiple use of engines, which usually account for 50 to 65 percent of the cost of farm machines (e.g., STWs or LLPs, hand tractors, farm trailers, crop threshers, dryers, fishing boats and village rice mills), can render the mechanization of many aspects of crop production economically attractive. The growing popularity of hand tractors in the Philippines is explained partly by the proliferation of STWs and LLPs. Engines (e.g., 6 to 8 Hp single cylinder) of these small-scale irrigation schemes are also used to power hand tractors, rice threshers, corn shellers, farm trailers, and reapers.

Post-harvest Facilities

The thrust in post-harvest handling and processing should be towards minimizing post-harvest losses and diversifying and improving the quality of farm products and their by-products through use of suitable harvest and post-harvest technologies and facilities. Upgrading existing rice mills can save about 6 to 8 percent of rice output.

Better drying, bulk handling and storage facilities, and product quality management should be established. There is also a need for continued testing and evaluation of performance of post-harvest facilities and quality of farm products and their by-products. This improvement in quality is essential to boosting agricultural exports and is hence vital in Cambodia's bid to enter the export market.

The lack of inexpensive small-scale feed and food processing equipment and technologies should be addressed through relevant R&D activity. A good starting point in solving this problem is to introduce (for testing and adaptive modifications) promising technologies and equipment developed abroad.

The government should promote a policy environment conducive to the entry of local and foreign investors into agro-based industries. Emphasis should be on secondary and tertiary processing of farm, forestry, and fishery products and their by-products, which includes medium-scale food processing, as well as local manufacture of simple farm machines such as power tillers, threshers, trailers, and pumps.

Provision of Other Essential Social Services and Public Goods

The joint use of water transport (e.g., rivers and man-made canals) with rural roads in light of increasing availability of small engines (prime movers of pumps) that can power boats should be reexamined. Storage and warehousing requirements at strategic locations to house projected rice export volumes in a gradually modernizing agriculture sector must also carefully assessed.

The emphasis on groundwater irrigation can improve the potable water supply situation for most farming villages. Whenever necessary and feasible, the installation of STWs and hand tube-wells (HTWs) should also be for the purpose of providing alternative sources of domestic water supply. In the drilling and construction of such systems, care should be exercised to avoid surface water contamination. Deeper artesian aquifers should instead be tapped with the last five to ten feet of pipe driven by hammering and the well properly grouted at the soil surface.

I.

Direct Support and Protection to the Poor

In a spatial sense, the poor are all over the country. However, they tend to be concentrated in agricultural households and in villages with a low level of infrastructure development. Since some type of area targeting will serve to maximize impact, the approach adopted by the WFP in selecting target communes seems very reasonable, at least in terms of excluding better-off areas.

Direct entitlement-enhancing programmes such as the WFP's "food-for-work" projects and emergency food targeting should hence be maintained. Given current trends, such programmes do not need to be expanded although some flexibility is desirable to tackle emergencies when they arise. Targeting efficiency has been greatly improved in this respect, and will surely improve even further. The main point here is that a system of targeting and delivery is already in place and should be retained and strengthened as a medium-term policy.

Cereal banks should be established in villages suffering from very high yield fluctuations, but the institutional capability to create and operate cereal banks has to be strengthened. This scheme has already exhibited some degree of success in stabilizing household consumption in villages subject to very high yield fluctuations.

Special safety nets that enhance the competitiveness of small farmers and fisherfolk, especially those who produce commodities included in the country's sensitive list under the AFTA scheme, should also be provided. Special programmes and projects must be formulated and implemented to make the commodities on the sensitive list (e.g., some vegetables, legumes, fish, and livestock) more competitive with those of the ASEAN member countries within the 13-year grace period during which tariff rates are left untouched. Tariffs collected during this grace period can be earmarked for the funding of safety nets.

Meanwhile, remote areas such as Mondul Kiri, Ratanakiri, Kratie, and Stung Treng, which are thinly populated and very poor, pose serious logistics problems and may best be tackled through programmes designed to improve skills and technology; ameliorate water, sanitation, and health conditions; and strengthen infrastructure. The delivery vehicle for development inputs still has to be created, but a start could be through cooperation with NGOs already operating in these areas.

I.

Empowering the Poor

While direct intervention measures can help tide the poor over in periods of distress, the only way that they can truly be partners in progress is to allow them access to production resources. These could be in the form of land ownership or claims over the use of common property resources. Another way to empower the poor is to guard their health and nutrition, labour being the most basic asset. Provision of public goods such as safe water and health services and the availability of credit can perform this function and in the process widen the participation of vulnerable groups in the

growth process. Steps that must be taken so that the fruits of development will be distributed more equitably are summarized below.

Land titling and distribution

Only 10 percent of the households that received land distributed in the late eighties have been given titles. This has remained a burning issue for some time now and progress has been slow in this area. There are still significant pockets of landlessness among refugees and displaced persons who missed out of the initial land distribution programme. This situation needs to be immediately remedied.

Of perhaps greater concern is the fact of sharply growing inequality in land and asset ownership already noted. Measures are needed to halt or slow this process. In addition, the RGC needs to carefully consider granting more land to poor households in the rural provinces, given that Cambodia is considered a land-surplus country.

Access to Common Property Resources

Intensified pressure applied on common property or open access resources has been noted. This alarming process is exacerbated as communities are increasingly denied access to these resources (especially fishery and forestry resources). The potential impact of these developments can be disastrous for the poor, who are critically dependent on these resources for fuel, food, and income. It is imperative to rationalize communal access to ensure sustainable use, and property rights reforms must be undertaken immediately.

Health and Nutrition

The high incidence of malnutrition and disease interacts in a complex manner to further reduce food entitlements, increase indebtedness, and diminish productivity. Steps need to be taken to address these problems through provision of public goods such as safe water and access to basic health services. In addition a well-targeted credit programme needs to be introduced to lower the high informal rates currently charged, to improve the coping ability of the poor, and to encourage adoption of modern agricultural practices and other farm and non-farm income-generating activities.

Food Procurement Schemes

At present, safety net programmes like the "food-for-work" and emergency distribution programmes are being conducted by donor agencies from donor funds. As long as this arrangement is in place, a separate strategic reserve does not appear to make sense. Holding of significant reserves is expensive, management intensive, and must be tied to an efficient distribution system to be effective. Since food availability at the national level does not appear to be a pressing problem, its desirability is not self-evident. A better approach might be to designate financial facilities for emergency rice procurements. With the membership of Cambodia in the ASEAN in the near future, the country will also be able to draw on the organization's food security reserve, which for a small country may be quite adequate.

ANNEX A: BASIC RESOURCES OF CAMBODIA

I. Land Resources

A. Land Use and Cover

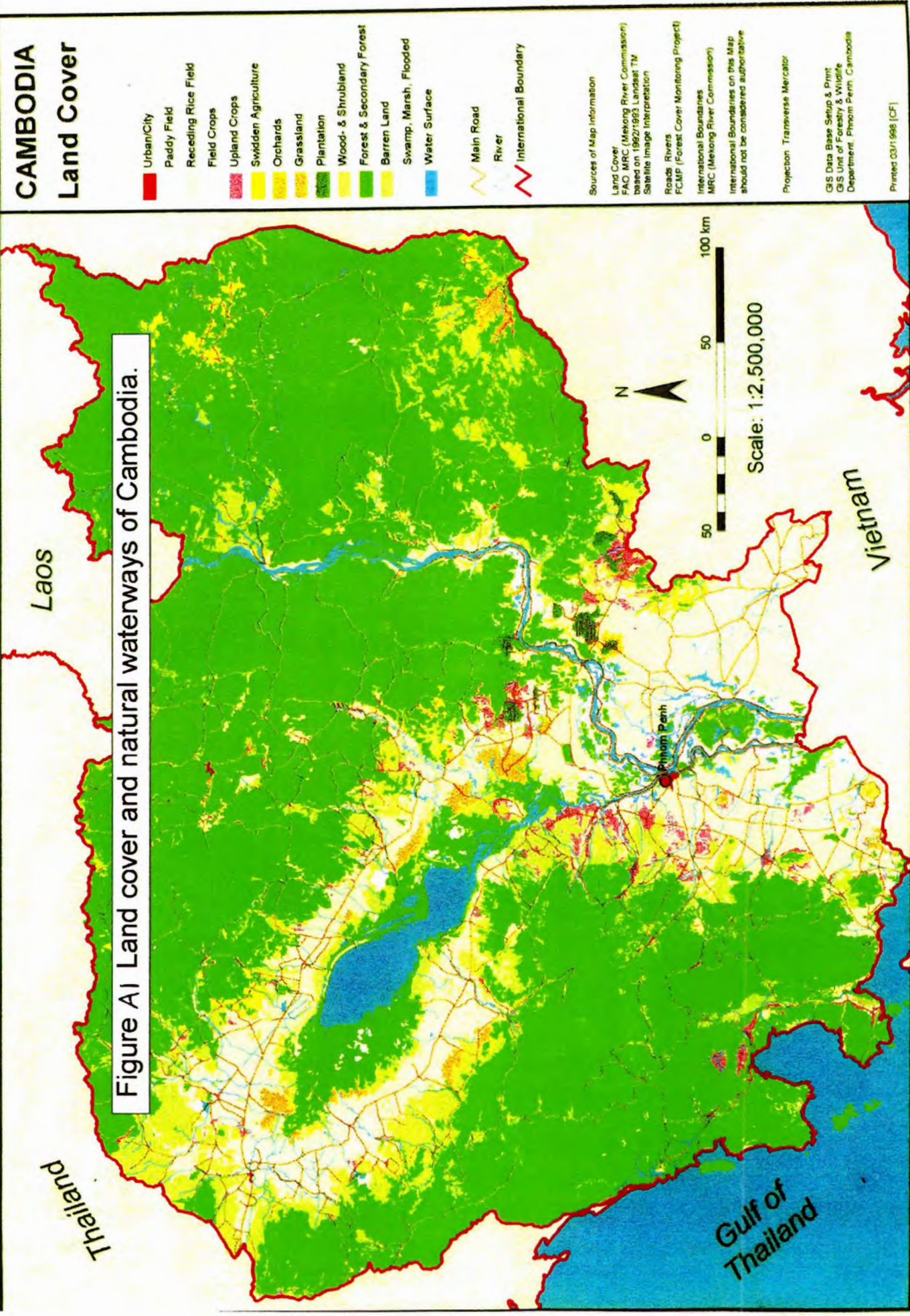
Cambodia has a total land area of approximately 18.1 M ha (see Table A.1). This indicates a relatively large natural resource base for a population of 10.7 million. Total area includes approximately 3.9 M ha of diverse agro-ecosystems suited to rice and a wide range of other crops, about 11.3 M ha of designated forest lands, and 2.3 M ha of shrub lands. Urban areas, inland water bodies, and abandoned settlements make up the rest of the land area. A land cover map of the country is shown on Figure A.1.

Table A.1: Land Use and Land Cover of Cambodia, Based on 1993 Landsat Data

Land Use Category	Area in '000 ha		
Error! Bookmark not defined.	Category	Subtotal	Total
Agricultural Lands			3914.4
Ricelands		2639.0	
Other crops		1275.4	
Forest Lands			11824.2
Drylands		10568.6	
Evergreen	4763.3		
Coniferous	9.8		
Deciduous	4301.2		
Mixed	977.3		
Secondary	517.0		
Edaphic (Flooded)		715.6	
Primary	370.7		
Secondary	259.8		
Mangrove	85.1		
Shrublands			2260.6
Urban			4.5
Abandoned Lands			278.7
Water Surface			411.1
GRAND TOTAL			18153.5

Source: World Bank, UNDP, and UNFAO, *Forest Policy Assessment - Cambodia*, 1996.

Figure A) Land cover and natural waterways of Cambodia.



Excluding Laos and Brunei, Cambodia has the fewest people per unit land area in the region. Its agricultural land-to-agricultural population ratio (at 0.5 ha) is exceeded only by Thailand and Malaysia (the average for the Asia-Pacific region is about 0.25). It should however be pointed out that in the case of Cambodia this ratio is not a reflection of arable land area constraints as some forest, shrubs, and abandoned lands are potentially arable lands. Table A.2 gives a summary of the comparison of the population density and ratio of agricultural land to agricultural population of Cambodia with those of ASEAN countries.

Table A.2: Population Density and Ratio of Agricultural Land to Agricultural Population of Cambodia and ASEAN Countries in 1993

Countries	Population density (person/sq km*)	Ratio of agricultural land to agricultural population (ha/person**)	Population growth rate* (% per year)
Cambodia	57	0.51	2.7
Lao PDR	21	0.24	2.8
Myanmar	69	0.30	1.7
Vietnam	226	0.14	2.0
Indonesia	107	0.31	1.5
Philippines	230	0.32	2.3
Malaysia	61	1.76	2.4
Thailand	114	0.64	0.9
Singapore	4,896	-	1.9
Brunei	54	-	1.5

*Source: S. Chan., T. Kato and V.P. Long, "Cambodia in the Regional Economy: A Cross-Country Study", paper presented at the International Workshop on Challenges and Options of Regional Economic Integration, Cambodia Development Resource Institute, Phnom Penh, October, 1997.

**Source: Regional Office for Asia and the Pacific, FAO, Bangkok. Selected Indicators of Food and Agriculture Development in Asia-Pacific Region, 1986-96. FAO, Bangkok, 1997.

B. Agricultural Lands

Of the 3.9 M ha classified as agricultural land, more than 2.6 M ha are lowland rice areas. Other areas are planted to annual upland crops, vegetables, fruit trees, industrial annual crops such as tobacco, and perennial crops such as rubber, coconut, and sugar palms. The rest are idle or utilized only when conditions such as peace and order permit. In areas dedicated to annual crops, only one crop is usually cultivated each year.

The lowland rice areas are concentrated on the alluvial plains around the Tonle Sap and the Mekong and Bassac rivers and their tributaries. In the 1960s, the total lowland rice area was slightly over 2.5 M ha. Because of lack of security resulting from continued armed conflict and the presence of land mines and shortages of farm labour in some areas, there has been a contraction in the cultivated lowland rice area. In crop year 1996-97, lowland rice cultivation totaled only 2.2 M ha.

The country presently cultivates approximately 0.2 M ha of upland crops including rice, corn, soybean, mong bean, peanut, cassava, sweet potato, and vegetables. On some 32,000 ha of land, also grown are assorted industrial upland crops like sesame, tobacco, sugarcane, and jute. Rubber which has traditionally been Cambodia's lead export crop is planted on an estimated 62,000 ha of which about 41,400 ha is tapped. The area set aside for fruit tree production is not known. However, it is estimated at about 36,000 ha at present.

Cambodia likewise grows a number of commercially important perennial crops. These include sugar palm, coconut, pepper, coffee, and cashew nuts. It has been estimated that there are 8 million sugar palm trees alive today but the area under sugar palm production is not known.

C. Forest Lands

The 1994 total forestland area estimate of 11.3 M ha consists of 10.6 M ha and 0.7 M ha of dryland and edaphic (flooded) forests, respectively. Dryland forests comprise 4.8 M ha of evergreen forest, 4.3 m ha of deciduous forest, 1.0 M ha of mixed forest, and 0.5 M ha of secondary forests (see Table A.1).

The state owns and allocates forest lands. Presently, the 11.3 M ha forest lands are partitioned into 3.5 M ha of protected forests and 7.8 M ha of production forests. About 6.8 M ha of the production forest area is under timber concessions.

In 1993, Cambodia established a National Protected Area System for the conservation of biodiversity and designated 23 protected areas classified as national parks, wildlife sanctuaries, protected landscapes, multi-use areas, and areas representing evergreen and deciduous forests as well as other fragile and critical ecosystems. These protected areas cover all edaphic forests and some 2.8 M ha of dryland forests for a total of 3.5 M ha (or 19 percent of the country's total land area). This coverage makes Cambodia one of the countries in the world with the highest proportion of forestland for biodiversity conservation.

Between 1973 and 1993, commercial logging, shifting cultivation, wood harvesting for fuel wood and charcoal production, and conversion of inundation forest into flood recession rice farming systems resulted in a net loss of about 1.1 M ha of dryland forest and 317,000 ha of edaphic forest. These represent an average annual loss of about 0.5 percent per year for both types of forest.

However, some forest types such as the flooded forest around the Tonle Sap Lake decreased by about 3 percent per year. The deforestation rate is lower in the western and northern areas, which are covered largely by evergreen and deciduous forests, respectively.

II. Water Resources

A. Surface Water

The surface water hydrology of Cambodia is inextricably linked to the Mekong river system. As shown on Figure A.1, about 86 percent of Cambodia drains into the Mekong river system. The northwestern part drains through the Tonle Sap Lake and Tonle Sap River and the northeastern section through the Mekong River. The south central part, meanwhile, forms the vast flood plains of the Mekong,

Bassac, and Tonle Sap Rivers. Only the extreme southwestern and southeastern sections drain into the Gulf of Thailand and the land borders in Vietnam.

From its headwaters in China, the Mekong river passes through Myanmar, Laos, and Thailand before it enters Cambodia at Stung Treng province with a mean annual discharge of over 300 billion cubic metres (B CM). Measured from a gauging station southeast of Kratie province (Figures A.2 and A.3), its mean annual discharge is estimated at about 482 B CM. From this point downward, the Mekong river spills over banks into its vast flood plains. The average outflows from the Mekong river into these flood plains exceed the inflows. A 1997 water balance study of the lower Mekong river basin in Cambodia, for example, shows that the alluvial flood plains and backswamps including the Tonle Sap Lake serve not only as temporary flood detention storage but also as storage reservoirs for flows over river banks and into colmatage canals.¹ Figure A.3 shows the average outflows and inflows into the Mekong, Tonle Sap, and Bassac rivers above and below their confluence point at Chamotuk.

A unique characteristic of the Mekong river system in Cambodia is the Tonle Sap Lake. During the flood season from May to September, the overflow from the right bank of the Mekong and the reverse flow through the Tonle Sap river run towards the lake. Averaging about 46 B CM per year, this would expand the area of the lake from about 0.26 to 1.05 M ha and increase its depth by 3 to 4 metres. Then, as the water level in the Mekong falls starting in November, the water within the lake starts draining back. This annual cycle of charging and discharging of the lake water enhances the dry season flow downstream of the lake and the fertility of the soil planted to flood recession rice. It is also vital to the breeding, spawning, and migration of fish within the flood plain ecosystems.

The level of irrigation development is still very low covering only about 16 percent of the area under food crops production. A recent inventory of existing surface irrigation systems lists 920 schemes serving an aggregate area of about 313,000 ha. These gravity irrigation facilities are primarily for: (1) supplemental irrigation during the wet season (54 percent of the total irrigated area of 313,000 ha); (2) flood recession or inundation schemes (32 percent); and (3) dry season irrigation (14 percent).² Rice yield levels in all irrigated areas are also very low ranging from 1.8 to 2.4 t/ha. The unit area productivity is very low, as irrigated areas are basically single-cropped areas.

B. Groundwater

A recent assessment of the shallow groundwater resources of Cambodia by concluded that the shallow aquifer resources of the country had been grossly underestimated in earlier studies.³ It argued that the old alluvial deposits around the Tonle Sap and the Lower Mekong basin are very good shallow aquifers offering excellent potentials for shallow tube-well irrigation. These old alluvial deposits have the following attributes:

¹ Sanyu Consultants Inc., "Agricultural Development Study of the Mekong Flooded Area in Cambodia", Draft Final Report prepared for the Japan International Cooperation Agency, September 1997.

² Halcrow and Partners Ltd., "Irrigation Rehabilitation Study in Cambodia", Final Report submitted to the Mekong Secretariat Contract No. CAM/IRS/238/93, June 1994.

³ Briese, E., "Technical Report on Feasibility Assessment of the Shallow Groundwater Resources of Cambodia and Proposal for Groundwater Pilot Project", Asian Development Bank TA No. 2554-CAM Community Irrigation Rehabilitation Project, June 1996.

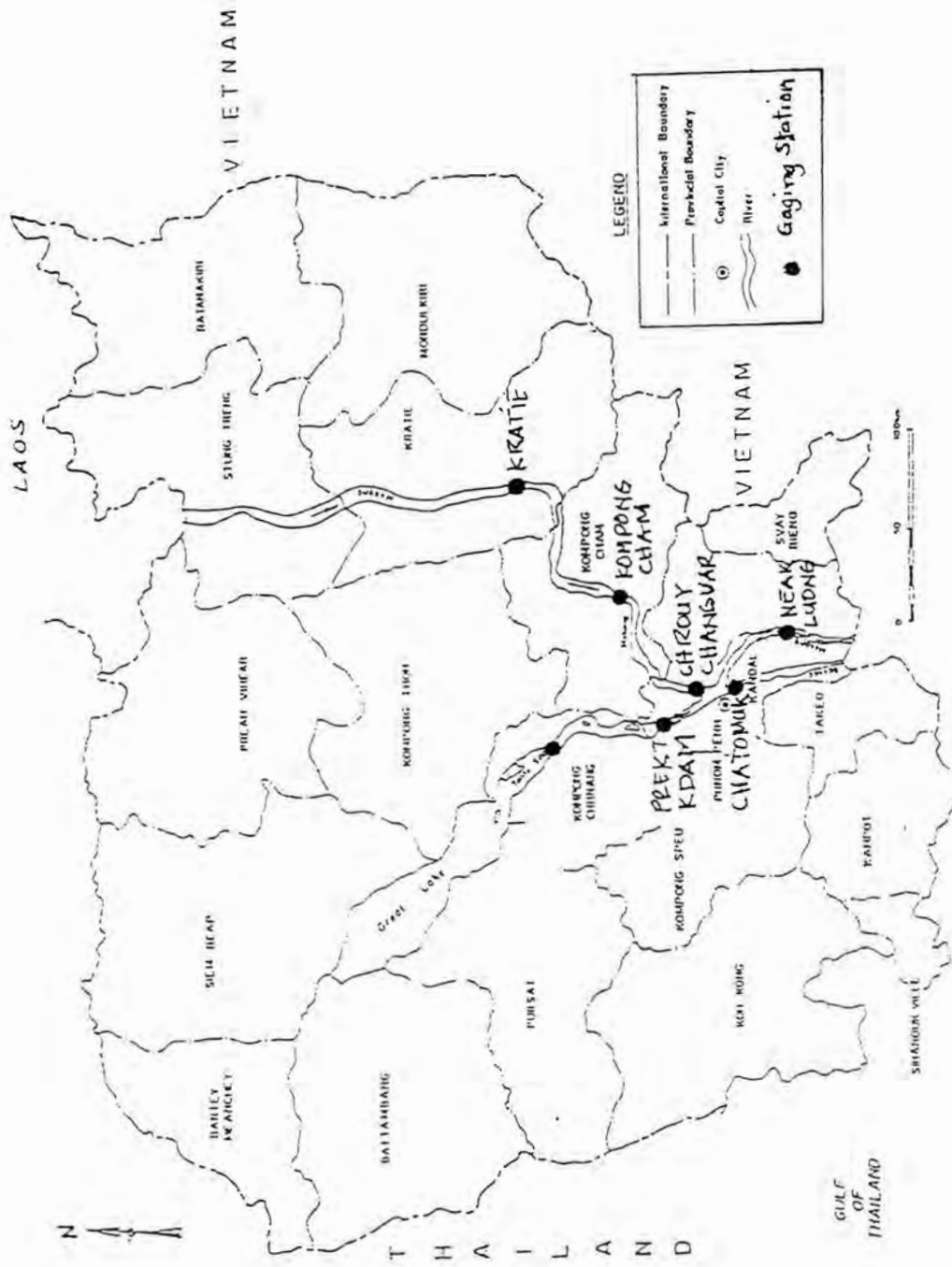


Figure A2 The major river systems and locations of gaging stations used in the Sanyu Consultants Inc. (1997) water balance analysis.

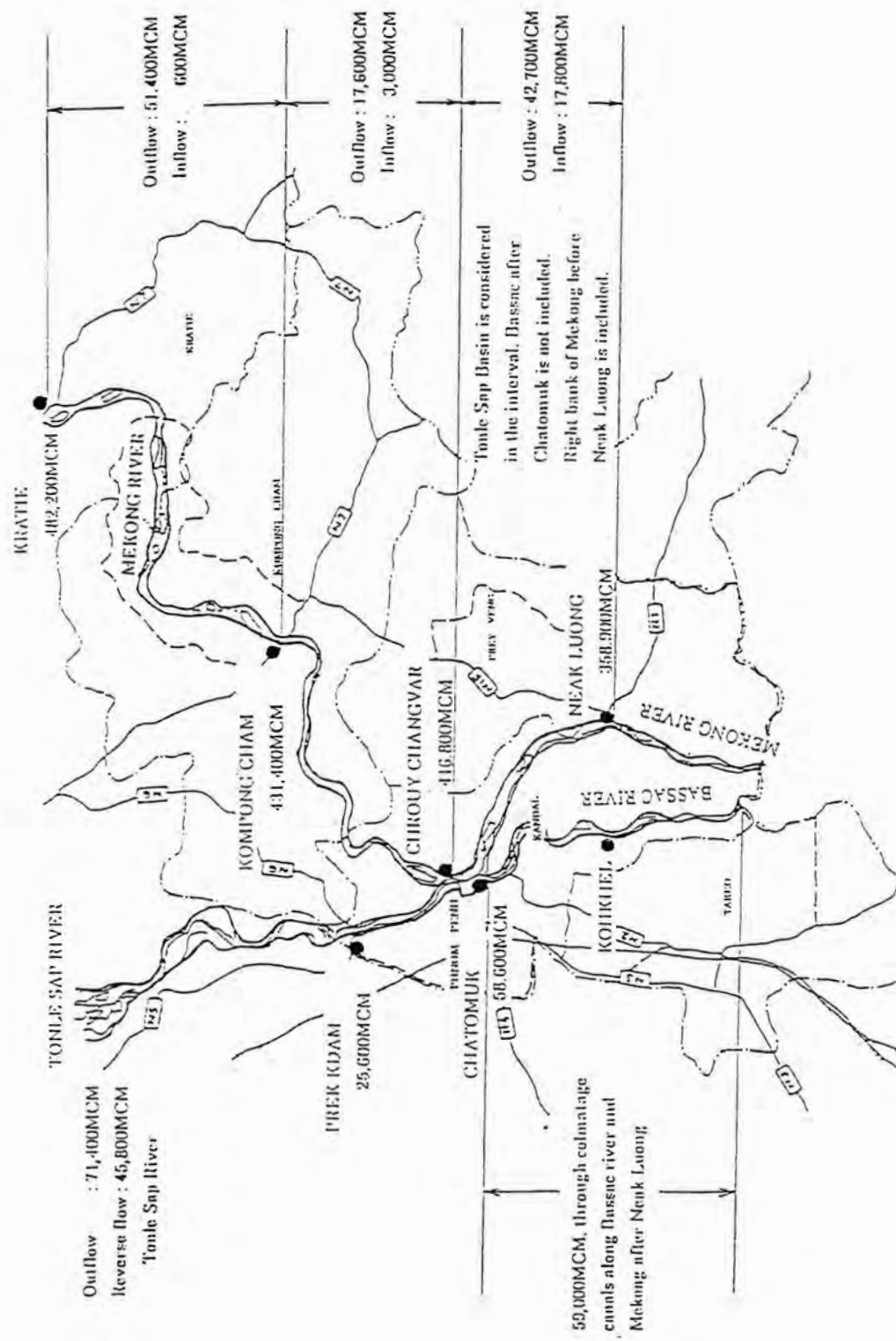


Figure A3 Water balance along Lower Mekong and Tonle Sap river system.

- they underlie the majority if not all the rice growing areas of the country;
- they have high recharge rates;
- they form excellent shallow aquifers (coarse sand of more than 100 m in thickness) in the delta region;
- their aquifers are of generally good water quality except in localized areas; and
- within the rice growing areas, the water table or piezometric water level is generally within 6 metres from the ground surface or within the suction lifting range of centrifugal pumps.

Figure A.4 shows the potential shallow well areas of the country. The delta region alone has an estimated shallow well area of 1.7 M ha. The total estimate for the country is about 4.8 M ha. The use of groundwater both for irrigation and/or domestic water supply is beginning to pick up primarily through the initiatives of the private sector. There are now over 20,000 manually operated community water supply tube-wells all over the country. Manually operated groundwater pumps and dug wells lined with concrete pipes are becoming very popular. For example, about 2,000 treadle pumps are being installed annually for domestic water supply and home garden irrigation.

It has also been estimated that there are now over 5,000 larger diameter motorized shallow tube-wells (STWs) in the country. Primarily used for irrigation, about half of these are in Prey Veng, Takeo, and Say Rieng provinces. Most of these were installed by the private sector.

C. Inland Water Bodies and Coastal Areas

Cambodia is fortunate in having abundant inland and marine fishery resources. Inland resources include the Tonle Sap which has surface area fluctuating annually from 0.26 to 1.05 M ha, and inland waterways consist of the Mekong, Tonle Sap, and Bassac rivers and their tributaries (at least 1,800 km of sizable or navigable river sections) and the vast lower Mekong and Tonle Sap flood plains. The country also spans a 435 km coastline being exploited by coastal fisherfolk.

III. Climate

The climate is monsoonal with distinct dry and wet seasons. The dry season runs from December to April. However, there may be one to two shower periods in the early and late dry season. The wet season is from May to November. Most of the rain falls in the months of July through October.

A. Rainfall

Figure A.5 shows isohyets of annual rainfall across the country. The annual rainfall is highest in the extreme southwest, averaging about 4,000 mm. This decreases to about 1,500 mm or less along the Tonle Sap plains all the way down to the Bassac and Mekong river flood plains. The average annual rainfall in the central and southeastern parts ranges from 1,500 to 2,000 mm. The northeastern corner has slightly higher annual rainfall ranging from 2,000 to 2,500 mm.

Most of the rice growing areas receives between 1,250 and 1,750 mm of rainfall annually. From the later part of July onward, there may be one or two periods without significant precipitation for 15 days or more. Referred to as the "short dry seasons", these short dry spells pose serious constraints to rainfed agriculture especially annual field crops.

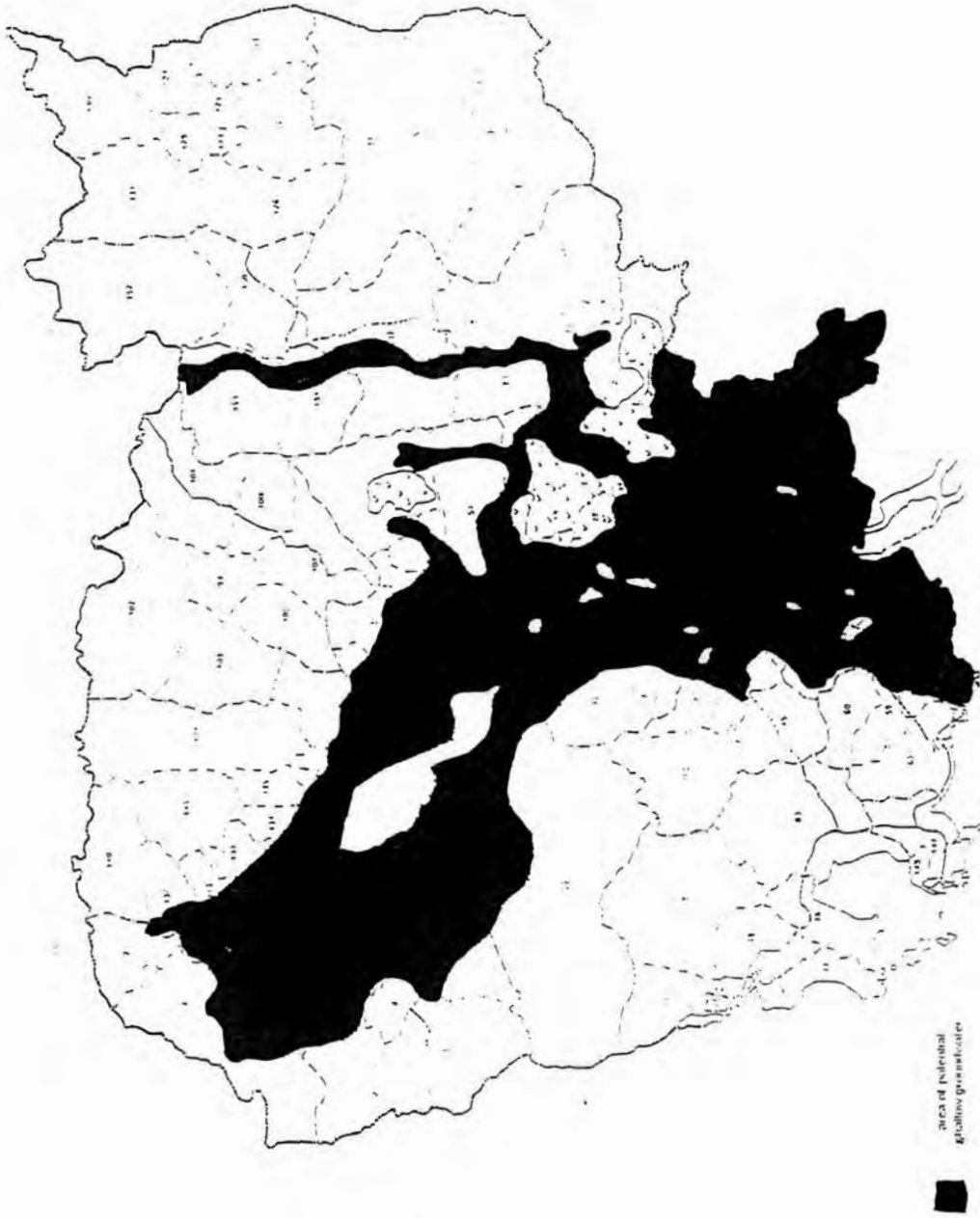


Figure A4 Potential shallow well areas of Cambodia (Adapted from Briese, 1996).

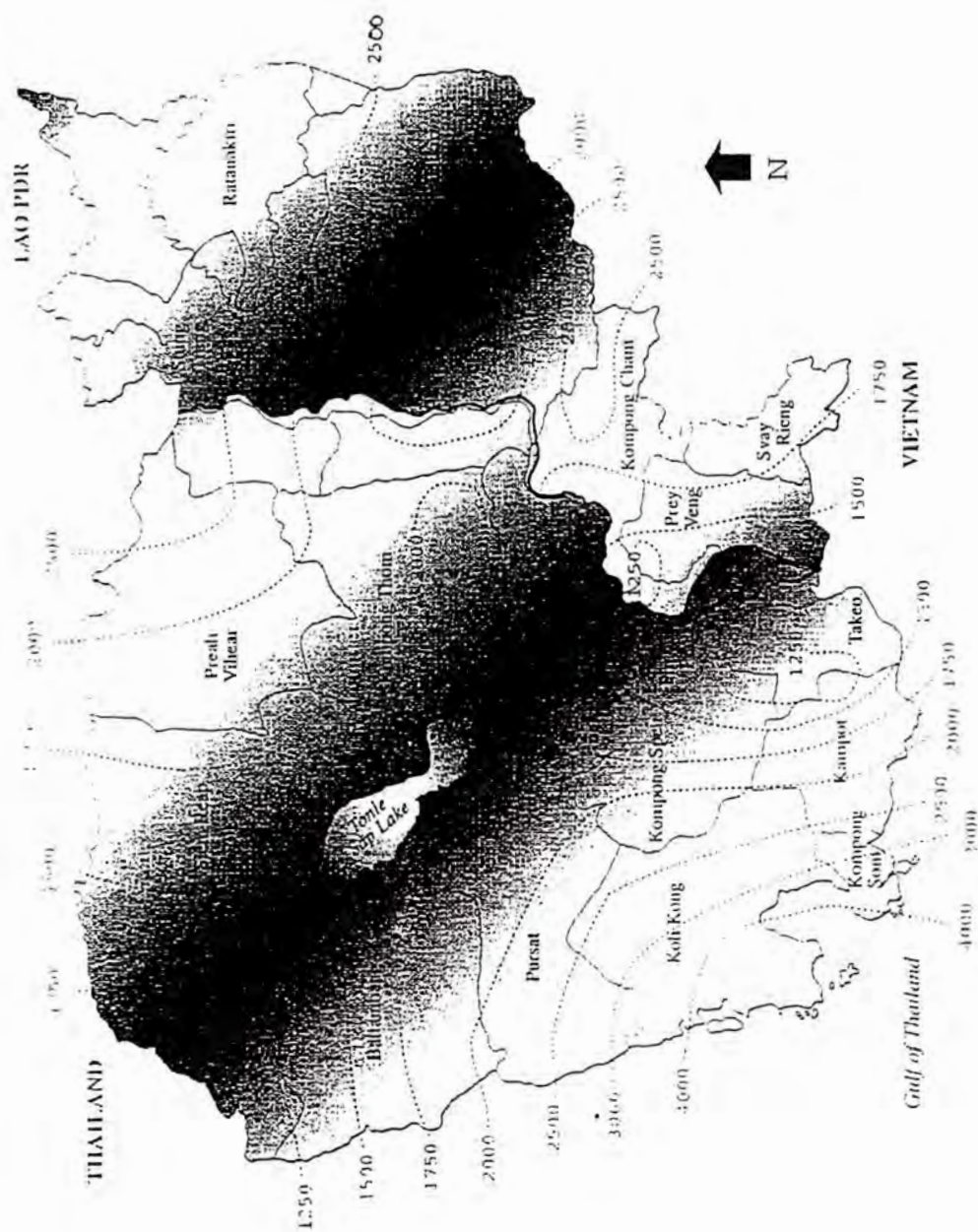


Figure A5 Map of average annual rainfall of Cambodia (Adapted from Nesbitt, Rice Production in Cambodia, 1997).

B. Temperature

The mean monthly temperature ranges from a minimum of about 25 °C in January to about 29 °C in April. At the peak of the hot season (April to May), daytime temperatures in °C may reach the mid-40s. Daytime temperatures are coolest in the months of October through January during which farmers harvest rice and prepare their lands for other crops while the soil still has residual moisture.

C. Humidity

The relative humidity fluctuates from 65 to 70 percent in January and February to 85 to 90 percent in August and September.

D. Evaporation

Annual evaporation ranges from 2,000 to 2,200 millimeters (mm). Monthly evaporation is highest in March to April at 200 to 240 mm and lowest in September to October at 120 to 150 mm.

IV. Biological Resources

Cambodia has a large capital of biodiversity. A 1994 report noted that more than 700 relatively unknown species of natural vegetation are found in the country's evergreen and deciduous forests.⁴ It also highlighted the many different kinds of fauna (i.e., an abundance of large, medium and small-sized species of mammals, reptiles, birds, and insects) that can be found within the different forest covers and mangrove and grassland areas. To protect these species, about 15 percent of the national territory were designated as national parks in November 1993.

The above document also reported that the country's inland waters host more than 200 species of fish including 36 varieties considered of economic importance and 18 considered essential. The dominant fish groups as they appear in fish catches are carp, catfish, and murrel. Although not substantiated by official statistics, it believed that there has been a general decline in stocks, particularly of large fish. The reasons for declining fish population are over-fishing and the growing use of inundated forest and flood plains for other agricultural purposes.

V. Human Resources

There are approximately 10.34 million people living in Cambodia.⁵ The country has a relatively young population with children (0 to 14 years old) comprising about 44 percent of the total with citizens between 15 to 65 and those above 65 accounting for the remaining 53 and 3 percent, respectively. Due to

⁴ FAO, *Cambodia Agricultural Development Options Review (Phase 1)*, Investment Centre, Rome: 1994.

⁵ Ministry of Planning, National Institute of Statistics, *Socio-Economic Survey of Cambodia 1996*, Phnom Penh: June 1997.

the effects of a protracted war, females now outnumber males (52 vs. 48 percent) while the proportion of female-headed household has shot up to about 25.8 percent.

Adult literacy rate is estimated at 67 percent. This rate is found to be higher in urban areas (77 percent) compared to rural areas (64 percent) and significantly higher among males than females (78 vs. 57 percent). The mean number of years of schooling for those 25 years or older in 1996 is estimated at 4.7 for those in urban areas and 2.8 for those in the rural areas.

The population is quite mobile. Some 2.18 million individuals (21 percent of the population) have reported changing residence at one point. About 55 percent of total migrants are 15 to 39 years of age. Reasons for migration include reunion with family, repatriation, marriage, better work prospects, and insecurity due to strife or calamity.

Labour force participants numbered 4.9 million in 1996. Of these, 2.6 million were females and 2.3 million males. The labour force participation rate (LFPR) or the ratio of the economically active population to the total population 10 years or older was about 65 percent (Table A.3). Approximately 99 percent of the labour force were reportedly employed. As most people are self-employed, a large proportion of those reportedly employed may be under-employed. Moreover, about 8 percent of those reported to be fully employed were actively seeking additional work.

Agriculture, fishery and forestry workers account for about 77 percent of total employment (Table A.4). Some 68 percent of total employed individuals were seasonal workers while 26 percent and 6 percent were permanent and casual workers, respectively. As expected, rural employment is mostly seasonal in nature. Unpaid family and own-account workers represented for 45 and 44 percent of total workers, respectively. Employees and employers workers comprised some 10 and 0.2 percent, respectively.

The 1996 *Socioeconomic Survey of Cambodia* results gives some insights behind the low unit area productivity and low level of utilization of agricultural lands. Only about 3.2 million of the 3.8 million workers in agriculture, fishery, and forestry are adults (over 17 years old). Even if all these adult workers engaged only in crop agriculture, the agricultural land-to-farm hand ratio is still relatively high at 1.2 ha per farm worker. Moreover, female farm workers outnumber male farm workers 55 to 45 percent. The high land-to-farmhand and female-to-male farm worker ratios and the low level of farm mechanization are the main reasons behind the very low cropping intensities and presence of vast tracts of idle lands.

Table A.3: Characteristics of Cambodia's Population

Demographic Characteristics	Number and Percentage Distribution
Population	10.34 million
Males	48%
Females	52%
0-14 years old	43%
15-64 years old	54%
65 years +	3%
Households	
Number	2.0 million
Average Size	5.3
% Female-headed	22%
Literacy and Education	
Adult literacy rate (15 year old and over)	67%
Adult literacy rate - Males	78%
Adult literacy rate - Females	57%
No Grade Completed (15 years old and over)	30%
Mean years of schooling (25 years old and over)	3.2 years
Current school allowance (5-12 years old)	60%
Internal Migration	
Number of migrants	2.18 million
Migrants in the past five years	28%
Migrants more than 5 years ago	72%
Migration due to:	
Family reunion/family moved	48%
Repatriation/Return after displacement	19%
On account of marriage	12%
Better work prospect	10%
Insecurity due to strife/calamity	8%
Others	3%
Disability	
Total number of disabled persons	311,000
Amputees/unable to use limb	39%
Blind/poor eyesight	23%
Others	38%

Source: Socio-Economic Survey of Cambodia, 1996.

Table A.4: Economic Profile of Population 10 Years and Over, 1996

Labour Force Participation or Economically Actual Population	Percent
Labour Force	
Labour Force Participation rate (LFPR)	65
Male LFPR	66
Female LFPR	65
Employment rate	99
Employment by Economic Activity	
Agriculture, Fishery and Forestry	78
Industry	5
Services and Trade	17
Employment by Occupation	
Agriculture, fishery and forestry	77
Services, shops and market sales	8
Legislators, professionals, technicians	5
Crafts and related trades	4
Elementary occupations	4
Plant/machine operators and assemblers	1
Armed Forces	1
Status of Employment	
Unpaid family worker	45.2
Own-account	44.5
Employee	10.0
Employer/other	0.3
Working Children (5-17 years old)	
Economically active	653,000
Percent of population in the same age group	17%
Percent of working children not attending school	72%

Source: Socio-Economic Survey of Cambodia, 1996.

Table B.1: Potentials and Constraints for Various Modes of Irrigation Development in Cambodia

Irrigation Technology/ Nature of Activity	Potentials/Opportunities/ Advantages	Constraints/Disadvantages
1. Shallow Aquifer Utilization a) Motorized Shallow Tube-wells (STWs)	• Extensive shallow well area underlying most arable lands. • Cost-effective and low investment cost (US\$560-700/STW or US\$ 200-300/ha). • Control by individual or group of 2 to 3 farmers. Greater degree of water control by farmers makes crop diversification and intensification feasible. • Amenable to privatization. Does not require O&M subsidy and, hence, is sustainable. • Short gestation period taking only a few days to install. • Easy to operate and maintain by individual farmers and does not require communal effort or institutional arrangements. • The prime mover or engine, which constitutes about 2/3 of the cost of an STW, can be used to power boats, hand tractors, trailers, and other farm machines. • The pump-set can also be used for drainage in waterlogged areas. • Benefits can be widely shared, as the technology is available to individual farmers. • Discharge can also be used for domestic water supply.	• Inadequate information on shallow aquifer properties for the proper design, drilling, and development of STWs. • Inadequate number and technical capability of well drillers in most areas. • Poor water quality in localized areas. • Lack of credit availed to local drillers and farmers. • Inadequate well drilling and well development equipment and technologies. • Lack of pump-set distribution outlets and after-sales servicing in some areas. • Lack of irrigation machinery testing and evaluation facilities. • Lack of trained groundwater hydrologists who can monitor groundwater levels.

Irrigation Technology/ Nature of Activity	Potential/Opportunities/ Advantages	Constraints/Disadvantages
b) Manually Operated Tube-wells (MOTs) such as treadle and hand pumps	• Cheap and cost-effective (about US\$70 to \$100 per unit). • Feasible even in shallow well areas with low hydraulic conductivity since the discharge is small. • Simple to operate, repair, and maintain. • Ideal water supply source for home gardens including elevated beds or “surjans” in flood recession areas. • Private sector has capability to install such equipment in most areas. • Available to a wide cross-section of the rural populace. • Short gestation period. • Sustainable—does not require subsidies or support from public institutions in installation, repair, and operation. • Offers excellent opportunities for crop diversification. • Pumps are locally manufactured.	• Very low discharge (can only irrigate a small area of about 1/3 ha at the most). • Drudgery from manual pumping. • Poor water quality in localized areas. • Lack of capable well drillers to properly drill, develop, and complete wells especially those to be used jointly for irrigation and domestic water supply. • Lack of credit for acquisition by the very poor.

Irrigation Technology/ Nature of Activity	Potentials/Opportunities/ Advantages	Constraints/Disadvantages
2. Small, Portable Low-Lift Pumps (LLPs)	• Cost-effective and low investment cost (about US\$ 175 to \$250 per ha). • Abundant surface water sources for supplemental wet season and dry season irrigation. Dependable flows from surface sources can irrigate about 1.0 m ha based on estimates. • Easy to install, very short gestation period. • Certain types of pumps (e.g., axial flow pumps) are manufactured locally. • Pumps can be used for both irrigation and drainage. • Like STWs, small LLPs are amenable to privatization. • Avoids the need for communal efforts and problems relating to constructing extensive canal system and land consolidation. • Like STWs, LLPs enables farmers to diversity and intensify their cropping systems. • Enhances water distribution and control when used in conjunction with reservoir and colmatage canal irrigation systems. • Prime movers of pumps can be used to power boats, trailers, hand tractors, and other farm machines. • Available to the majority of farmers and fisherfolk.	• Lack of essential support services such as testing and evaluation of pumps and their prime movers. • Possible conflicts between irrigation and fishery when LLPs draw water from storage reservoirs and inland water bodies. • Inadequate after-sales services in some areas. • Lack of credit for acquisition by farmers • Lack of baseline information on adequacy and dependability of water supply from small streams and ponds. • Lack of technical capability for proper repair, operation, and maintenance of pump sets on the part of farmers in many areas. • Siltation of rivers and reservoirs.

Irrigation Technology/ Nature of Activity	Potentials/Opportunities/ Advantages	Constraints/Disadvantages
3. Shallow Bunded (low dam) Reservoirs	• Common to Cambodia and hence well understood by farmers. • Can be repaired easily by farmers' groups because of their small size. • Suited to flood recession rice especially when used in combination with small, portable low-lift pumps. • Rehabilitation of some existing systems that are within the capability of farmers groups and/or local government units can be economically attractive. • Can be used in harmony with or supportive of inland fishery. • Adapted to the flood cycle of the flood recession area. • Compatible with colmatage canal and LLP irrigation systems. •	• High investment cost. Halcrow and Partners, Ltd. study (1994) shows that only a small proportion of the 2,800 small reservoirs are economically attractive to rehabilitate. • Construction cost is relatively high because of the topography of the plains, shallowness of the reservoirs, and higher evaporation rates. • Open to disputes between farmers and fisherfolk. • Requires community effort, which may be difficult to mobilize in some areas. •

Irrigation Technology/ Nature of Activity	Potentials/Opportunities/ Advantages	Constraints/Disadvantages
4. Colmatage Canal Irrigation and Drainage System	- Well understood by farmers and fisherfolk in the flood plains of the Mekong and Bassac rivers where there are existing systems irrigating about 80,000 ha. - Traps nutrient-rich sediments thus enhancing soil fertility.	- High unit area investment cost. - Requires community effort or support from district or higher level public agencies in terms of construction, repair, and maintenance. - Desilting of canals must be carried out regularly on a cooperative basis by farmers and fisherfolk.
5. Run-of-the-River Gravity Systems	- Cheaper operation and maintenance cost. - Mekong river tributaries have enough dependable water supply to command large areas. - Less reliance on pumping units and fuel.	- Prohibitive investment costs. The 1994 study of Halcrow and Partners, Ltd. showed that the construction of new systems or rehabilitation of existing systems is unlikely to prove economically viable. - Severe problem of siltation of canals. - Beyond the capability of farmers groups and local government units to properly design, construct, repair, operate, and maintain. - Requires the formation of viable water users' associations, which are very difficult to establish in the country.

Irrigation technology/ Nature of Activity	Potentials/Opportunities/ Advantages	Constraints/Disadvantages
6. Large Fixed Station Pumping Units	• Can extract large quantities of water from the Mekong and Tonle Sap rivers and their tributaries, from the Great Lake, and from the dead storage of reservoirs. • Short-gestation period. • Low unit area investment cost.	• High operations and maintenance cost. • Requires a technically sound water conveyance and distribution system. • Requires adequate organization for repair, operation, and maintenance. • Siting may be difficult due to the large fluctuations in the flow stages of big rivers. • High water losses in conveyance.
7. Large Storage Dams	• Technically feasible on an estimated 27 sites with an aggregate service area of over 500,000 ha. • Rehabilitation of some existing storage dam appears feasible. • Multi-purpose—some potential schemes are also useful as flood central and for power generation and fish production.	• Very high investment cost. Not economically attractive unless combined with hydropower generation and flood control. • Very long gestation period (at least 10 years from project planning to full project development). • Many of the potential sites are located in high security risk areas. • Requires institutional arrangements and mechanisms that will be very difficult to put in place in the medium term. • Very difficult for the government to recover investment and operation and maintenance costs.