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FOOD AID AS A DEVELOPMENT  
RESOURCE IN NEPAL: A REASSESSMENT

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## EXECUTIVE SUMMARY

This study was designed as an assessment of food aid as a development resource in Nepal. It builds on an earlier assessment completed in December 1984. It is based on the same conception of food aid as a potentially valuable development resource when it is additional to other assistance and when it can be integrated with complementary financial and technical resources to achieve socioeconomic benefits without creating disincentives for local production and policy improvements.

The food situation continues to deteriorate in the country: food production growth is lower than population growth. While lagging production has not yet converted Nepal into a large-scale food importer, it has eliminated the country's margin of food availability over the basic nutritional requirements of the population. Food imports are also limited by a perpetual lack of foreign exchange.

Although the country remains relatively self-sufficient in terms of the effective market demand for food, there are growing segments of the population that are chronically under-nourished. These food-deficit households are concentrated in the hill and mountain districts where resources are inadequate to achieve minimum levels of food consumption. These families can neither grow, nor earn enough cash income to purchase, enough food to meet their basic nutritional needs.

This inadequate family food availability is closely linked to the high degree of inequality in access to cultivated land in the country. In 1981, half of all the rural households operated less than half a hectare of land each, and only 6.6 percent of the country's cultivated land in total. At the other end of the distribution, the 16 percent of the rural households operating 2 hectares or more each accounted in total for 62.8 percent of the cultivated area. This land distribution problem deserves to be high on the country's policy agenda and a key element in the GON's policy dialogue with donors. The chronic food insecurity of the landless and near landless rural households is a result of their persistent inability to acquire enough food either by buying it or producing it. More

adequate food availability, through domestic production or imports, will not in itself solve this problem of under-nutrition if the affected group continues to have insufficient ability to acquire the food (either because they don't produce more themselves or because they don't earn more income to buy it).

A case can be made that Nepal needs more food aid. It has a substantial number of people suffering from under-nutrition. Others experience temporary declines in access to food arising from instability in production, food prices, or household income. Seasonal underemployment of labor is prevalent where chronic food deficits are the most serious. Food-for-work could reduce the under-nutrition and mitigate the lack of transportation infrastructure, reforestation, irrigation, and other development resources.

For USAID, the question of utilizing food aid is now moot. It has successfully provided PL 480 Title II resources to the Dairy Development Corporation, which should continue to be supported. It has successfully collaborated with the World Food Program on food-for-work for road construction. This collaboration should be continued and expanded. Furthermore, we recommend that a PL 480 Title I program in vegetable oil should be explored.

The GON is interested in receiving more food aid. It has made numerous requests to donors for specific commodities and for expanded food-for-work assistance for roads and reforestation. Despite the promise of food aid for Nepal, the difficulties of designing, managing, and monitoring food aid activities, and the financial burdens that would fall on the GON, sharply curtail the country's absorptive capacity beyond the food resources WFP is now supplying.

Government implementation capabilities are strictly limited and are currently stretched very thin by a plethora of foreign aid donors and projects. External private voluntary organization (PVOs) and local non-governmental organization (NGOs) are neither involved nor interested in food assistance to any extent. The GON and donors will need to collaborate more effectively with these private organizations to expand the use of food aid.

Specific recommendations made in the report are summarized below:

1. Inequality in land distribution is a root cause of chronic food insecurity in Nepal and should be a priority policy issue for the GON and foreign aid donors.
2. An in-depth study of Indian foodgrain pricing in relation to seasonal and regional price levels in Nepal should be carried out and regularly up-dated.
3. Assistance to the GON to strengthen its collection and processing of agricultural statistics and its early warning system is needed.
4. A study of inter-district movements of food, seasonal migration of people, and adjustment strategies of food-deficit households and districts should be supported.
5. USAID should continue to provide PL 480 Title II resources to the Dairy Development Corporation if the Corporation's policy and operational performance remains satisfactory.
6. USAID should continue to collaborate with the World Food Program on food-for-work road building and improvement activities in the Rapti Zone.
7. Food-for-work for reforestation and tree fruit production should be explored with the relevant agencies of the GON.
8. USAID should explore a PL 480 Title I sales program in vegetable oil in response to the GON's request.
9. The Nepal Food Corporation should be assisted in analyzing how it could provide price floors and limit seasonal price increases of food crops in hill and mountain districts.
10. USAID should appoint a Food Aid Officer to enhance its access to food aid programs that have potential for alleviating hunger and fostering economic development in Nepal.
11. USAID should catalyze the development of a "food assistance strategy" for Nepal and initiate a dialogue with GON officials, other donors, and non-governmental organizations on the expanded use of food aid as a development resource in the country.
12. As a means of expanding institutional capacity in Nepal, USAID should organize a Food Aid Workshop for GON officials, other aid donors, foreign PVOs, and local NGOs.

## I. INTRODUCTION

Nepal is a landlocked, least-developed, low-income country with a per capita income that reached only about \$160 in 1985.<sup>1/</sup> Its indicators of life expectancy, infant mortality, and literacy are all well below South Asian norms. Moreover, according to Government of Nepal (GON) estimates, the bottom 42.5 percent of the population received only 12.6 percent of personal disposable income in 1984/85.<sup>2/</sup> If true, this highly inequitable distribution resulted in an average income of not more than \$40 per year for the 7 million people in this large low-income population group.

Since 1965, real GNP growth has barely kept up with population growth. Over the two decades from 1965 to 1985, real per capita GNP rose by only a scant 0.1 percent per year.<sup>3/</sup>

Real economic growth accelerated moderately in the 1980s averaging between 3 and 4 percent per year compared to a population growth of 2.4 percent annually.<sup>4/</sup> Beginning in 1982/83, the economic performance of the economy has been unstable mainly as a result of erratic monsoons. The GON has accepted both SAF and SAL programs to stabilize the country's finances and adjust its economic structure over the medium term.<sup>5/</sup> In 1985/86, agricultural production rebounded as a result of good weather. Overall economic performance also improved; real growth for the year was 4.2 percent. Performance in 1986/87 deteriorated, however, due to drought in the Tarai followed by flooding. The resulting shortfall in agricultural production held real GNP growth to less than 2 percent for the year.

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<sup>1/</sup>World Bank, World Development Report, 1987, Washington, D.C., 1987, p.202.

<sup>2/</sup>National Planning Commission, Program for Fulfillment of Basic Needs (1985-2000), Kathmandu, September 1987, p.35.

<sup>3/</sup>World Development Report, 1987, op. cit., p.202.

<sup>4/</sup>Ibid., p.254. The estimated population growth rate in this source is lower than the 2.66 rate commonly used in the country. Some observers believe that even this latter rate is too low.

<sup>5/</sup>International Monetary Fund, IMF Survey, Wash., D.C., March 7, 1988, pp. 66-8; World Bank, Kingdom of Nepal, First Structural Adjustment Credit, Wash., D.C., Report No. P-4473NEP, March 3, 1987.

Available data (reviewed later) show that per capita food production has been falling in Nepal, a shocking fact that the country shares with the impoverished food-short countries of Sub-Saharan Africa.

Food aid plays an important role in the economies of developing countries. Total food aid currently amounts to \$2.5 billion per year, some 10 percent of all official development assistance. In South Asia alone, Bangladesh, India, and Sri Lanka received more than 2 million metric tons (mmt) of food aid in cereals in 1984/85.

In contrast, the World Food Program (WFP) operates the only continuing food aid program in Nepal, and its regular and emergency assistance has averaged a modest 13,000 metric tons (mt) per year during the last decade. This circumstance causes the GON and USAID to question whether an important development resource is possibly being underutilized. Recent budget cuts have intensified the interest of both parties in bilateral food aid programs.

The purpose of this report is to re-examine food aid's potential contribution to the dual objectives of food security and economic growth in Nepal. It is based on the previous assessment conducted in 1984.<sup>6/</sup> It begins by reviewing the statistical record of food production since the early 1960s and the overall food situation in 1984-1987, paying particular attention to the quality of the data base. It then analyzes the need for, and effective use of, food aid in Nepal. It concludes with recommendations on future food aid for the consideration of the GON and USAID, WFP, and other donors.

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<sup>6/</sup>Fletcher, Lehman B. and David E. Sahn, An Assessment of Food Aid as a Development Resource in Nepal, Ann Arbor: Community Systems Foundation, December 1984.

## II. THE COUNTRY'S DETERIORATING FOOD SITUATION

### A. Trends in Foodgrain Production and Overall Food Balances

"Nutrition in Nepal is chronically deficient. The only national sample survey was an AID/CDC effort in 1976 showing widespread childhood malnutrition. New data from small, localized surveys confirm the chronic problem."<sup>1/</sup> With these words USAID/Nepal began and ended its treatment of nutritional problems in its current country development strategy. Yet the same document refers to Nepal as "a food surplus country."<sup>2/</sup> How can both statements be true?

#### 1. Foodgrain exports and imports

In most years, Nepal officially records both imports and exports of foodgrains. Usually, the recorded exports exceed imports (Table 2-1). It is also known that larger quantities of foodgrains move in both directions across the open border with India in response to changing price relationships but the quantities involved in these unrecorded movements cannot be measured. Net official exports and imports are only a minor percentage of national production.

The foodgrain trade situation in Nepal has been deteriorating. The country was a net exporter of foodgrains during the mid-1970s: exports averaged about 115 thousand mt per year. However, the situation has undergone a reversal during the last decade: foodgrain exports dwindled by 13.48 percent per year whereas annual foodgrain imports shot up by 36.81 percent per year. Consequently, net imports of foodgrains during 1984-1987 averaged 86 thousand mt per year.

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<sup>1/</sup>Agency for International Development, Nepal: Country Development Strategy Statement (FYs 1988-1992). Washington, February 1987, p.41.

<sup>2/</sup>Ibid., p.8.

TABLE 2-1  
FOODGRAIN EXPORTS AND IMPORTS  
(000 mt)

<u>Year</u>	<u>Foodgrain Exports</u>	<u>Foodgrain Imports</u>
1974/75	66	8
1975/76	158	150
1976/77	129	1
1977/78	63	5
1978/79	68	7
1979/80	12	38
1980/81	45	55
1981/82	62	9
1982/83	3	73
1983/84	130	21
1984/85	14	31
1985/86	15	165
1986/87	43	133

Source: Department of Food and Agricultural Marketing Services and Nepal Rastra Bank, HMG.

Note: Includes rice, wheat, maize, millet and barley. Exports are officially recorded and do not include unrecorded movements across the border.

In the sense of overall national balance between production and effective market demand, Nepal could best be termed about self-sufficient in food-grain production. Its internal foodgrain market clears with only relatively small annual imports and exports. However, as will be shown later, this national "self-sufficiency" in no way implies adequate nutrition for all the country's population.

## 2. Declining per capita foodgrain production

Moreover, this national "self-sufficiency" obscures a marked deterioration in the country's production of foodgrains on a per capita basis. Table 2-2 gives the historical picture. During the period from 1964/65 through 1987/88, aggregate foodgrain production grew at an annual rate of 1.32 percent. While positive, production growth was less than population growth so production per capita trended downward. The negative growth rate in the key production-per-capita variable was 1.01 percent per year over the period. The cumulative impact of this fall in per capita production can be

seen by observing that the provisionally estimated bumper crop in 1987/88, if confirmed, raised per capita production to the highest level in the last decade but that figure was still lower than any recorded during the 1964-1977 period.

TABLE 2-2

GROWTH IN POPULATION AND FOODGRAIN PRODUCTION

<u>Year</u>	<u>Population</u>	<u>Foodgrain Production Edible (000 mt)</u>	<u>Foodgrain Production Per Capita (kg/year)</u>
1964/65	10,218	2,020	198.0
1965/66	10,421	2,090	201.0
1966/67	10,646	1,968	187.4
1967/68	10,866	1,984	182.0
1968/69	11,091	2,061	185.7
1969/70	11,321	2,149	190.2
1970/71	11,551	2,157	185.9
1971/72	11,806	2,150	182.2
1972/73	11,061	2,095	188.7
1973/74	12,321	2,305	187.4
1974/75	12,587	2,410	191.3
1975/76	12,856	2,470	191.5
1976/77	13,136	2,352	179.5
1977/78	13,422	2,246	167.6
1978/79	13,713	2,302	168.0
1979/80	14,010	2,000	142.9
1980/81	14,331	2,409	168.5
1981/82	15,023	2,509	167.3
1982/83	15,422	2,197	142.7
1983/84	15,834	2,676	169.6
1984/85	16,459	2,595	157.3
1985/86	16,894	2,752	162.8
1986/87	17,339	2,589	149.6
1987/88*	17,800	3,074	172.7

Source: Department of Food and Agricultural Marketing Services and Central Bureau of Statistics.

\*Estimates of wheat and barley production are provisional.

Using a linear time trend, production of edible foodgrains has been declining at the rate of 1.77 kg per capita per year. To put this figure in perspective, it is just about equal to one percent of the average food grain production per capita over the entire 1964-1988 period. Thus, for more than two decades, food grain output per person has fallen on the average approximately one percent per year, a cumulative loss of 25 percent over the quarter-century covered by the data.

There is also some evidence that instability in production is growing as per capita output declines. The coefficient of variation in production was 9.4 percent for the overall period but fluctuations seem to be larger and more frequent in the last decade. If true, both the decline in per capita production and the growing year-to-year fluctuations have adverse implications for meeting the country's food requirements. More detailed analysis by crop and production region is needed to confirm the hypothesis that production instability is growing. If confirmed, unstable as well as inadequate production will need to be addressed to improve Nepal's food security.

### 3. Overall food balances

The principal features of the Nepalese food and nutrition situation may be outlined thusly: extremely low average intakes of calories and protein, poor composition and variety of diet, unequal distribution of food consumption, and lack of access to minimum nutrients by nearly half of the population.

Average food energy available per person during 1984/85-1986/87 has been estimated at 1,863 calories per day (Table 2-3). This figure is very low in terms of minimally adequate nutrition levels. Other important indicators of diet adequacy and quality, such as protein, minerals, and vitamins, are also low.

In terms of sources of food energy, the largest contribution is from cereals, including rice, maize, wheat, millet, and barley. Average availability per person of cereals during 1984/85-1986/87 was 156.6 kg per

TABLE 2-3

NUTRITIVE VALUES AVAILABLE FROM FOODS  
AVERAGE, 1984/85-1986/87

<u>Nutrition Factor</u>	<u>Unit</u>	<u>Amount Per Capita Per Day</u>
Energy	Calorie	1,863.30
Protein	gm	52.50
Fat	gm	23.80
Calcium	mg	466.80
Iron	mg	27.80
Vitamin A	I.U.	3,514.80
Thiamine	mg	1.70
Riboflavin	mg	22.90
Niacin	mg	14.00
Ascorbic acid	mg	91.50

Source: DFAMS, Food Balance Sheet of Nepal, various issues.

TABLE 2-4

FOOD AVAILABILITY BY COMMODITY GROUPS  
Average, 1984/85-1986/87

<u>Food Group</u>	<u>Unit</u>	<u>Quantity</u>
Cereals	kg/capita/year	156.60
Potato, Roots, and Tubers	kg/capita/year	24.20
Sugar, Honey and Other Confectionary	kg/capita/year	3.90
Pulses	kg/capita/year	6.70
Vegetables	kg/capita/year	42.40
Fruits	kg/capita/year	18.70
Milk and Milk Products	kg/capita/year	41.30
Meat	kg/capita/year	7.70
Fish	kg/capita/year	0.45
Oils and Oilseeds	kg/capita/year	1.97
Ghee and Butter	kg/capita/year	0.96

Source: DFAMS, Food Balance Sheet of Nepal, various issues.

year (Table 2-4). Potatoes, roots, and tubers are the other major sources of calories in the national diet.

Rice alone makes up 53 percent of the cereal basket (Table 2-5). Maize contributes about 25 percent and wheat 18 percent. Thus, rice, maize, and wheat together add up to 95 percent of cereals consumed. In other words, millet and barley have a very small place in the diet at the national level. Yet these food grains are quite important basic foods in some regions, especially in the mountain districts.

Given this mix of cereals, the daily energy available from a composite kg would be about 9.39 calories. If one person consumed the average available quantity of 156.6 kg per year, his/her calorie intake from cereals would be 1,470 calories per day. Adjusted to adult consumption units (ACU), intake of calories from cereals would reach 1,821 calories per ACU. This level corresponds to 75 percent of minimum calorie requirements, but does not include calories contributed by other food groups. It is common in Nepal to assume that cereals are the source of about 80 percent of total calories. On this basis the calories available from cereals represented about 93 percent of minimum energy needs expected to be met from cereals (80 percent of minimum requirements).

TABLE 2-5  
COMPOSITION OF EDIBLE FOODGRAIN PRODUCTION  
Average, 1984/85 - 1986/87

<u>Cereal</u>	<u>Total Quantity (000 mt)</u>	<u>Kg/capita</u>	<u>%</u>
Rice	1,400	82.90	52.90
Maize	654	38.70	24.70
Wheat	476	28.20	18.00
Millet	109	6.40	4.10
Barley	6	0.40	0.30
All Cereals	2,645	156.60	100.00

Source: DFAMS.

Official GON estimates of foodgrain production requirements and self-sufficiency for the 1984/85-1986/87 period show that production exceeded national requirements by 2.8 percent, which is in line with the previous characterization of the country as "self-sufficient" (Table 2-6). However, this slight surplus is changed to an equally slight deficit of 23,000 mt per year if estimated in-kind wages of Indian workers are deducted.

Broken down by agro-ecological zone, the results show that the Tarai produced about 25 percent more than its requirements, whereas the Hill and Mountain Zones had deficits of 16 percent and 30 percent, respectively. These results are in line with the widely accepted view that food deficits exist in the heavily populated hill districts and the more sparsely populated remote mountain districts.

Most of the surplus foodgrain is produced in the Eastern and Central Tarai; the Midwestern and Far Western Tarai do not produce much surplus. As a result, both the Midwestern and Far Western development regions fall short of self-sufficiency. The areas most prone to food shortages are mountain and hill districts in the Karnali River catchment zone where self-sufficiency varies between one-half to two-thirds of requirements.

TABLE 2-6  
GON ESTIMATES OF OVERALL AND ZONAL FOOD BALANCES  
Average, 1984/85-1986/87

Zone	Population (million)	Foodgrain Production (000 mt)	Foodgrain Requirement (000 mt)	Balance Surplus(+) Deficit(-) (000 mt)	Self-sufficiency %
Mountains	1.47	122.70	175.20	-52.50	70.00
Hills	8.03	969.70	1155.40	-185.70	83.90
Tarai	7.39	1552.90	1243.00	309.90	124.90
Country	16.89	2645.30	2573.60	71.70	102.80

Source: DFAMS.

Several aspects of these estimates of zonal food balances should be noted. First, zonal balances are the differences between requirements and actual production in the zones. Thus, the deficits can be met by movements of food into deficit districts. However, nothing guarantees that a given household will or will not be able to meet its minimum food requirements whether the household is located in a surplus or deficit zone. That depends on whether the household grows enough food or can buy enough food to fulfill the requirements of its members.

The "requirements" of foodgrains per capita used in the GON estimates vary by zone. The zonal levels implicit in the estimates are:

Mountains	- 119.2 kg/capita/year
Hills	- 143.9 kg/capita/year
Tarai	- 168.2 kg/capita/year
Country	- 152.4 kg/capita/year

It seems likely that these large discrepancies serve to understate actual food deficiency patterns in the hills and mountains.

The calorie requirements are based on recommendations of the World Bank for South Asia. The levels used are:

Tarai	- 2,210 calories/ACU/day; and
Mountains and hills	- 2,410 calories/ACU/day.

The weighted average of total energy requirements for the country is 2,322 calories/capita/day.

The average foodgrain requirement implicit in column 4 of Table 2-6 is 152.4 kg/capita/year. This quantity will meet only 51.4 percent of the total target calorie intake. In other words, the estimates assume that fully 38 percent of food energy requirements will come from sources other than cereals.

Moreover, there are large differences in the contributions of cereals to calorie requirements among the zones. These turn out to be:

Mountains	- 46.4 percent
Hills	- 56.0 percent
Tarai	- 71.4 percent
Country	- 61.4 percent

Potatoes, other bulbs and tubers, and pulses are included in the most recent estimates of food balances. These food items were not considered in the estimates presented here due to difficulties in obtaining comparable data for the three years of the 1984/85-1986/87 period used for this analysis.

In an attempt to see how sensitive these estimates are to some of the underlying assumptions, we prepared a more detailed set of food balances based on more consistent and uniform norms.

Energy requirements in the mountains and hills agro-ecological zones were specified as 2,454 calories per adult consumption unit per day. The Tarai target was set at 2,254 calories/ACU/day. Next, we assumed that 80 percent of the energy requirements would come from cereals throughout the country. This percentage is more in line with the GON's Basic Needs Program that establishes a goal of 87.3 percent of food energy from cereals, pulses, and potatoes.

Using these revised assumptions, annual cereal requirements were calculated as 209 kg/ACU in the mountains and hills and 192 kg/ACU in the Tarai. The weighted average for the country was 201.6 kg/ACU. On this basis the country had a food deficit of 103,000 mt (4 percent) per year before any adjustment for in-kind payments to Indian workers (Table 2-7). More significantly, deficits in the mountains reached almost 50 percent and almost 29 percent in the hills. While our estimates of the surplus in the Tarai exceeds GON estimates, it is still insufficient to offset the larger deficits in the other two zones.

TABLE 2-7

EDIBLE FOODGRAIN PRODUCTION, REQUIREMENTS AND SELF-SUFFICIENCY  
Revised Estimates, Average 1984/83-1986/87

<u>Zone</u>	<u>Population (million)</u>	<u>Edible Foodgrain Production (000 mt)</u>	<u>Edible Foodgrain Requirement (000 mt)</u>	<u>Balance Surplus(+) Deficit(-) (000 mt)</u>	<u>Self-sufficiency %</u>
Mountains	1.47	122.7	248.9	-126.2	49.3
Hills	8.03	969.7	1359.4	-389.7	71.3
Tarai	7.39	1552.9	1141.1	+411.8	136.1
Country	16.89	2645.3	2749.4	-104.1	96.2*

\*This level of national self-sufficiency is reduced to 92.8 percent if allowance is made for rice taken home by Indian workers in the form of in-kind payment of wages.

Source: Authors' estimates based on DFAMS and CBS data.

People in the Mountains as a whole are able to produce food for just half (49.3%) of the year with a deficit of 126,000 mt. The people in the Hills produce food sufficient for about 8 months (71.3%) of the year with a deficit of 390,000 mt, whereas the surplus in Tarai (412,000 mt) emerges to be more than the GON estimates.

Analysis of the food balance situation by development region and agro-ecological zone (Table 2-8) shows that the gravity of food deficiencies rises in the Midwestern and Far Western Mountains and Hills and the Central Mountain, areas in which people are able to grow enough food for half or less of their yearly requirements.

#### 4. The Nepal Food Corporation

Trading in foodgrains in Nepal is done both by private traders and a parastatal organization, the Nepal Food Corporation (NFC). The NFC plays a pivotal role in implementing the GON's food policies. Its share in total grain trading is about 10 percent in most years.

TABLE 2-8

EDIBLE FOODGRAIN PRODUCTION, REQUIREMENTS, AND SELF-SUFFICIENCY  
BY DEVELOPMENT REGION AND AGRO-ECOLOGICAL ZONE  
Average, 1984/85-1986/87

Region/ Zone	Population (million)	Edible Foodgrain Production (000 mt)	Foodgrain Requirements (000 mt)	Balance Surplus(+) Deficit(-) (000 mt)	Self-sufficiency %
Eastern D.R.:	4.19	659	678	(-) 19	97.2
Mountains	0.38	43	66	(-) 22.8	66.7
Hills	1.41	207	240	(-) 33	86.3
Tarai	2.40	409	374	(+) 36	109.4
Central D.R.:	5.52	927	900	(+) 27	103.0
Mountains	0.46	33	79	(-) 46	41.8
Hills	2.38	294	406	(-)112	72.4
Tarai	2.68	600	415	(+)185	144.6
Western D.R.:	3.48	546	571	(-) 25	95.6
Mountains	0.02	4	4	0	100.0
Hills	2.39	288	402	(-)114	71.6
Tarai	1.07	254	165	(+) 89	153.9
Mid-Western D.R.:	2.22	315	358	(-) 43	88.0
Mountains	0.28	18	46	(-) 28	39.1
Hills	1.18	129	197	(-) 68	65.5
Tarai	0.76	168	115	(+) 53	146.1
Far-Western D.R.:	1.34	197	240	(-) 43	82.1
Mountains	0.38	25	52	(-) 27	48.1
Hills	0.68	51	115	(-) 64	44.3
Tarai	0.28	121	73	(+) 48	165.8

D.R. = Development Region.

Note: The energy requirement in the Mountains and Hills is assumed to be 2,454 Calories/Adult Consumption Unit/day and that in Tarai is assumed to be 2,254 Calories/ACU/day. This gives a national average requirement of 2,366 calories/ACU/day. It is assumed that 80 percent of this total requirement is to be met from five cereals. Based on these norms, the edible grain requirement is 209.14 kg/ACU/year in the Mountains and Hills and 192.0 kg/ACU/year in the Tarai. At the national level, average requirements turns out to be 201.64 kg/ACU/year.

Source: Authors' estimates based on DFAMS and CBS data.

More important, however, is the mode of procurement and sales of NFC. It deals with foodgrains, meat, and sometimes oil and ghee. Until recently, a large part of its grain procurement was through levies on exporters (up to 30%) at a price much below the prevailing market price. However, two things emerged. First, the levy (tax) on the millers was in turn shifted backwards to the producers in the form of lower purchase prices. Second, foodgrain exports gradually dried up and the economy became more of a net importer of foodgrain. Subsequently, open market purchase of foodgrains from millers and wholesalers has become the major source of NFC's domestic procurement.

The Government has been announcing support prices for major foodgrains since the beginning of the 1980s. However, these support prices remain far from being effective either in terms of being implemented or in terms of motivating the farmers to produce more. In this context, NFC has begun to purchase foodgrains directly from farmers. Thus, the storage capacity and the village level network of co-operatives (Sajha) could well be coordinated to make price policies more effective, but it is unlikely that price floors above the levels in border Indian markets could be defended.

Historically, the NFC has been making foodgrains, meat, oil and ghee available at cheaper prices, and most of its sales have been confined to Kathmandu Valley (Table 2-9). The foodgrain sales of NFC in low income areas in the Hills and Mountains have been relatively small.

The NFC has been reconsidering its sales policy recently. First, it proposes to terminate general sales in high income areas and increase its activities in the low-income, food-deficit hill and mountain areas. In this regard, it has already commissioned a study on the identification of vulnerable groups in those areas. Second, the Nepal Food Corporation expects to become involved in a consumers' retail price stabilization scheme in urban areas. It is considering establishing a stabilization reserve for this purpose and has commissioned a study to design an operational plan. Finally, the NFC wishes to establish a disaster-relief stock reserve. The stocks needed for the stabilization reserve and the emergency reserve have been identified by the GON as potential uses of food aid. They will be discussed further in Chapter 5 of this report.

TABLE 2-9  
NFC FOODGRAIN SALES BY GEOGRAPHICAL REGIONS  
1975/76-1986/87

Regions	F I S C A L Y E A R S											
	<u>1975/76</u>	<u>1976/77</u>	<u>1977/78</u>	<u>1978/79</u>	<u>1979/80</u>	<u>1980/81</u>	<u>1981/82</u>	<u>1982/83</u>	<u>1983/84</u>	<u>1984/85</u>	<u>1985/86</u>	<u>1986/87</u>
Mountains	1,673 (6.62)	2,865 (10.83)	4,469 (12.12)	3,647 (11.42)	4,501 (9.25)	5,022 (11.08)	3,838 (10.52)	10,776 (17.44)	8,910 (19.93)	7,937 (23.64)	7,937 (21.63)	4,559 (17.69)
Hills	8,544 (33.80)	9,111 (34.44)	12,820 (34.77)	8,832 (27.66)	17,111 (35.15)	14,180 (31.29)	13,539 (37.13)	23,337 (37.78)	13,705 (30.65)	10,890 (32.44)	11,669 (31.80)	9,373 (36.37)
Kathmandu Valley	14,499 (57.36)	14,049 (53.12)	19,529 (52.96)	18,888 (59.16)	26,441 (54.32)	25,699 (56.64)	18,190 (49.88)	26,025 (42.13)	21,446 (47.97)	14,685 (43.74)	16,900 (46.06)	11,445 (44.41)
Farai	562 (2.22)	429 (1.62)	54 (0.15)	558 (1.75)	620 (1.27)	422 (0.93)	900 (2.47)	1,638 (2.65)	648 (1.45)	62 (0.18)	199 (0.54)	395 (1.53)
Country	25,278	26,454	36,872	31,925	48,673	45,323	36,467	61,776	44,709	35,574	36,692	25,772

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Note: Figures in parentheses indicate percentages of total foodgrain sales.

Source: NFC Monthly Bulletin, (Special Issue) 1987 and other data from NFC.

Distribution of foodgrain sales by the NFC in relation to our estimated food deficits by major food production zones and agro-ecological/regional cells are presented in Tables 2-10 and 2-11. On the whole, the NFC's sales account for 31 percent of the national food deficit. However, its sales in the Mountains are just 4.5 percent of the deficit. The problem of food availability is especially severe in these districts since they are so remote and private suppliers hardly reach there. It is exorbitantly expensive for the NFC to ship grain to the most remote districts and equally expensive to transport fertilizer and other inputs to them. The constraint of inaccessibility affects both attempts to produce more food in the deficit mountain districts and to supply larger quantities through the NFC subsidized sales program. As seen in Table 2-11, in some of the most deficit locations NFC sales as a percent of the deficit barely exceed one percent.

TABLE 2-10

FOODGRAIN SALES OF NFC BY AGRO-ECOLOGICAL ZONE IN RELATION TO DEFICITS  
Average, 1984/85-1986/87

<u>Agro-Ecological Zone</u>	<u>Foodgrain Sales (mt)</u>	<u>% of NFC Sales</u>	<u>% of Zonal Deficit</u>
Mountains	5,650	17.59	4.48
Hills	26,241	81.72	6.73
Tarai	221	0.69	NA*
Country	32,112	100.00	31

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\*Not applicable as is food surplus.

Source: NFC.

TABLE 2-11

NFC FOODGRAIN SALES IN RELATION TO DEFICITS  
Average, 1984/85-1986/87

<u>Development Region/Agro- ecological Belt</u>	<u>Foodgrain Sales (mt)</u>	<u>% of NFC Sales</u>	<u>% of Deficit</u>
Eastern D.R.	4,473	13.92	23.68
Mountains	1,077	3.35	5.00
Hills	3,395	10.57	10.30
Tarai	1	-	NA
Central D.R.	16,577	51.62	NA
Mountains	603	1.88	1.37
Hills	15,974	49.74	14.26
Tarai	-	-	NA
Western D.R.	3,859	12.01	15.44
Mountains	642	2.00	NA
Hills	3,216	10.01	2.82
Tarai	1	-	NA
Mid-Western D.R.	3,733	11.62	8.67
Mountains	1,468	4.57	5.25
Hills	2,046	6.37	3.01
Tarai	219	0.68	NA
Far-Western D.R.	3,470	10.80	8.07
Mountains	1,860	5.79	6.89
Hills	1,610	5.01	2.52
Tarai	-	-	NA
Country	32,112	100	31.06

Note: NA means not applicable as the area is food surplus.

Source: NFC.

5. Household access to food

Average availability of food in relation to minimum nutritional requirements is low in Nepal. Likewise, the subsidized public food distribution program

is weak in the areas of most serious food deficits. These factors suggest a severe problem of access to food by those rural households that neither grow enough food nor can afford to buy enough food to meet their nutritional requirements.

In Nepal, 96 percent of the population is rural and 92 percent of the economically active population depends on agricultural production for its livelihood. In these circumstances, land distribution is a good proxy for income distribution, which in turn is the most important factor affecting access, or entitlement, to food.

In the 1981/82 census, a total of 2.19 million households were classified as rural. Of this total, 1.11 million, or 50.5 percent, were landless or near-landless, owning and/or renting less than half a hectare of land per household (Table 2-12). This majority of rural households as a group had access to only 6.6 percent of the country's cultivated land. These households do not have access to enough land to grow their own food and most do not have enough off-farm income to purchase sufficient food, even if it were locally available.

This high degree of inequality in land distribution, and the derived inequality in income distribution, is a key factor affecting access, or entitlement, to food. Not only is the overall Gini coefficient high, it seems to have increased in 1981/82 in comparison to previous census years.

Gini coefficients for the Mountain and Hill Zones are lower than for the Tarai and for the country as a whole (Table 2-13). Moreover, the average sizes of holdings in those zones are smaller than in the Tarai. This means that an effective program of land redistribution would involve additional movement of population from the Hills and Mountains to the Tarai.

Inequality in income and land distribution is the major source of chronic under-nutrition and household food insecurity in Nepal. Yet it is largely ignored in GON and donor strategies, notably including USAID's country development strategy. It deserves a much more prominent position on the country's policy agenda.

TABLE 2-12

NUMBER OF HOUSEHOLDS, CULTIVATED AREA, AND  
SIZE DISTRIBUTION OF HOLDINGS, 1981/82

	Number of Hholds	Cultivated Area			Percent Hholds	Percent of Culti- vated Area	Average Size of Holding
		Wet (ha)	Dry (ha)	Total (ha)			
0.0-0.5 ha	1,107,921	57,892	104,107	161,999	50.50	6.6	0.15
0.5-1.0 ha	355,420	115,716	149,214	264,930	16.20	10.8	0.75
1.0-2.0 ha	379,051	223,029	267,384	490,413	17.28	19.9	1.29
Over 2.0 ha	351,584	102,097	525,401	1,546,375	16.02	62.8	4.40
TOTAL	2,193,956	1,417,611	1,046,106	2,463,717	100.0	100.0	0.95

Source: Central Bureau of Statistics (CBS), National Sample Census of Agriculture 1981/82, Kathmandu, 1985, and Population Census 1981, Kathmandu, 1984.

TABLE 2-13

LAND DISTRIBUTION PATTERNS

(a) Agro-ecological Zone

Zone	Average Size of Holding Ha/holding	Inequality of Distribution (Gini index)
Mountains	0.62	0.56
Hills	0.90	0.59
Tarai	1.47	0.67
Country	1.12	0.69

(b) Comparisons by Census Years

Variable	1961	1971	1981
Size of holding (Ha/Household)	1.09	0.97	1.12
Gini index	0.64	0.62	0.69

Note: The Gini ratios were calculated from data from the National Sample Censuses of Agriculture in the indicated years.

Source: CBS.

B. How Good is the Data and Information Base?

1. Current statistics on crop areas, yields, and production

In the terms of reference for the assessment and the orientation by USAID/ARD personnel, we were asked to investigate the reliability of the data on agricultural production. The CDSS speaks of "soft" and "vintage" data and claims that "statistics are of limited use in illuminating the agricultural picture in Nepal."<sup>1/</sup>

Actually, Nepal was one of the early countries to introduce the area-frame sampling technique for collection of data on crop areas and crop-cutting for objective estimates of crop yields. The area segment sampling approach has been used in the country since 1975.

In Nepal as in other countries, the need exists to develop a statistical system that can produce reliable and timely area, yield, and production data at the district and national levels. This information is desired both by local and international planners, analysts, and policy makers. At the same time, there is growing interest in disaggregated information at the Panchayat and ward levels to facilitate preparation, monitoring, and evaluation of agricultural and rural development projects. It is not surprising that a still inadequate and poorly supported system directed to the first task appears even less adequate for the second. This discussion deals only with the first task.

In districts that have been cadastrally surveyed, estimation of areas under different crops is based on sampling procedures. The sampling system utilizes an area sample frame. Each cadastrally surveyed district was first

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<sup>1/</sup>CDSS, p.25. Two other statements on this page are puzzling. One claims that the statistics do not take account of multiple crops grown on the same land. But yields are estimated per crop, and separately for each crop in a multiple cropping sequence. Second, it refers to "reliable, newer Ministry of Finance data based on improved methodology and broader coverage." As far as we are aware, all collection, processing, and dissemination of data on crop areas, yields, and production are and will continue to be the responsibility of the Ministry of Agriculture.

stratified on the basis of soil quality, agricultural practices, and extension coverage. Cultivated land within each stratum was then divided into area segments of fixed dimensions. These area segments are the primary sampling units. Area estimation is based on a random selection of 15 percent of these primary units from each stratum. The areas devoted to crops in the sampled segments are used to make ratio estimates of cultivated areas by crop.

Parcels identified by operators within a segment constitute secondary sampling units. Yield estimates for paddy, maize, and wheat in all districts with agricultural statistics units are based on crop-cutting procedures conducted on 60 plots for each crop from selected parcels. The size of plots for crop-cutting is 5x5 meters in the Tarai and 5x2 meters in the Hills/Mountains. Crop-cutting is also used to estimate potato and sugarcane yields in districts of highest production. In carrying out the crop-cutting, a certain number of the plots are purposively allocated to block, special, and pocket production areas while the remainder are from randomly selected parcels.

The districts with area sample frames account for more than 75 percent of the cultivated area of the country and even more of the total production. Area and yield estimates for other crops are made on the basis of household surveys. The non-cadastrally-surveyed districts are included through subjective estimates made by extension personnel of the Ministry.

The area sample frames suffer from two main problems. The first is that fragmentation of parcels and reorganization of administrative boundaries make it increasingly difficult to identify the areas segments selected in the samples. Second, new land brought into production in the districts but not included in the original frames results in some underestimation of cultivated areas. These problems could be solved by adjusting the area frames and updating the fieldbooks, which will require a major effort. Future updating should be integrated with the work of the field units. While the underestimation of crop areas biases production estimates downward, the extent of the resulting bias is not known.

In terms of yields the level of precision of the estimates has not been evaluated. Questions of inadequacy of sample size and whether the fixed sample size of 60 plots per district leads to unequal representation of cropped areas among districts need investigation. Moreover, the allocation of a fixed number of plots to special program areas may be over-representing those areas and hence biasing yield estimates upward.

Problems identified in field visits include inadequate number of personnel, lack of transport, lack of training for personnel, inadequacy of supervision of field work, and above all lack of funds for field work.

Although errors have not been evaluated, the consensus opinion of our informants is that area and production data are generally underestimated. By how much and where? These are the questions that lack answers at this time.

FAO has been the major donor contributing to the agricultural statistics program of the Ministry. It recently supported the development of an early warning system, as described below. In a recent visit, an FAO statistics expert briefly examined and made recommendations to strengthen the Division's data collection and organizational arrangements at the central and field levels. The expert is expected to return soon for a second visit and bring a proposal for improvement of current agricultural statistics produced by the Agricultural Statistics Division (ASD). The likelihood of FAO providing the assistance to implement the proposal is not known.

Improvements of the current agricultural statistics will require short-term and long-term technical assistance in statistics and data processing, external and in-country training, up-grading of computer hardware and software, and increased budget support for the ASD. We believe that USAID should give high priority to assisting the GON in this critical area and collaborate with FAO in designing a project for that purpose.

## 2. Early Warning Information

From 1982 to 1987, FAO undertook a two-phased program to improve Nepal's Early Warning System. The project began in September 1982. Its objective

was to assist the GON in the establishment of a crop forecasting and early warning system and in the improvement of the current agricultural statistics system. An Early Warning Unit was established in the Agricultural Statistics Division (ASD) of the Department of Food and Agricultural Marketing (DFAMS) in the Ministry of Agriculture for issuing regular reports on the crop situation at district and national levels. The first phase of this project concluded in September 1983. A follow-up \$300,000 project was launched in April 1984, financed by Japan through Trust Fund arrangements with the FAO/Food Security Assistance Scheme. This latter project, which was terminated in March 1987, undertook the following activities:

- (1) Extended the use of meteorological data by expanding the network of daily reporting stations (from 12 to 23 against a target of 50). This data is reported to the Meteorological Department which supplies weekly and monthly rainfall data to the Early Warning Unit (EWU). The EWU then analyses this data using micro-computers provided by the project.
- (2) Introduced a system of weekly and monthly reporting on the crop situation of all food crops. These reports are prepared by the field staff of DFAMS and the Agricultural Development Offices in districts and sent telegraphically to the central office. All 75 districts are covered by the system, but not all of them report each time period as required. These reports are supplemented by field visits by the EWU staff who collect information on production practices and conditions relating to crop production. This information is used to adjust area estimates and to alert GON officials to crop damage, production prospects, and impending shortfalls.
- (3) Helped improve the agricultural statistics system by initiating a crop forecast survey, based on interviews of a random sample of farmers (in 45 districts by 1986), undertaking in-depth sample surveys for estimation of crop area and special surveys in remote hill and mountain districts, and improving regular statistical activities of the ASD.
- (4) Instituted in-depth district profile reports in 11 districts to provide a detailed agricultural stratification of the districts. In the preparation of these district profile reports extensive use was made of land use and land systems maps produced by the Land Resource Mapping Project. (This information could be incorporated into revised area sample frames.)
- (5) Undertook a trade flow survey to provide information on food movements, most of which are handled by private traders and millers. Phase I identified the various trades routes, and Phase II was to record the volume of quantities traded and was to have included an

actual count of trade traffic, but this phase had to be postponed indefinitely for want of adequate funding. The project also supported studies on the trade flow of important cash crops, such as sugarcane, tobacco, and cardomon.

- (6) Organized a data bank, for the storage of all reports, bulletins, and data from various sources in the Agricultural Statistics Division of DFAMS.

The operation of Nepal's Early Warning System was severely tested during the 1986 drought. Reports to the international community on foodgrain shortages, the areas and number of people at risk, and the amount of food assistance needed was contained in two GON Food Shortage Situation Reports, one an evaluation as of September 5; the other, as of October 31.

In the first report the GON alerted foreign countries and international organizations that a food shortage "was likely" because inadequate rainfall had caused paddy rice farmers to plant late and production was expected to be low. The GON said it would provide further information. On-the-spot checks in all 20 Tarai districts indicated that the situation had improved because of late rains the last week of August which would benefit the late paddy. Still a 24.6% decrease in the rice crop was predicted for the Tarai, and an 18.7% decrease for the rest of country. A shortfall in the maize crop was also predicted. The GON expected to reduce the overall shortfall by 100,000 mt by producing and marketing winter crops (wheat, pulses, etc.) planted after the rice harvest. Foreign donors were asked to make up the remaining shortfall by providing 183,190 mt of foodgrains.

An early delivery of 54,543 mt of that total was requested to cover the months of October through December to help those most seriously affected:

<u>Month</u>	<u>Est. No. of People Needing Assistance</u>	<u>Kg/person</u>	<u>Requirement (mt)</u>
October	508,226	0.450	6,861
November	1,026,458	0.450	13,857
December	2,505,603	0.450	33,825
			<u>54,543</u>

The second report, as of October 31, updated the first one. It noted that an FAO officer from the Food Survey and Information Service had confirmed the GON's earlier findings. GON teams had once again monitored the situation in all Tarai districts and found that:

- (1) the early paddy crop was 38.4% less than the one in 1985/86.
- (2) the late planted paddy rice would not make a full crop because of late rains and fungus.
- (3) floods had reduced the irrigable land for winter wheat and the crop would be reduced.

Overall, however, their assessment of the shortfall in the Tarai was more hopeful because of sufficient rainfall in most of the Tarai during September. The expected shortfall in paddy rice production in the Tarai districts declined by 19.8% from 524,241 mt to 426,325 mt. The estimated shortfall in the maize crop remained the same.

The revised estimates of the shortages of foodgrains that needed to be met from food aid donations fell from 183,190 mt to 157,795 mt.

Because the Mission was not confident of the data reported by the GON, USAID/Nepal requested a foodgrain assessment team be sent from USAID/Pakistan. This team arrived some weeks prior to an FAO assessment team that came in late November. The conclusion of the USAID/Pakistan team was that the total foodgrain production would be larger than the average production of the previous five years, depending on the success of the wheat crop to be planted in November (for which prospects looked good), but, as a safeguard against failing rains and an unsuccessful wheat crop, recommended that donors collectively donate 70,000-80,000 mt of foodgrains as soon as possible and that strict requirements be placed on the GON to ensure that the food-for-work programs be limited to the hardest hit Tarai districts. The FAO/WFP team gave differing estimates of the shortfall in various crops and the resulting number of people at risk. They confirmed, however, that there was indeed a food crisis in the affected districts of the Tarai, and recommended that donors contribute 8,400 mt of emergency food aid for free distribution to 234,000 people and 94,500 mt of cereals before mid-1987 to provide food-for-work for 300,000 persons. They also recommended, to insure

more accurate predictions of future needs, that \$250,000 be budgeted for further strengthening of the GON's Early Warning System.

In retrospect, it is unfortunate that the USAID/Pakistan team and the FAO/WFP team did not arrive at the same time and make a common assessment. Their differing estimates of the severity of the situation only compounded the confusion.

Because of the late and differing estimates of the extent of the 1986 food crisis, USAID/Nepal adopted a wait-and-see attitude about donating food through WFP. Other donors -- ten countries, plus the EEC and WFP -- by September, had pledged 42,501 mt of rice, wheat and maize. (Canada and the U.K. later withdrew their pledges.) By May 31, 1988, a total of 30,475 mt of food had been received and 4,800 mt was still in the pipeline. These donations proved more than was actually needed and in any case arrived too late to be fully utilized during the drought year. A large part of the food had to be stored for use in food-for-work and other schemes aimed at mobilizing local labor. That aftermath was an unfortunate outcome which would not have occurred if more accurate assessments had been made at the appropriate times.

This three-year FAO project put in place many of the elements needed for a reliable early warning information system. Unfortunately funds ran out and the project had to close down before it was completed. One of the recommendations that the FAO/WFP team made when they came to assess the 1986 drought was that an additional \$250,000 be spent to refine and complete the EWS. The team did not suggest which donor might finance such a project nor exactly what remains to be done. As far as we know, nothing further has been done on the EWS.

Since the GON's early warning system did not meet the test of the 1986/87 food crisis to produce reliable estimates, it is clearly in the national and donor interests to strengthen it to the point where its estimates of crop failures and food shortages will be timely and credible, not only for the GON but for foreign governments and international organizations as well. As a first step the system should be assessed to see what remains to be done and at what cost.

### 3. Prices and Market Intelligence

DFAMS is also responsible for the collection, processing, analysis, and dissemination of price information for food and agricultural commodities. It collects price information from all 75 districts. This information includes farm-gate, wholesale, and retail commodity prices as well as agricultural input prices. The most extensive data are on retail prices, which are collected for 35 agricultural commodities including cereals, vegetables, fruits, and livestock products. Prices in Indian border markets are also regularly collected.

We made only the most cursory review of the price reporting system. Nevertheless, price reporting has an important potential role to play in food security. If knowledge of normal price relationship between Indian and Nepali markets, among districts in the country, and seasonally in the various sub-markets, is good, then accurately monitored price movements can be an important element in an early warning system to identify impending localized food shortages. Analysis of spatial price relationship will also show to what extent various parts of the country are integrated into a single market for the major food commodities and reveal normal patterns of commodity flows in response to the price differences.

Within the GON, much interest exists in extending data collection to the monitoring of physical flows of commodities within the country and across the Indian border. While we have spent almost no time on this question, we are not convinced that an elaborate system for recording commodity movements would be very useful, even if it were feasible. It would probably be more useful and more efficient to concentrate on price reporting and analysis, and use prices as indicators of actual and potential commodity flows. This is not to say, however, that a one-time evaluation of inter-district food flows is unwarranted.

C. Conclusions

1. Foodgrain pricing policies

While awareness is growing that the open India/Nepal border effectively limits the GON's food price policy options, ambivalence and confusion on this matter still abound. The GON announces annual minimum support prices for rice and wheat. These prices, however, are usually announced after planting in the Tarai (pre-harvest) and generally are lower than prevailing market prices. Should the GON attempt to raise and/or stabilize prices producers receive to improve incentives for domestic production (as is often recommended by national and foreign experts)?

The reality is that Nepal cannot have a support price, made effective through government purchases, that raises prices in the Tarai above prices in Indian border points by more than the low unit transportation costs between the markets. Not, that is, unless the GON is willing to purchase the large quantities of grain that could flow across the border. Such a policy is neither economically sound nor financially feasible.

What this means is that Indian foodgrain pricing and stabilization policies are the single most important determinant of price levels in Nepal. Rather than attempting ineffective and potentially costly price policies, the GON would do better to equip itself to understand and adapt to Indian policies. This is not necessarily damaging to Nepal's own interests. To the extent that India has provided attractive and stable prices to its own foodgrain producers, and shielded them from low and unstable world prices, Nepal has received a derived benefit. Only if India were to begin to implicitly tax producers or lose control of regional/seasonal price variations would Nepal be damaged by its dependence on Indian policies.

We recommend that USAID assist the GON in undertaking an in-depth study of Indian foodgrain pricing and its implications for Nepal, and establishing a mechanism for updating the results on a regular basis. We further recommend that the GON improve its monitoring and analysis of farm-gate prices relative to Indian border prices to determine that spatial and seasonal

variations are appropriately related to transportation and storage costs, and that observed deviations from these norms are random and transitory. If systematic deviations are found, remedial policies should be designed.

## 2. Agricultural data and information

A coordinated approach to strengthening data collection and processing is needed. Given the GON's intention to develop a panchayat-level data system, care should be exercised to keep that system compatible and complementary with the existing agricultural statistics system. The weaknesses of the latter are fairly clear. After the imminent visit of the FAO expert, USAID and FAO should collaborate with the GON to provide assistance to improve the system.

What is needed in the early warning area is less clear. More mobility for data collection in the districts is one obvious constraint. Beyond that, we doubt that a sophisticated system is sustainable in the Nepal context. Attention should be turned toward a simple approach that integrates assessment of production conditions with analysis of price movements. FAO has been the source of assistance so far and should be urged to "finish the job."

## 3. Inter-district movements and strategies for adjusting to food deficits

DFAMS would like to complete its study of inter-district movements of food and cash crops. This study should be supported if it is expanded to include the seasonal movements of people in and out of hill and mountain districts. People migrating out seasonally may be almost as important as in-flows of food for compensating for some of the observed food deficits. Case studies of adjustment strategies by households and small districts in selected food-deficit areas would also be useful and are recommended for USAID funding.

### III. DOES NEPAL NEED MORE FOOD AID?

Projecting the future is inherently fraught with difficulties: the estimation of food aid requirements of recipient countries is no exception. The analyst is confronted with a series of fundamental questions, the answers to which essentially determine the magnitudes of the estimates that result. These questions involve trends in population, per-capita income, food production and consumption, nutritional requirements, and commercial import capacity.

Various approaches have been used to establish criteria and estimate countries' needs for food aid in a given year and in the future. A frequently used approach involves estimates of total import requirements under various growth and consumption scenarios, and then calculation of the portion of import requirements likely to be met with commercial imports based on the country's ability to pay. The residual between total import requirements and projected commercial imports represents the "cereals gap" that must be met by food aid if consumption targets are to be met. Evaluation of ability to pay usually takes into account export earnings, foreign exchange reserves, and total merchandise imports.

Estimates of food aid requirements reported in B. Huddleston, Closing the Cereals Gap with Trade and Food Aid (IFPRI), Research Report No. 43, Washington, D.C., 1984, are of this type. This study included 99 middle-income and low-income countries. Only middle-income countries with weak food production and balance of payments positions were assumed to need food aid. However, the amount was limited by imposing the condition that food aid be given only when the quantity of cereal imports adequate to meet nutritional needs exceeded five percent of export earnings.

All low-income countries were assumed to require food aid. In the few cases where per capita availability was adequate by the specified nutritional norms, food aid was still needed for balance of payments support. The amount of the requirement for each country was estimated to fulfill minimum per capita nutritional needs, with an allowance for commercial imports equal to two percent of export earnings. The last adjustment forces countries to allocate some foreign exchange for cereal imports before the quantities of food aid needed to close the gaps between food requirements and availability were calculated.

The 39 low-income countries included received 4.3 mmt of food aid in 1978/79. The amount required was far larger, totaling 27.3 mmt. The principal reason for the large size of the total food aid requirements was the increase to meet nutritional needs. While the estimates would be lower if other data showed lesser nutritional deficiencies, the basic conclusion that larger amounts of food aid are needed to alleviate hunger in the low-income countries would not change.

For Nepal, the estimated requirements were 225,000 mt compared to actual food aid levels of only 2,000 mt in the 1976-1978 period. While the absolute volume of food aid requirements for the country were small relative to those of such countries as India and Bangladesh, no other country showed as large a percentage gap between actual and required food aid.

Projections of this same type, but using a more complex model and including separate estimates for non-project, project, and emergency food aid, have been presented by FAO (Assessing Food Aid Requirements: a Revised Approach, Economic and Social Development Paper No. 39, Rome, 1983). In addition, project food aid for each country was linked to the amount that could be effectively utilized under existing economic conditions and management constraints. At this point, this study integrated the second main approach to food aid requirement (to be discussed below) with the "cereals-gap" approach.

The final example of the "gap" approach is the USDA, Food Aid Needs and Availabilities (FANA) annual projections. The FANA model contrasts the cereals import requirements to maintain "status quo" consumption, defined as the average per capita level of the preceding three years in each country, with the "nutrition based" requirement of providing 100 percent of the FAO/WHO standards for average per capita intake of calories. Projection of total cereal requirement are made for each of the two succeeding years.

The next step in the FANA approach is to estimate food aid needs within the total cereal import requirements. The FANA procedure incorporates a decision rule reflecting the assessment of a country's ability to finance cereal imports from export earnings: food aid requirements are calculated on the assumption that the percentage of export earnings spent on cereals does not exceed the share during the

base period. The FANA procedure also incorporates the best estimates of the production of staple foods in the coming year, using the latest USAID forecasts. In this way, short-term food aid required to avoid a fall in food consumption due to production short falls are included in aggregate food aid needs.

The latest FANA results for Nepal are of considerable interest:

### Nepal<sup>1/</sup>

Total cereal production in 1987/88 is currently estimated at 3.0 million tons, 29 percent less than earlier forecasts and slightly below the drought-reduced harvests of 1986/87. The decline stems largely from rice losses from drought, followed by heavy downpours, in the central and eastern parts of the country. Rice production is now estimated at 1.6 million tons, revised downward 53 percent.

Because of the drop in domestic cereal production, the estimated status quo cereal import requirement has risen from zero to 327,000 tons in 1987/88. Similarly, the nutrition-based estimate has nearly tripled, increasing to 848,000 tons from 300,000.

There have been no revisions in Nepal's financial situation, which remains extremely weak. The commercial import capacity continues to be estimated at \$7 million (28,000 tons), leaving 1987/88 status quo and nutrition-based additional cereal needs of 299,000 tons and 821,000 tons, respectively. According to some observers, it is unlikely these needs can be met because logistical and administrative problems would limit imports to about 200,000 tons.

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<sup>1/</sup>ERS, USDA, World Food Needs and Availabilities, 1987/88: Winter Update, Washington, February 1988, p.33.

Assuming average weather in 1988/89, a rebound in overall cereal production is projected. Status quo import requirements are forecast to fall to 131,000 tons, with about 697,000 tons needed to raise consumption to the FAO/WHO recommended minimum diet. Compared with 1987/88, additional cereal needs will also drop to 100,000 tons and 667,000 tons, using the status quo and nutrition-based methods, respectively.

Although based on the latest agricultural projections available in Washington, the divergence of the estimates given by FANA for 1987/88 and the actual situation in the country is striking. As noted previously in this report, if provisional estimates are confirmed, a bumper crop was produced in 1987/88, leading to the highest per capita supply in a decade. Assuming the production estimates in the country are closer to reality, the FANA conclusion that 327,000 mt of cereal imports are required just to maintain "status quo" utilization levels is totally unwarranted. Were the situation as represented by FANA, the GON would be seeking emergency food aid with the same diligence it demonstrated in 1986/87.

This leaves the 500,000+ mt needed in Nepal for nutrition-based requirements to be discussed. The first point about this figure, as well as the "status quo" requirements given earlier, is that the FANA analysts recognize that "it is unlikely these needs can be met because logistical and administrative problems would limit imports to about 200,000 tons." How this particular limit on Nepal's absorptive capacity was established is not explained.

But understanding that imports even at the level of 200,000 mt would not necessarily alleviate hunger and reduce malnutrition in Nepal is essential to understanding Nepal's food situation. If sold into the major domestic market, prices would likely change little and food would flow across the border into India. This would happen because the Nepal price structure for food is tied to the larger Indian market by effective spatial arbitrage. Everything would depend on how the food aid were used. Only if it were made available to food-deficit households through subsidized sales or food-for-work and feeding programs would the food-deprived benefit. Nepal has neither the financial nor management capacity to mount a program of the required magnitude.

The implication is that all food aid requirements calculated by a "gap" approach are likely to be well above the amounts that could be effectively utilized in a country. Management constraints and the costs associated with use of the "free" food almost always restrict the amount which can be put to good use. In fact, the other approach that is used for estimating requirements is based on this notion of a country's "absorptive capacity."

The underlying implication of this second approach is that "needs" cannot be defined independently of some assessment of financial and programmatic capacity at different levels in the country to handle the food resources. Local budgetary as well as institutional capacities are both involved in this assessment. The extent to which various constraints prevent countries from absorbing the quantities of food aid they appear to need will differ from country to country. This report, as well as the previous one, is designed to identify some of the constraints in Nepal and show their impact on the GON's and donors' capacities to use additional food aid effectively.

#### IV. EXPERIENCE WITH FOOD AID SINCE THE 1984 ASSESSMENT

##### A. The World Food Program (WFP)

WFP is the principal importer and programmer of food aid in Nepal. By way of background, WFP was started 20 years ago by the United Nations and FAO to distribute food surpluses to needy people throughout the world. The program was a success and became institutionalized. WFP operates with its own governing body and considerable resources of food(2/3) and cash (1/3). It spent \$7 million in Nepal in FY 1987. An historical account of WFP food aid to the country is given in Table 4-1.

For fifteen years WFP/Nepal has conducted a mainly welfare-oriented "handout" program whose impact was never accurately measured and which was largely ignored by the GON because it was not closely tied in with the work of any ministry. In November 1987, WFP/Rome sent a mission to Nepal for the first serious overall assessment of the food aid program. The main point in their review was that food aid must be considered not just in a social welfare context but as a development tool to be used as a complementary resource in umbrella-type, sectoral programs like nutrition and education, agro-forestry, small farmer community irrigation programs, watershed management, and road and trail building/renovation. A part of WFP's program, of course, was already development-oriented. The mission from Rome merely stressed that in the future all projects, particularly nutrition interventions, should be tied to government programs from their initial development.

WFP has been involved in every aspect of food aid assistance. It marshalled donor assistance during the 1986 food crisis. It provided initial food support to the mountain people the government settled in the Tarai. From 1977 until 1985 it provided skim powder milk and butter oil supplements to the Dairy Development Corporation, assistance which may soon be renewed. WFP also played an integral role with the Agricultural Development Bank in resettling landless peasants and assisting them with food until they could achieve self-sufficiency through agro-forestry development projects. WFP has been a

TABLE 4-1  
WFP-SUPPLIED FOOD AID DELIVERIES TO NEPAL (QUANTITY IN METRIC TONS)

Commodity	1964-74	1975	1976	1977	1978	1979	1980	1981
1. Sugar	30.7	--	--	--	--	--	--	--
2. B. Oil	257.5	28.981	75	9.920	9.707	--	47.775	58.660
3. C. Fish	57.2	--	--	--	--	--	--	--
4. DSM	1,428.3	1,051.947	784.303	1,208.136	1,429.57	708.356	1,364.138	2,228.453
5. D. Eggs	39.8	--	--	--	--	--	--	--
6. W. Flour	4,653.0	--	--	300.0	929.609	4,091.970	2,771.074	4,961.704
7. Wheat	--	--	--	448.932	2,265.958	2,392.413	1,665.387	2,983.393
8. V. Oil	170.0	--	--	24.176	167.062	465.030	348.382	594.942
9. WSM	837.5	863.936	1,506.411	1,091.0	1,391.915	177.851	1,174.715	2,263.874
10. Pulses	--	--	--	29.704	278.028	347.718	295.006	486.805
11. Maize	700.0	--	--	--	--	--	--	--
12. Corn S.M.	888.0	--	--	--	--	--	--	--
13. Ghee	134.0	--	--	--	--	--	--	--
14. Rice	--	--	--	--	--	--	--	--
<b>Emergency Assistance</b>								
1. Rice	--	--	--	--	--	--	--	--
2. Wheat	3,637.7	--	--	--	--	--	17,046.226	15,576.374
3. Maize	2,000.0	--	--	--	--	--	--	--
<b>T O T A L</b>	<b>14,833.7</b>	<b>1,944.864</b>	<b>2,365.714</b>	<b>3,111.868</b>	<b>6,471.849</b>	<b>8,183.338</b>	<b>24,712.703</b>	<b>29,154.205</b>
Commodity	1982	1983	1984	1985	1986	1987		
1. Sugar	--	--	--	73.023	149.878	122.853		
2. B. Oil	92.161	148.933	--	411.081	110.783	590.741		
3. C. Fish	--	--	--	--	--	--		
4. DSM	1,998.576	1,460.957	1,714.706	2,165.253	1,989.725	430.874		
5. D. Eggs	--	--	--	--	--	--		
6. W. Flour	5,323.182	1,752.730	1,883.068	1,404.665	1,815.259	--		
7. Wheat	354.751	--	3,032.122	993.613	650.0	353.0		
8. V. Oil	83.640	119.347	295.737	207.511	337.081	39.684		
9. WSM	1,829.196	1,389.55	2,283.602	5,645.589	2,886.393	4,804.619		
10. Pulses	250.665	218.632	229.544	83.239	186.0	75.0		
11. Maize	--	--	--	--	--	--		
12. Corn S.M.	--	--	--	--	--	--		
13. Ghee	--	--	--	--	--	--		
14. Rice	--	--	--	--	985.139	--		
<b>Emergency Assistance</b>								
1. Rice	--	--	--	--	--	5,359.0		
2. Wheat	--	9,986.0	--	--	--	--		
3. Maize	--	--	--	--	--	--		
<b>T O T A L</b>	<b>9,932.171</b>	<b>15,076.151</b>	<b>9,438.779</b>	<b>10,983.974</b>	<b>9,110.258</b>	<b>11,775.818</b>		

1982-1987  
Continued...

partner in several rural development schemes involving food-for-work, most recently and successfully with the Sulichaur-Liwang road project in the Rapti Zone on which it collaborated with USAID.

A large portion of the WFP budget has been spent on food for nutritionally vulnerable groups -- preschoolers, malnourished children, lactating mothers, and school children in need of supplemented in-school meals. In delivering food to these groups, WFP has had to rule out remote mountain areas where food is needed most. It is simply not cost-effective to use food aid in those areas. Transportation (by mule or porter) costs more than the food is worth. It is more cost effective to pay beneficiaries cash and let them buy local food from private traders. If WFP were to deliver the food, it is unlikely that the MOE would have schools or the MOH Health Posts to link up with. The food aid would then just be a handout.

Even in the more accessible areas, feeding programs for nutritionally needy mothers and children have been hampered by an apparent lack of interest on the part of the MOE and MOH and a lack of counterpart government funding. At present WFP pays 50% of the costs of the programs, the GON pays only 5%-6%, and the beneficiaries pay the rest, which is put into a development fund. Prospects for an increase in government funding are dim because of the budget strains of the Structural Adjustment Program.

B. Sulichaur-Liwang Road (28 Km), Rapti Zone: USAID/WFP Collaboration

In Nepal the interests of USAID and the WFP are complementary. USAID, faced with a downward trend in budgeting resources, is seeking ways to stretch available development funds through the use of food aid, particularly food-for-work. WFP (the principal source of external food aid in Nepal), in an overall effort to reorient its country program away from welfare to development projects, is seeking ways in which food can be used as a complementary resource in well-conceived, financed, and managed development efforts. The two seem well matched. The Sulichaur-Liwang Road project in the Rapti Zone is a good example of a successful collaboration.

In July 1987, USAID, the GON, and WFP signed an agreement to improve the Sulichaur-Liwang road in the Rolpa District of the Rapti Zone. This three-year project should serve as a model for collaborative food-for-work efforts in the future, primarily because it meets the prerequisites thought to be essential if food-for-work efforts are to succeed. It is worthwhile to examine these prerequisites and how they have been satisfied in the project.

1) The project should be part of a larger development effort.

The three mountain roads in the Rapti Zone, originally constructed by the Districts, were improved under the USAID-financed Phase I Rapti Area Development Project (1981-87). The "Rapti Roads Assessment Study" prepared for USAID by Louis Berger International in 1985-86 stressed the economic importance of these mountain roads for further development of the area and prepared plans for further upgrading of the roads. The Sulichaur-Liwang project will open the remaining 28 km section of the road in the Rolpa District.

2) The project should be located in a food deficit area with high under-employment.

The Rapti Zone is poor and underdeveloped. In the mountain area that this road will serve per capita income is \$74, half the national average. Population density per unit of cultivable and grazing lands is extremely high, incomes are very low, food production is far below nutritional requirements, and soil erosion and nutrient depletion have become so pervasive that the fundamental life support systems of the people (agriculture, livestock and forestry) are threatened. The surplus labor in Rolpa is estimated as the equivalent of 17,316 persons, mostly comprising small and landless farmers. Fifteen percent of the surplus labor is estimated to be female.

- 3) The project should be soundly conceived and managed, and financing should be assured.

The design of the project was a coordinated effort involving WFP, USAID/Nepal, the Ministry of Panchayat and Local Development, and the Department of Roads of the Ministry of Works and Transport. The Local Development Officer (LDO) of the Rolpa District also helped to prepare the final proposal. Progress monitoring of the construction work is the joint responsibility of WFP, the GON, and USAID. Financing responsibilities are as follows::

<u>WFP Support</u>		<u>USAID and GON Support</u>	
<u>Food AID</u>		<u>Cash Contribution</u>	
Wheat	1950 mt	Construction Materials	\$267,500
Pulses	130 mt	Skilled Workers	47,210
Edible Oil	98 mt	Food Transportation	56,700
Food Transportation		Operating Costs	97,410
Cash Contribution	\$56,700	Cash payment for unskilled workers	78,120
		Total	<u>\$546,940</u>

- 4) Transportation and storage of food should be feasible.

The food required is imported by WFP through Nepalgunj, just to the west of the project site. From there it is transported by locally contracted trucks and tractors. Local food transport and local administration are handled by the Local Development Officer of Rolpa District under the Ministry of Panchayat and Local Development. Food is stored in several small new buildings in Sulichaur constructed with USAID funds. A few months prior to this report delays in the delivery of food and cash occurred due to difficulties with the transporter and the transfer of the LDO of Rolpa. Pulses and vegetable oil have not yet been delivered, only wheat; steps have been taken to resolve these problems.

WFP learned through experience not to entrust both road construction and food distribution to the local contractor. The responsibilities must be kept separate. In this case food distribution is being handled by the LDO of the MPLD. In future, WFP expects to turn it over to the local officials of the Ministry of Works and Transport.

5) Food commodities provided should have high value in terms of the local price of food; wages must include some cash payment.

An unskilled worker's daily food ration is 3 kg of wheat, 0.2 kg of pulses, and 0.5 of edible oil. Based on the market prices of these foods in Sulichaur he will be receiving a quantity of food of a slightly lower value than the prevailing food wage of NR 20-23/day. Therefore, each worker is paid NR 2.60/day in cash, making an average total pay of NR 22/day. Workers require some payment in cash in order to buy kerosene and other necessities for the household.

C. Dairy Development Corporation

In October 1987, USAID agreed to provide Nepal's parastatal Dairy Development Corporation (DDC) with 1000 mt of non-fat dried milk (NFDM) and 250 mt of butter oil, which were badly needed as a supplement to the local supply of fresh milk. WFP, the usual supplier to the DDC of these commodities, had cut off support in 1985 because certain preconditions in the agreement with the DDC had not been met. The government first turned to the commercial market and ordered 1,100 mt of powdered milk from Poland. But before Poland could ship it, the Chernobyl nuclear disaster occurred in Russia, and the GON, fearing the Polish milk powder was contaminated, cancelled the order. Urban buyers of milk, knowing dairy milk was mixed with powdered milk and fearing contamination, boycotted the dairy milk produced by the DDC and instead bought their milk direct from the farmers. To rectify the situation, the GON announced it would not buy any more powdered milk from abroad. So people once more started buying fresh milk from DDC. But it was the beginning of the lean season and there was a shortage of milk. The GON then reversed itself and turned to USAID for help, with imported powdered milk. That help came when it was very badly needed, and the Mission earned considerable praise for its timely intervention.

The NFDM and butter oil imported by the Mission were brought in under the provision of PL 480 Title II, Section 206, which is similar to Title I and requires "the establishment of a special account of facilities monitoring and

accountability of local funds generated by the sales of the USG commodities provided." This was the appropriate choice because of the nature of DDC's operations. The NSDM and butter oil the DDC receives are used in the corporation's four milk processing plants. The sales proceeds from the reconstituted milk are deposited in a special interest-bearing account and used to develop Nepal's dairy industry, especially the increased domestic production of milk by small farmers.

The DDC has been dependent on milk supplements since 1977 when it first turned to WPF for help. It did so because not enough fresh milk was being produced by local farmers to keep its milk processing plants operating to capacity, especially during the dry season. In 1983-84 DDC produced 25,259,000 liters of pasteurized milk, 54.3 percent of which was collected by local farmers. The rest was produced by mixing fresh milk with imported powdered skim milk and butter oil. At present the four DDC processing plants operate at full capacity (68,000 liters/day) only during the "flush" season (September through November). During the remaining months, the "lean" season, they are reduced to as little as 20 percent of capacity. In July 1987, the DDC launched its "Intensive Milk Production Program" which in three years' time (1990) expects during the "flush" season to produce 47,000 liters/day of fresh milk in excess of its total processing capacity of 68,000 liters/day. This excess will be turned into more easily stored and more profitable milk products (cheese and milk powder), and will enable the DDC to run their milk processing plants entirely with domestic milk without further dependence on imported supplements. Dry milk powder will be produced in a new plant to be built with assistance from DANIDA. The expected increase in local fresh milk production will result from DDC investing funds from the special account in the improved breeding of stock, animal health services, fodder production, and training. Farmers will also be provided loans through the Agricultural Development Bank to purchase improved breeds. DDC plans to upgrade and strengthen existing milk collection and chilling centers. The corporation now operates 325 collection centers, 17 chilling plants, and 4 processing plants. Eighty-nine milk producer societies have been formed to collect milk from producers. The milk is then chilled and sent by road tanker to one of the DDC milk processing plants.

It has not been smooth sailing for the DDC. A serious issue has been its price policies. Under pressure some time back, the GON raised the price it paid farmers for fresh milk, but it refused to allow an increase in the price at which DDC milk was sold to urban consumers of milk who are an elite and powerful pressure group. Consequently, the DDC operated increasingly in the red. Funds from the special fund were used to keep the corporation going. When WFP found that the special account was short NR 38 million, they ceased their support of DDC until the matter could be rectified. Consumer prices have now been increased and all but NR 8 million has been restored to the special account with promises that the remainder will soon be forthcoming. A second issue is the 179 mt of dried skim milk that the DDC borrowed from a WFP-assisted project and has not yet paid back. A third is the fact that whatever food the GON imports from non-European countries is subject to less stringent radioactive contamination levels than are European foods imported by WFP. Most of these issues may soon be resolved to WFP's satisfaction, and their support of the DDC is expected to resume. Assuming WFP and USAID support of DDC continues, however, both organizations should make certain that producer and consumer price adjustments are not just ad hoc reactions to pressures, but are part of a pricing mechanism that will provide a regular, smooth procedure for whatever adjustments may be needed in the future.

We recommend that USAID continue to provide NFDM and butter oil to the DDC through FY 1988/89 and possibly through FY 1989/90 when the corporation hopes to become self-sufficient and no longer dependent on imported supplements. Failure to do so, we feel, would jeopardize the success of an organization which the U.S. Mission's timely intervention last October was so helpful in stabilizing. Any support past 1988/89 should be coordinated with WFP.

In addition to the institutionalization of a price-review mechanism, USAID should urge the GON to encourage more private activity in milk processing and distribution. As a start, the DDC's milk and milk products might be retailed through private dealers rather than sold directly to consumers. Producer associations could own and operate the collection centers and chilling plants as cooperatives. Ultimately, even the processing plants themselves could be sold to the private sector and the DDC converted to a regulatory and service organization, supported through fees collected on the marketed milk.

Considering USAID's interest in enhancing the role of women in rural development, we further suggest that the Mission investigate dairy farming in a project entitled "Production Credit for Rural Women" (PCRW) to see if the milk produced on those farms can be sold to one of the DDC collection centers.

PCRW was launched in 1982 to increase the income of poor rural women by involving them in small-scale production enterprises. Credit is being provided in the project for on-farm activities. Its \$12.3 million budget is made up of loans from commercial banks, grant aid and loans from IFAD, UNICEF, Finland, Volags and the GON. The project, which will run until June, 1994, is assisted by the Women Development Section of the MPLD. In six years, PCRW has expanded its operations into 34 districts in 13 Zones, and it expects to open additional sites this year in the far western part of the country. The DDC has collection centers near four of the sites where the PCRW is operating — Tharpa (Tanahaun District), Pingola (Kavre District), Manigram (Rupandehi District) and Dudhai (Jhapa district).

Women play an important role in dairy farming: looking after cattle, cutting forage, raising calves, and processing home milk products such as cheeses. Increasingly family income through dairying is an activity in which the women in PCRW are very much interested and which the DDC aims to encourage. USAID should foster closer collaboration between these two programs.

D. 1986/1987 Emergency Food Aid

In 1980, 1981, and 1983, WFP handled substantial quantities of food aid provided to Nepal as emergency assistance (Table 4-1). Again in 1986, the GON requested emergency food aid and WFP agreed to manage the emergency operations.

Initially, donors made a commitment of 40,000 mt for emergency food assistance. However, to date 35,901 mt have been delivered and 2,400 mt are still in the pipeline (Table 4-2). An additional 1,000 mt may be forthcoming from the Swiss depending on their evaluation of the utilization of the food aid in the Tarai districts affected by the drought/floods.

TABLE 4-2  
 NEPAL 1986/87 DROUGHT - KNOWN PLEDGES AND DELIVERY STATUS  
 (May 31, 1988)

Donor Countries	Known pledges				Received				In Pipeline			
	Rice	Wheat	Maize	Total	Rice	Wheat	Maize	Total	Rice	Wheat	Maize	Total
Pakistan	500	100	--	600	498	100	--	518	--	--	--	--
Burma	500	--	--	500	493	--	--	493	--	--	--	--
Switzerland	3,000	--	--	3,000	2,898	--	--	2,898	--	--	--	--
W.F.P.	5,500	--	--	5,500	5,355	--	--	5,355	--	--	--	--
B.B.C.	3,000	--	10,165	13,166	2,946	--	10,046	12,992	--	--	--	--
France	1,250	--	--	1,250	1,246	--	--	1,246	--	--	--	--
West Germany	--	2,400	--	2,400	--	--	--	--	--	2,400	--	2,400
Japan	4,455	--	--	4,455	4,391	--	--	4,391	--	--	--	--
Australia	--	2,500	--	2,500	--	2,478	--	3,478	--	--	--	--
Yugoslavia	30	--	--	30	27	--	--	2,478	--	--	--	--
Belgium	--	2,500	--	2,500	--	--	--	--	--	--	--	--
<b>T O T A L</b>	<b>18,235</b>	<b>7,500</b>	<b>10,166</b>	<b>35,901</b>	<b>17,854</b>	<b>2,578</b>	<b>10,046</b>	<b>30,478</b>	<b>--</b>	<b>2,400</b>	<b>--</b>	<b>2,400</b>

Source: WFP, Kathmandu

The circumstances leading to this emergency aid have already been reviewed in this report. The information provided by the GON was not especially accurate. Neither did the information provided to donors permit them to respond in a timely fashion.

Some of the food aid was distributed free to flood victims after it arrived in 1987. The remainder has been used in food-for-work projects in the affected districts. Some of the donated food was sold in Kathmandu to generate funds to meet the operational costs of the distribution and work programs.

Other than for relief, the food was to be used to benefit the affected population through food-for-work. Such activities as repair/construction of feeder roads, renovation of canals, and repair of temples were carried out in the hill and Tarai districts involved. The Ministry of Supply, its Nepal Food Corporation, and the Ministry of Panchayat and Local Development were the executing agencies on the GON side. At the district level, a food committee chaired by the District Panchayat was used to establish priorities and implement district work projects.

By all accounts, coordination was poor among the GON agencies and allocations were influenced by political pressures as well as project priorities. Plans were neither sufficiently detailed nor adequately implemented to effectively utilize the quantities of food that arrived. As a result, food was held in storage long after the emergency conditions had passed. While no careful evaluation has yet been done, there is doubt that the food-for-work approach reached many of the affected population in a timely fashion. Even with the sale of some of the food to provide local currency, difficulties in organizing and implementing the food-for-work activities substantially reduced the value of the food-aid assistance. The lessons learned from this experience clearly indicate the degree of organizational and management constraints that currently curtail the effective use of project-type food aid in Nepal.

## V. WHAT FUTURE FOR FOOD AID IN NEPAL?

In the aggregate, food aid is currently making little contribution to development and welfare in Nepal. For the GON and donors alike, this fact carries both beneficial and prejudicial implications. The country escapes potentially damaging anti-developmental impacts of misused food aid and donors are spared its management and monitoring burdens. But on the other hand, in light of new understanding of and programmatic possibilities for food aid, the country is forgoing the possible benefits of its use. The critical question is, "Can food aid contribute more to food security and development in Nepal?" This chapter addresses that question in light of the special characteristics of food aid as a development resource and the reality of Nepal's geographic location, transport infrastructure, and institutional capacity.

### A. Program-type Food Aid: PL 480 Title I Sales

Following the economic crisis of 1985, the GON has developed a structural adjustment program with support from the DMF, World Bank, and other donors. AID missions have several options for quick-disbursing program lending in support of structural adjustment. These include cash grants, commodity import programs, and PL 480 Title I sales.

It was not within our terms of reference to evaluate the overall need for additional program lending for balance-of-payments and budget support for the GON. That question requires that USAID assistance be viewed in light of what the DMF, World Bank, and other donors are providing. However, the Minister of Finance did say that his government is seeking additional balance-of-payments and budget support in the course of a meeting specifically concerned with PL 480 issues (see Appendix B, Memorandum of Conversation).

As for PL 480 Title I sales, Nepal is not a promising candidate for large-scale support under this concessional lending program. It certainly meets the low-income-country criterion and disincentive effects on local production could be contained. What, then, are the reasons for concluding that Title I support is generally not justified?

First, Nepal is not a large food importing country with a growing structural deficit between import needs and its capacity to pay for commercial imports. Rather, as discussed in Chapter II, its major food needs arise from chronic under-nutrition of poor population groups largely located in remote hill and mountain districts. No cost-effective mechanism exists for making food available to this needy group at prices they can afford to pay. Thus, Title I food would not meet the country's unfulfilled nutritional needs.

Second, notwithstanding the favorable concessional terms of the PL 480 loans, the food is not free in terms of local-currency expenditures. Nepal would have to pay some ocean and trans-India shipping costs as well as in-country handling costs. The food might well cost the GON more in local currency than it would derive from the market sales of the food. Even if the food assistance were strictly additional to other U.S. economic assistance, it is doubtful that the GON could afford to accept much of it.

More specifically, the GON has requested PL 480 assistance in the form of cotton and vegetable oil imports. We were asked to review the situation with regard to those commodities and make recommendations for an appropriate response to the GON request. Our tentative conclusions and recommendations are given in the following two sections of the report.

#### 1. Cotton

Nepal is highly dependent on imported yarn and cloth from India, China, and Pakistan. As much as 90 percent of its current consumption comes from those imports. It currently has one state-owned mill that can spin cotton yarn and produce cloth. This mill is currently using 2,300 mt of cotton lint per year, operating at half capacity. A second spinning mill to produce cotton and blended yarns is expected to be on-stream by 1990. This second mill will require 900 mt of cotton lint per year at capacity operation. The cloth and yarn produced in the country are sold to garment makers and to the cottage textile industry.

Nepal has a cotton production promotion project operated by the Cotton Development Board with technical assistance from UNDP. In 1987/88, about

7,000 farmers in the Nepalganj area produced 1600 mt of cotton lint on 4,000 ha. The Board expects production to rise to about 4,000 mt on 10,000 ha in the early 1990s. The cotton is medium staple and reported to be of excellent quality. The Board provides inputs and technical assistance to the farmers and buys the cotton from them at a price established before planting. No particular problem between the Board and the farmers has been reported: the Board pays them promptly on delivery of the seed cotton to the gin.

The Board sells the cotton lint to the Hetauda mill. The mill uses the cotton blended with short-staple lint imported from India. Imported short-staple lint could be limited to 25 percent of the total mill use of cotton. However, the imported short-staple cotton has been cheap and the Board has been trying to pay producers a remunerative price, hence asking a higher price from the mill. The mill, in turn, faces severe price competition from imports in the market for its cloth. In these circumstances, PL 480 cotton would effectively subsidize the mill and discourage payment of incentive prices to Nepali cotton farmers.

Indian prices for short-staple lint rose this year. Thus, the GON would like to substitute PL 480 cotton for the Indian imports. This would give the country balance-of-payments support but would be counter to the UMR requirement of Title I. Also, the Board would like assistance in establishing the price at which it sells cotton to the mill and in financing storage costs between harvest and delivery to the mill. Moreover, it foresees that the production of cotton will soon exceed the quantities needed by the existing and new mill. The GON has ambitious plans to construct additional textile mills as a part of its basic needs program. A recent Japanese mission appraised investment possibilities in textile production. Some interest by Russia has also been reported.

Two questions are apparent:

- 1) Can Nepal efficiently import-substitute in production of cotton cloth and textiles?
- 2) If so, can cotton be produced locally of competitive cost and quality for use as a raw material for yarn and cloth production?

At the present time, more progress is being made on the second question than on the first. This means that the country may soon begin to accumulate surplus cotton that can only be exported at large losses. Moreover, if Indian prices for short-staple cotton falls, the board will have even more problem getting the mill(s) to buy its output at prices high enough to make cotton profitable for producers.

Our tentative conclusion is that cotton imports through Title I concessional sales would not be justified. While we recognize that the Mission will want to explore this question in more depth before giving a final answer to the GON, our conclusion is that the case for cotton assistance will turn out to be weak.

## 2. Vegetable Oil

Mustard seed is Nepal's principal oilseed and is grown in the winter season. Rapeseed, linseed, soybeans, and other indigenous oil plants are minor sources of cooking oil. In the higher mountains, animal fats are more often used in the diet. The Tarai is the most important production region for mustard seed, but area has been expanding in the Hills in recent years due to attractive prices for the crop.

Edible oil is a common and important item in household consumption in Nepal. Countrywide average consumption varies between 1.6 to 1.9 kg/person/year. In major urban centers, however, consumption can be as high as 5 kg/person/year.

Historically, Nepal has been about self-sufficient in vegetable oil. As with other commodities, the price is closely linked to the Indian market. In years of above-average production, some oil is normally exported to India. Imports from India supplement local supplies in years when production is below average.

The area of mustard seed production has been rising in recent years but stagnant yields have held back production growth (Table 5-1). Some crop damage from hailstorms and diseases has occurred in recent years.

TABLE 5-1  
DOMESTIC PRODUCTION OF OILSEEDS, 1982-1987

<u>Production Year</u>	<u>Area Planted Hectares</u>	<u>Production Tons</u>	<u>Yield Kg/ha</u>
1986/87	142,890	82,500	577
1985/86	138,460	78,660	568
1984/85	127,820	84,030	657
1983/84	110,700	73,350	663
1982/83	110,340	69,590	631

Source: Ministry of Finance, GON.

What seems to be happening is that demand for edible oil in the country is rising faster than supply. If these trends are projected, then an increasing national deficit will have to be filled through imports. The traditional source of imports is India. But at present mustard seed oil prices are high there so the GON has been licensing imports of soybean oil that are sold in the urban market. These imports have helped to stabilize the supplies and price of edible oil in the country. Notwithstanding these imports, mustard seed oil prices have recently been high both in Nepal and India. Consumers apparently maintain a strong preference for mustard seed oil and are willing to pay higher prices for it. In this circumstance, the imported oil offers a cheaper alternative to households willing to use it in place of the more expensive local product.

The favorable prices for mustard seed oil has encouraged farmers to expand the area planted to the crop. But yields are not rising, and may well be falling. Research on varieties, agronomic practices, and disease control is required to get yields moving upward. However, only limited research is now being done due to manpower and budgetary constraints.

The GON has requested donors to finance a reserve stock to stabilize the availability and price of this essential commodity. It is doubtful that a buffer stock would accomplish that objective at reasonable cost. If

supply stabilization is the goal, then an approach through trade would in all likelihood be more cost-effective. Such an approach would require a small reserve fund of foreign currency. In years of low production, imports would be financed out of this fund to stabilize supplies. When production is high, exports would be undertaken to replenish the foreign-currency fund.

We believe, however, that what is really happening is that the country is facing a growing import gap, which can only be closed if the downward trend of domestic yields can be reversed. We further believe that inadequate research is the major constraint on yields.

We see this situation as promising for a modest, multi-year Title I import program. Vegetable oil imports, justified on the basis of a growing gap of import requirements over commercial import capacity, and hence in excess of UMRs, could provide needed balance-of-payments support and also local currency generation. The foreign currency saving could be used to form a stabilization fund that would operate in the manner described above. The local currency could be programmed to support an intensive effort to improve varieties, management practices, and disease control for oilseed crops, especially mustard seed. The expected results after five years would be:

- 1) A cost-effective foreign exchange buffer fund for stabilizing domestic edible oil supplies and prices; and
- 2) Normal national self-sufficiency in edible oils maintained by a continuing flow of new yield-increasing technology.

The case for Title I imports of vegetable oil is made stronger by two characteristics of the commodity itself:

- 1) It has a relatively high value-to-weight ratio and a favorable income-transfer efficiency; and
- 2) It can be sold in the major urban markets, thereby lowering the transfer-cost burden on the GON.

Moreover, modest imports of vegetable oil should not create disincentive effects on local production. This is demonstrated by the current situation where mustard seed oil is scarce and its price is high alongside cheaper imported vegetable oil.

In this case, we recommend that the Mission further explore a Title I program along the lines outlined above. It is likely that the quantity required may initially be 8,000-10,000 mt per year and would decrease as local production resumed an upward trend.

B. Project-Type Food Aid: PL 480 Title II

1. Food-for-work

The objective of food-for-work is to provide jobs for unskilled workers in areas of the country where members of rural households are seeking jobs to tide their families over the five lean months of the dry season. Food-for-work projects should be labor-intensive, people-oriented, and generally small-scale. They are best suited for work on irrigation canals, flood control and other water-management schemes, community forests, and small road and trail construction. Roads deserve to be given priority to connect isolated areas to national highways and facilitate the movement of farm produce to local, national, and international markets.

a. Road construction

Roads probably offer the best opportunity in Nepal for the utilization of food aid in development projects. A number of road improvement projects are contemplated within the Rapti II Development Project, but their implementation will depend on the first evaluation of the project in 1990. There are insufficient funds in the present budget to allow for additional road projects, even if the food needed were available. Nevertheless, it is worthwhile reviewing the roads contemplated to determine what food-for-work opportunities might arise in future.

Rapti II is focusing on the improvement and upgrading of roads that were built earlier by the district Panchayats, with local unskilled labor, no engineering plans or skilled labor, and a minimum of materials and road-building equipment. These roads have deteriorated to the point where they are no more than tractor trails unable to handle regular vehicular traffic. But they are vitally needed because they are links to

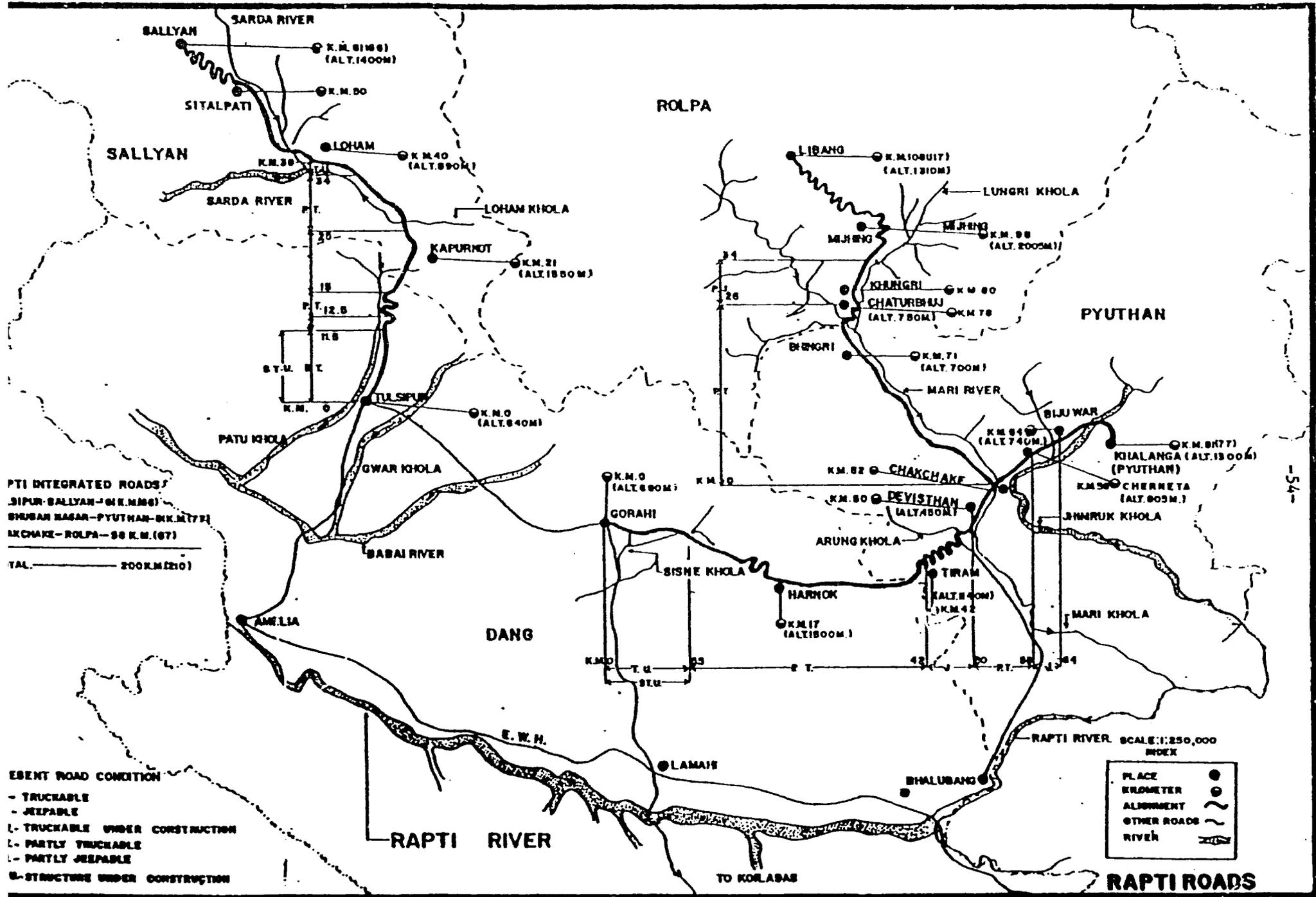
district road systems and tie areas with existing or potential horticulture production to local markets. The first category of roads includes those whose improvement would provide vital links with the existing all-weather road system. Three of these are discussed below (see map on the following page for locations).

First is the road from Devasthan to Bhalubang that would join up with the kingdom's main East-West highway to the south. A tractor road exists but considerable upgrading needs to be done to make it serviceable. The delivery of food-for-work to the job site would be no problem. The main problem with the proposed road is political. It would bypass the town of Gorahi, east of Devasthan, which has considerable political and economic clout.

Second is the road from Gorahi to Holeri, a village to the north. The link is important because the ridge where Holeri located has good potential for the raising of apples and off-season vegetables, and marketing of the area's produce would contribute substantially to the economic well-being of farm households.

Third is a tractor road from Tulsipur to Purandara, a village to the northwest. This road, if improved, would also open up a fertile area where marketable fruits and vegetables can be grown.

The second category for road upgrading would involve small feeder roads up river valleys and along ridge lines into the hills. These would be simply built at first with minimum inputs and a maximum amount of unskilled workers who could be paid a mix of food and cash. The aim of these minor roads would again be to link to markets areas like the Jinabang Panchayat where the RDP has helped train farmers in horticulture and has provided inputs for the planting of a variety of fruit trees. Road projects, including food-for-work programs, were formerly under the Ministry of Panchayat and Local Development. Manpower for projects was under the District Panchayat, particularly the Local District Officer. Food-for-work was handled at the district level. This worked well administratively because of the umbrella control of MPLD. The management and supervision of district projects is now being shifted from MPLD to



PTI INTEGRATED ROADS  
 SIPUR-SALLYAN-81 K.M.(86)  
 SHUBAN NAGAR-PYUTHAN-81 K.M.(77)  
 KACHAKE-ROLPA-88 K.M.(87)

SCALE 1:250,000

ROAD CONDITION  
 - TRUCKABLE  
 - JEEPABLE  
 [ - TRUCKABLE UNDER CONSTRUCTION  
 [ - PARTLY TRUCKABLE  
 [ - PARTLY JEEPABLE  
 [ - STRUCTURE UNDER CONSTRUCTION

SCALE 1:250,000  
 RIVER

PLACE	●
KILOMETER	○
ALIGNMENT	—
OTHER ROADS	~
RIVER	~

RAPTI ROADS

the Construction Board of the Ministry of Works and Transport. The Ministry will have to work through the District Panchayats, and it is uncertain how effective it will be since, unlike MPLD, it is not well represented at the district level. The Ministry may have difficulty with projects other than roads. Projects may become more difficult to monitor, and it is difficult to say as yet how effectively food-for-work will be administered under the new arrangement.

These road construction/maintenance possibilities, suited to the food-for-work approach tested so successfully in the Sulichaur-Liwang Road project, should be explored by the staffs of WFP and USAID's Rapti II project. The Rapti Zone is the most likely area since that is where USAID's development program is concentrated and integrated. The upgrading and maintenance of secondary roads, trails and bridges is tied in with other designed rural works activities which help strengthen the local management capacity of the Panchayats and other local groups. USAID's intimate knowledge of the socio-economic conditions of the zone, and the close working relationships it has developed with the local government infrastructure, better insure that the prerequisites essential for success of food-for-work projects will be met.

b. Forestry

Community forestry in the Rapti Zone offers some possibilities for the use of food-for-work to pay unskilled community workers (digging pits, transplanting, etc.). There are two problems involved, however. First of all, although community forestry is being undertaken in 90 of the 130 Panchayats in the zone, project sites are very small and scattered throughout the district. Approximately 10 hectares are being planted at each site. It will be difficult to manage food-for-work effectively and on a cost-effective basis in such a fragmented program.

Secondly, although the Department of Forests is paying people to plant trees, the land is being turned over to the people, who must maintain the community forests themselves. Self-help, not further subsidy in cash or food-for-work, is the direction in which USAID staff feels these projects should move.

Government-owned forest projects are better bets for food-for-work, especially projects along roads that facilitate food delivery to work sites. Project possibilities should be explored with the Forestry Department and the Department of Soil Conservation. Good prospects lie within those departments' stabilization programs aimed at preventing landslides which block roads. This program employs unskilled laborers in the planting of grasses and trees in large areas where the difficulties in managing food inputs would be minimized.

c. Small-scale irrigation

Rapti I initially invested more funds in irrigation than is planned in Rapti II but cut back because the GON demonstrated limited ability working with farmers and managing projects. Rapti II projects fall under the Small Farmer Community Irrigation Program, which USAID funds with CARE and the Agricultural Development Bank. Like Community Forestry, these projects have been quite successful. However, the irrigation systems are small (10 ha at most) and scattered, and none of the agencies involved want to introduce cash or food payments. Self-help is vital in the construction of these systems since they are to be owned and managed by the farmers themselves. At present, food aid does not appear to be promising for use in this type of project activity.

2. Human resource development

Human resources have been defined as the "stock of human attributes -- physical, mental and social -- which contribute to the economic and social productivity of a nation."<sup>1/</sup> A full examination of the development of human resources should not only consider the use of food aid in supplementary feeding programs and school feeding programs but as a resource to support training programs which increase the range of skills available and to shape them in ways which meet the needs of the economy.

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<sup>1/</sup>WFP, "Food Aid and the Development of Human Resources," Occasional Papers, WFP/African Development Bank Seminar, September 1986.

The examination in this report of the future use of food for human resource development is limited to the nutrition intervention programs of WFP and the interest in such programs, or more to the point, the lack of it, on the part of private voluntary organizations (PVOs). It does not consider ways in which such programs can be interrelated with the use of food aid in adult skills training in the rural areas. Nevertheless, the following perspective on priorities for human resource development should be considered.

"Most analyses suggest two main priorities: first, the need to address the problem of childhood under nutrition in as much as it is likely to jeopardize future functional potential; second, the need to expand the skills of the rapidly growing labor force. Our analysis suggests that the second is relatively neglected and is a much more urgent consideration than might be supposed. Furthermore, the two should not be considered competitive with respect to scarce resources. Indeed, the two are not unrelated. On the one hand, higher and more stable levels of household income must remain a necessary, if not sufficient, condition in the prevalence of childhood malnutrition. On the other hand, a reduction in severe malnutrition remains an important aspect of improving the quality of human capital. The two are related most explicitly by women who fulfill vital production and reproductive roles in society. The potential for expanding the value of women's contributions to both the family and the market economy is enormous. However, the most important point is that it may be possible to achieve both nutritional and investment objectives at the same time."<sup>2/</sup>

The foregoing statement suggests possibilities for future collaboration between USAID and WFP using food aid in support of skills training programs at the rural level with a particular focus on women. At present, however, USAID's budget constraints and WFP's reformulation of its country program make such projects only a hope for the future.

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2/ Ibid.

WFP will not be expanding its own nutrition intervention programs. If anything, it must reduce and redirect them, cutting out the dead wood and trying to convince the GON of their contribution to national development. There is a four-year pilot program for which WFP is seeking other donor assistance. Because of the loss of food when it is distributed in bulk to mothers, who come with various sorts of containers to collect it, WFP, on a pilot basis, plans to distribute weekly food rations to mothers in pre-packaged, heavy-duty plastic bags. Outside help is being sought to purchase plastic bagging equipment, additional warehouses and trucks. With this approach, WFP hopes by the fourth year to reach 95,000 beneficiaries and expects the GON to pay 50% of the costs.

There are additional constraints on this type of food-aid use that USAID should keep in mind. Paramount is the inadequacy of present GON budgetary support. The Ministries of Health (MOH) and of Education (MOE) are underfunded and are not able to reach the districts where they are needed most. MOH health posts and clinics are reported to be staffed by people who are poorly trained, paid, and motivated. It is significant that WFP, the principal provider of food aid in the country, has had difficulty involving the health authorities in its programs for mothers and children. If these programs are to succeed, to take root, they require budgetary allocations which the GON seems unable or unwilling to provide at the present time.

Second is the lack of interest on the part of most private voluntary agencies in conventional nutrition programs, and the reorganization of WFP's programs which, for the time being, will focus on redefining objectives and forging of closer links with government ministries, not so much on expansion of activities.

PVOs have traditionally been the agencies involved with MCH, pre-school and school feeding programs. In Nepal four of seven organizations interviewed were not interested in making any use of imported food for either nutrition or food-for-work projects (Action Aid, Peace Corps, Redd Banna and SCF-US). One (Lutheran World Service) favored using food-for-work; and one (Care) is interested in the possibility of monetizing PL 480 Title II food for project support. Only two (Plan International and SCF-UK) were involved in typical mother and child nutrition programs.

PVO programs and attitudes towards food aid are worth reviewing in more detail.

Action Aid has been working in Nepal for six years and is concerned with the rural development of 9-10 Panchayats. Using a multi-sectorial approach, they provide private education for mother and children and a nutrition program which utilizes small amounts of locally purchased food to supplement the diets of undernourished children. They support a preventive health care program and are training a cadre of health workers. It is significant that Action Aid's program is totally independent and does not tie in with any of the line ministries. No use is made of food-for-work although WFP has supported a local road building program and Action Aid hopes they will do more of the same.

CARE/Nepal makes no use of food in any of their development work. CARE/India and CARE/Indonesia have been successful in monetizing PL 480 Title II wheat to promote community development activities, and CARE/Nepal is interested in doing the same. For the present, CARE cooperates closely with several ministries and agencies: MPLD for the building of trails and bridges; ADB in irrigation and agro-forestry; MOF for integrated watershed management projects; and a new integrated rural development project with MPLD that is partially funded by USAID. CARE's forestry project utilizes community-based self-help. They do not want to weaken village motivation by using food-for-work.

Lutheran World Service (LWS) is not involved in human resources so much as community development. They see some value in food-for-work and hope in future to cooperate with WFP on more development projects. The concern of all PVOs, including LWS, is that distributing free food will foster dependency and will be a disincentive to improved and more intensive farming.

LWS is working in remote areas to help develop agriculture and increase local employment. They have worked with the Nepalese Red Cross and WFP in the eastern Tarai on relief and rehabilitation projects for people affected by the 1987 floods. Some food is being used as partial payment for laborers helping reconstruct houses, roads, and bridges. The newly settled mountain

people in the Tarai have been given small plots of inadequate land by the GON and must eke out a living by working as sharecroppers. LWS plans, with the help of WFP and locally purchased commodities, to provide them with short-term food support.

Peace Corps once had a nutrition and child health care program but gave it up because there was inadequate MOH funding and the health posts in remote areas had limited staff who were not well trained, motivated, or paid.

Plan International (Foster Parents Plan International) supports projects in health, education and income generation. They built four clinics (25% GON contribution), ran them for six years, and have since handed them over to the village Panchayats. They use their own mix of imported food to serve malnourished children whose growth they monitor. USAID/N has reportedly helped fund the program. Plan also builds schools where literacy, agriculture, home economics, and public health are taught.

Redd Banna (SCF/Norway) has been operating in Nepal since 1984. They have no feeding programs and are now opposed to food-for-work. They started out with a trail building program using locally purchased food-for-work (no cash). They stopped paying with food because they found it too cumbersome to purchase and transport food, and the workers said they preferred to be paid only cash. Redd Banna, like most of the PVOs, is concentrating on community development. Their focus is on western Nepal. The farmers in that area are self-sufficient for nine months and then are short of food. The objective of the program is to improve the marketing system so that food can be better distributed. They have established a cooperative to break the local merchants' monopoly that forces farmers to sell at low prices and to buy later at inflated prices. The cooperative, which will buy and sell the commodities the people need, will be run by the villagers themselves.

Save the Children Fund (UK) is the only PVO, other than Plan International, to be engaged in feeding mothers and children. Their program, which covers six districts, directly supports MOH work in health posts throughout the area, using food provided by WFP. Each month the SCF staff assess the food needs in each district and distribute food to mothers and children at the

health posts. MOH clinics are not used because they are short staffed and are not reliable. SCF, with some GON support, has built its own clinics. Personnel are seconded to SCF by the MOH to work and to be trained in the SCF clinics and then return to the MOH. Headquarters' staff visit each health post once a month and run a joint clinic, with MOH personnel, for undernourished children and lactating mothers. WFP food is distributed to the mothers and children, prepared under supervision, and consumed at the clinic to prevent it being sold in the market. Severely malnourished children are admitted to the clinic for special care. SCF wants to expand the program but would need extra staff to handle the food.

Save the Children Fund (US) has no feeding programs and is not interested in managing or monitoring food-for-work activities. The Nepal office is focusing on the Gorkha district and does not expect to use food in any of its programs.

### 3. Emergency and Stabilization Stocks

The GON has requested food aid donors to support several reserve stock proposals. These proposals will be discussed in this section.

The most definite proposal is one to create a small emergency reserve stock to use for localized relief purposes. The stock would be held by the Nepal Food Corporation in several dispersed locations ready for distribution in response to small-scale natural disasters. A stock of 8,000 mt sufficient to provide emergency food for 200,000 people for 90 days is the scale of the emergency reserve that has been proposed to donors.

It is clear that this type of reserve stock is needed. Nepal has a long history of local droughts, floods, landslides, and other disasters and these adverse acts of nature will undoubtedly continue to afflict the country in the future. What is not clear is the procedure for deciding when and where the emergency reserve will be utilized. Moreover, once utilized, it will then have to be replenished for future use. Since the cost of maintaining and distributing the emergency food will fall on the GON, the rebuilding of the stock will be another cost to the public treasury. In fact, paying for its maintenance, distribution, and replenishment is the main issue with this

proposal. The stocks can and should be purchased locally. While a donation of food to form the reserve initially would relieve the government of that financial outlay, cash assistance would be more cost-effective. But neither cash nor food will do more than postpone the need for the GON to cover the recurrent costs of operating the reserve from its own budgetary resources.

Nepal is also a signatory of the Agreement on Establishing a Food Security Reserve by the South Asian Association for Regional Cooperation (SAARC). This Reserve consists of wheat or rice, or a combination, earmarked for emergency use in the member countries, according to the following schedule:

<u>Country</u>	<u>Share of the Reserve (metric tons)</u>
Bangladesh	21,100
Bhutan	180
India	153,200
Maldives	20
Nepal	3,600
Pakistan	19,100
Sri Lanka	<u>2,800</u>
TOTAL	200,000

Each country will store its share of the reserve, which is to be additional to any national reserve maintained by the country.

In the event of emergency needs that exceed a country's national reserves and its ability to purchase grains internationally due to ~~balance-of-payments~~ constraints, the country can notify other SAARC member countries of its requirement for emergency assistance. Other members are covenanted to provide food assistance but at prices and conditions of payment to be fixed by negotiations between the sending and receiving countries. Although the logistical advantages of using emergency supplies positioned in the region are obvious, it does not seem likely that the SAARC Reserve will displace free food donated and transported to the country by traditional donors. Thus, the problem of timely and credible assessment of large-scale emergency needs, as discussed in Chapter II, still must be resolved.

Finally, the GON has proposed a 28,000 mt reserve to stabilize consumer prices of food grains in the Kathmandu Valley and other urban markets. The basic idea is to sell grain in the urban market when prices rise to a trigger level and then use the sales proceeds to procure grain in the Tarai to replenish the stock.

The NFC has wisely, in our opinion, arranged for a study (by APROSC) of the feasibility of this approach. If consumer prices in the Kathmandu Valley are closely linked to farm-gate prices in the Tarai by transportation, milling, and storage costs, then large-scale sales by NFC that lower consumer prices in the urban market would not be possible on a break-even basis. A subsidy would be conferred on urban consumers and this subsidy would have to be paid by the operating agency. We question whether this type of urban subsidy is the highest priority for NFC and suggest that donors wait for the results of the APROSC analysis.

Furthermore, we suggest that NFC should be oriented to supporting producer prices in the more remote hill and mountain districts. We are aware of several anecdotal accounts of large seasonal price savings in those somewhat isolated production areas. Prices fall at harvest but producers still must sell grain to meet their household cash requirements. Later, in the season, prices rise but food-deficit landless and near-landless households are forced to buy food to supplement their own inadequate production. As in 1984, we feel a priority area of activity by NFC should be to provide floor prices for producers at harvest and limit seasonal price rises to consumers in these hill and mountain districts.

C. A Donors' Food-Aid Coalition for Hunger Alleviation and Development in Nepal?

The previous assessment recognized that food assistance, especially in the form of food-for-work, has potential in Nepal. Seasonal food deficits and underemployment, and associated health and nutritional deficiencies, commend the use of food aid to address unfulfilled basic needs and inadequate infrastructure in the country. This conclusion is still valid.

But it also recognized the limited absorptive capacity of the GON. The GON continues to struggle to cover the costs of moving and using effectively the

food provided by WFP. The recent experience with emergency food aid showed the limitations of local government in absorbing food aid and programming it successfully. Furthermore, it recommended that USAID should collaborate with WFP without initiating new PL 480 assistance. Successful collaboration on a food-for-work road-building project ensued, and merits continuation.

Since the earlier assessment, modest Title II resources have been used to assist the Dairy Development Corporation. That assistance should be continued for a second and probably third year. We have also recommended that Title I assistance in vegetable oil be seriously considered.

Up to this point, the difference between the current and previous assessment could be summed up as an overall recommendation of "not much" U.S. food aid in place of the earlier recommendation of "not now." This section raises the question that if the current contribution of food aid to development and food security is considerably less than it might be, how can USAID explore ways of enhancing the use of food aid?

Our first recommendation in this regard is for the Mission to appoint a Food Aid Officer at least on a part-time basis. This step is necessary to keep USAID abreast of significant changes in U.S. food aid programs that affect their potential for alleviating hunger and fostering economic development in poor countries such as Nepal. An example is the expanded authority in the Food Security Act of 1985 to monetize donated food commodities in recipient countries. USAID use of the monetization provision, which is severely limited in WFP projects, could assist in meeting costs of in-country transportation, handling, and storage, as well as project-specific expenses to purchase tools and equipment and pay skilled workers and managers.

More generally, the Mission needs to be able to consider project-type food aid as one more resource that is most effective when integrated with other technical and financial resources to carry out development activities. The range of activities to which project food aid can contribute include:

- employment creation;
- infrastructure improvement;
- income generation through skills and asset creation;

- food security;
- health and nutrition;
- school and pre-school feeding; and
- emergency relief.

Next, the Mission needs to initiate a process for strengthening the institutional capability of the GON, other donors, and especially PVOs, for managing and integrating project food-aid resources into on-going and new development activities. This step is very timely given the heightened interest of the GON in utilizing food aid for infrastructure and forestry development.

The long-term goal should be to produce a "food assistance strategy" to give explicit focus to food aid as a development resource. This strategy should be developed jointly with WFP and other food donors. The purpose of such a strategy is not to differentiate food aid as an end in itself but rather to integrate food aid as a resource in the overall and sectoral strategies of the GON and aid donors.

PVOs play a pivotal role in the use of project food aid. In fact, the new provisions require that PVOs or cooperatives monetize the donated food. The foreign currency acquired is then allocated to carry out development or food distribution activities. It can be used to pay for inland transportation of food commodities, personnel, equipment, maintenance, and other recurrent costs of the activities.

PVOs in Nepal will need to be included in the planning and implementation of food assistance. As a group they are not very involved or interested in food aid at present. By involving these groups at the early stages of planning food assistance, they are more likely to share a common understanding and vision of what can be achieved through food aid as a development resource.

One possibility would be for the Mission to organize a Food Aid Workshop for GON officials, other donors, foreign PVOs, and local nongovernmental organizations to consider to what extent food aid can be an effective resource

for development activities given local conditions, what new programming initiatives should be explored, and how food aid could be linked to GON development priorities and resources and to complementary donor and PVO support. Moreover, the Mission could request TDY assistance for planning and carrying out this workshop.

## APPENDIX A

### PL 480 TITLE I SALES

The PL 480 Title I program provides concessional sales of surplus U.S. agricultural commodities to recipient countries. These concessional sales are based on U.S. and host-country government agreements that are negotiated annually. Terms with respect to the interest rate, grace period, repayment period, and currency mix accepted for repayment vary somewhat depending on the economic situation of the recipient country. Usual terms for the long-term, low interest loans result in high concessionality for the recipient countries.

Concessional sales, or program food aid, provide recipient countries with the commodities themselves, balance of payment support, and local currencies. The commodities are expected to be re-sold into the domestic market usually through private wholesale and retail traders, import firms, or other private channels. The proceeds from these sales are the local currencies that constitute additional budgetary resources for the host government to be used for agreed purposes.

The legislation imposes two stipulations on Title I assistance. The first is that adequate storage space to prevent spoilage and loss of the commodities is available. The second is that the local sales in the recipient country will not result in substantial disincentives to domestic production or marketing in the country. Analysis supporting a positive situation in regard to these stipulations must be provided in the documentation for proposed assistance. These two stipulation are known as the "Bellmon determination."

In economic terms, the stipulation that food aid not create disincentives for local production requires either that food aid not increase the total supply of food and depress local prices, or that food aid be sold at below-market prices only to low-income consumers who will not reduce their other food purchases or the food they grow for themselves, or both. Another approach to address disincentive effects is for the government to implement an effective domestic program to support producer prices, possibly using some of the local currencies generated by market sales of the commodities.

The substitution of concessional for commercial imports, which is the source of balance of payments support conveyed through food aid, is explicitly prohibited under PL 480. Title I assistance is required to be "additional" to commercial imports. The purpose of this prohibition is to safeguard commercial sales of the U.S. and other agricultural exporting countries.

This "additionality" is imposed by requiring recipient countries to commercially import certain quantities of food to qualify for food aid. That quantity -- the Usual Marketing Requirement (UMR) -- is generally based on the average level of commercial imports over the past five years. To the extent that the UMR is enforced, it eliminates most balance of payments support.

Each Title I concessional sales agreement must include specific policy reform or structural measures as conditions for the granting of the food aid. These are the

"self-help" provisions. Their documentation should include a description of the programs and projects that the recipient country is undertaking to improve its production, storage, and distribution of agricultural commodities, and its development activities in rural health and education. Then, self-help measures that are in addition to those that otherwise would have been undertaken are identified, some of which may be financed by the local currency counterpart. In most cases, food and agricultural policies and programs predominate in the self-help provisions, although some agreements have expanded the list to a wide-ranging agenda of policy and non-policy improvements and reforms.

The local currency proceeds that accrue to the recipient countries from domestic sales of the commodities are a key ingredient of Title I programs. They are to be jointly programmed to finance self-help measures and/or carry out mutually agreed programs of agricultural and rural development, nutrition, and population. The legislation places emphasis on using the proceeds for purposes that directly improve the lives of the poorest groups and enhance their capacity to participate in the development process.

Title I of PL 480 was recently amended to allow limited sales of commodities for repayment in local currencies (Sec.108). The reflows from these local currency sales can be programmed for lending through private financial intermediaries in the recipient country for development of private sector production and marketing activities in its agricultural sector. Subsequent repayment of the local currency credits by the private financial intermediaries must be in a manner that will permit conversion to dollars within a period of 10 years.

REFERENCES:

- Aid Handbook 9: Chapter 4 - Title I Concessional Sales Programs
- Policy Determination No. 5 (March 1983) - Programming PL 480 Local Currency Generations
- Cable STATE 245265 (August 18, 1984) - Guidelines for Improving the Design of Self-Help Measures

APPENDIX B  
MEMORANDUM OF CONVERSATION

Date: June 14, 1988

Place: Ministry of Finance (MOF)

Time: 11:30 a.m. - 12:30 p.m.

Participants: Hon. Bharat Bahadur Pradhan, Minister of Finance  
Mr. Shashi Narayan Shah, Additional Secretary, MOF  
Dr. Thakur Nath Pant, Joint Secretary, MOF  
Dr. Lee Fletcher, Food Assessment Team  
Dr. Louis Connick, Food Assessment Team  
Mr. Yam Thapa, Food Assessment Team  
Mr. Wm. Stacy Rhodes, A/D, USAID  
Mr. Niranjana Regmi, ARD, USAID

Distribution: The Ambassador; A/D; PFD; ARD; C&R

The meeting was opened by Stacy Rhodes, referring to the letter dated June 7, 1988, by the American Ambassador, Milton Frank, to Hon. Finance Minister, Bharat Bahadur Pradhan. Minister Pradhan recalled the use of PL 480 funds generated in India in the Nepal development program during the 1950's. Now he would like to request USAID for a direct PL 480 program in Nepal. Since Nepal is a food surplus nation, he realizes that a PL 480 Title I program may be difficult to justify. However, there are local food deficit areas that need help. In these deficit areas, food production is not enough to meet local consumption requirements, and additional food must be brought in or people must move seasonally to areas where food supply is adequate.

In response to the Minister's question as to whether the U.S. was still a contributor to the World Food Program (WFP) in Nepal, Mr. Rhodes informed that the U.S. Government provided over \$2 million equivalent of food support to Nepal through WFP in 1986, and continues to support WFP programs here.

Minister Pradhan mentioned that the edible oil and cotton were two items which are urgently required by the nation, as they are not produced in sufficient quantity to meet domestic demand, and valuable foreign exchange is being expended for their importation.

Minister Pradhan mentioned that a dialogue had also been opened with other countries such as Japan, Germany and U.K. for help under the IMF/IBRD-sponsored Structural Adjustment Program. Nepal has limits on deficit financing by the IMF which makes it hard to import these items commercially. Nepal does not want to sacrifice

growth while adjusting the economy. To avoid deficit financing Nepal needs concessional help on imports. Nepal would like to request a PL 480 program in its development to support the import of cotton and edible oil.

Dr. Fletcher asked if the Minister could explain the status of edible oil and cotton at present and also the use of local currency generated from the sale of commodities.

Minister Pradhan briefly informed that edible oil is in shortage in both Nepal and India at present. Nepal is importing edible oil (soyabean) from Singapore. Nepalese prefer mustard oil and the price is higher than imported soyabean oil. Mustard oil prices are not controlled by the Government, but the price of imported oil is controlled. Soyabean oil has been imported and distributed both by Government-owned corporation (Salt Trading Corporation) and private parties. Edible oil imports supported under PL 480 would substitute cheaper oil for present commercial imports and provide both balance of payment (BOP) and budget support. Also he explained that the GON would want to use the generated local currency on a "program basis," not on a project specific basis (for budget support).

Regarding cotton, Minister Pradhan mentioned that some cotton of lower quality is being produce in Nepal. Nepal needs a higher quality to support the exports of textiles and ready-made garments. Nepal is mainly importing cotton yarn and textiles from India for its local needs as well as for the garment export industry. As of now, the cotton is available from India without any restriction. Cotton yarn is also used in the carpets industries, and Nepal imports wool from Tibet and the New Zealand (and Australia).

Mr. Rhodes asked the Minister for his viewpoint regarding the timing of such commodities support under PL 480, and whether he viewed the program as long-term or short-term in nature. Minister Pradhan stated that the commodities support is required on a relatively short-term basis, like five years, to permit Nepal to increase local production of both items.

Minister Pradhan mentioned that in five years time, Nepal may be able to produce required quantities of quality cotton and mustard or other oil seeds to meet demand requirements. However, the support of Title II PL 480 programs in the forestry sector would be a long-term program, and oriented to hills which are food deficit areas. PL 480 Title II programs could be justifiable in the hills because it supplements food and provides seasonal employment.

Minister Pradhan also identified three development areas which could be benefited with PL 480 Title II programs.

- (a) Community Forestry & Soil Conservation
- (b) Small Irrigation Schemes
- (c) Road Construction

Community Forestry: 90% of Nepal's energy supply comes from forest products. Both the price and demand for forest products are going up, and the emphasis now is on forestry development through community participation. Also, as the GON is discouraging clearing trees from sloped land (for conversion to food production land) more food from existing land or from imports will be needed.

Dr. Connick mentioned that he had a useful discussion with Mr. Rabi Bista, Chief Planning Officer, Ministry of Forests and Soil Conservation on subject of possible Title II support to community forestry programs.

Dr. Fletcher raised a question how the Government would encounter the constraints faced by WFP to run the programs; especially the high cost of transportation of food in hills, and the clear need for complementary resources of cash, technical inputs, etc.

Minister Pradhan mentioned that under decentralization, emphasis is being given to strengthening district level offices. District governments will have to dedicate budgetary and technical inputs to Food For Work (FFW) projects. Also, the districts are fully responsible to take decisions regarding the types of FFW projects, based on the the actual needs of the local people.

Mr. Rhodes mentioned that under a "joint venture" (USAID & WFP), a portion of road is under FFW construction to connect two districts in the Rapti Zone (Pyuthan and Rolpa). Also, he added that there are other activities that could be carried out in other districts of Rapti Zone where the USAID supported Rural Area Development Project is being implemented.

Mr. Rhodes also informed Minister Pradhan that the Title I PL 480 commodity program is at heart a USDA program, but that USAID was responsible for its administration overseas, especially where there are no USDA Agriculture Attaches. USAID will look into the details of qualification/eligibility for a Title I program in Nepal. This would require the clarification that such assistance would not in any way effect negatively the interest of local farmers by creating a disincentive to local production of cotton and edible oils.

At the end of the discussion Minister Pradhan advised his officials to provide the cotton and edible oil related information

and reports to the Food Assessment Team. Mr. Rhodes thanked the Minister for his time and information, and promised to follow-up with him based on the recommendations of the report by Drs. Fletcher and Connick.

## APPENDIX C

### GROWTH RATES OF FOODGRAIN AREAS, YIELDS, AND PRODUCTION

As a part of this assessment, DFAMS staff assisted us in calculating growth rates of areas, yields, and production for the five major cereal crops during the 17-year period from 1970/71 through 1987/88. These are the most complete data available and were disaggregated both by agroecological belt (3) and development region (5). This disaggregation gives 15 sub-areas and basic growth rates were calculated for each. In addition, in the five tables, the marginal cells provide summaries for each of the corresponding agroecological belts and development regions. The lower right-hand cell in each table provides overall national growth rates for the crop.

The numbers in the table are average annual percentage changes estimated by least-squares growth equations. The estimated growth rates with "X" beside them are statistically significant at the 10 percent level.

The designations used for agroecological belts are:

- M - Mountain
- H - Hill
- T - Tarai

The designations used for development regions are:

- E - Eastern
- C - Central
- W - Western
- NW - Mid-Western
- FW - Far-Western

In general, the production growth rate for a crop should be approximately equal to the algebraic sum of the growth rates in area and yield. This test is satisfied for most of the cells reported in the five tables. Where discrepancies exist, they are minor and are largely due to rounding errors in the extensive computations necessary to estimate the many growth rates.

Production of rice, Nepal's staple foodgrain, has grown only because an increase in area planted has offset declining yields (Table C-1). The Central development region and the Tarai agroecological belt were the only places to show positive growth in yields of rice over the period analyzed. The Tarai/Central sub-area showed the strongest gain in yields. With little prospect for continuing growth in area, these data present a pessimistic picture for future rice production. It will be necessary to reverse the declining yields that have prevailed over most of the country.

Maize shows an equally disturbing pattern (Table C-2). For maize no agroecological belt nor development region achieved an overall positive growth in yields. In fact, the only positive yield changes were in the Tarai/Central and Tarai/Western sub-areas. The national rate of decline in maize yields was almost six times as large as the rate of decline in rice yields. It outweighed the increase in maize area resulting in a downward trend in national maize production.

TABLE C-1  
GROWTH OF AREA, YIELD AND PRODUCTION OF RICE IN NEPAL  
1970/71-1987/88

UNIT: PERCENT/ANNUM

Agroecological Belts		Development Regions					Summary Agro-ecological Belt
		E	C	W	MW	FW	
M	Area	10.80X	1.79X	-34.1X	3.01X	0.79	3.66X
	Yield	-1.49X	-3.33X	-0.67	-2.21X	-2.77X	-2.16X
	Prod.	9.29X	-1.51	-34.52X	0.72	-2.01X	1.41X
H	Area	2.61X	2.47X	5.66X	3.11X	2.94X	3.61X
	Yield	-2.32X	-1.03X	-1.78X	-2.68X	-4.13X	-1.94X
	Prod.	0.28	1.46	3.06X	0.45	-1.30X	1.55X
T	Area	0.30	-0.08	0.72	0.60	0.92	0.27
	Yield	-0.21	1.18	0.18	0.18	-0.25	0.15
	Prod.	0.16	1.11	0.90	-0.41	0.60	0.37
Summary Dev. Regions	Area	1.06X	0.39X	1.91X	0.32	1.88	0.90X
	Yield	-0.39	0.81	-0.34	-0.48	-1.12	-0.25
	Prod.	0.67	1.20X	1.65	-0.16	0.74	0.69

Source: DFAMS.

TABLE C-2  
GROWTH OF AREA, YIELD AND PRODUCTION OF MAIZE IN NEPAL  
1970/71-1987/88

UNIT: PERCENT/ANNUM

		Development Regions					Summary Agro- ecological Belt
		E	C	W	MW	FW	
Agroecological Belts							
M	Area	1.37	0.28	-7.44X	0.53	4.59X	0.69
	Yield	-1.39X	1.53	-1.33	-2.32X	-1.46X	-1.89X
	Prod.	-0.03	1.89	-8.69X	-1.80X	3.06X	-1.17X
H	Area	3.28X	2.68	3.96X	3.97	-0.11	2.94X
	Yield	-1.83X	-2.01X	-3.39X	-3.44X	-2.97X	-2.68X
	Prod.	2.48X	0.62	0.48	0.51	-3.06X	0.19
T	Area	7.07X	-0.34	-7.32X	-0.16	-1.81X	-0.10
	Yield	-1.74X	0.72	0.65	-0.73	0.44	-0.11
	Prod.	5.48X	-0.37	-6.50X	-0.89	1.37X	-0.21
Summary Dev. Regions	Area	3.25X	1.44X	0.55	0.76	0.44	0.95
	Yield	-1.30X	-1.98X	-0.99	-2.16	-0.57	-1.42X
	Prod.	1.93X	-0.52	-0.44	-1.14	-0.17	-0.55

Source: DFAMS.

The picture for wheat was the most positive (Table C-3). Rapid growth in area cultivated in the Hill and Tarai belts was reinforced by yield growth in the Tarai. This confluence of area and yield changes was especially strong in the Tarai/Eastern and Tarai/Central sub-areas. Their rate of growth in production was matched by the Tarai/Far Western sub-area, but area change accounted for most of its output growth. This was also true for the country as a whole.

Millet and barley are more important crops in the Hill and Mountain belts. Both crops showed declining yield trends (Tables C-4 and C-5). Nationally, production fell for both crops. For millet, declining yields offset an increase in area. For barley, both area and yield trends were negative.

These data are profoundly pessimistic for Nepal's future food supply. They suggest that the factors affecting yields negatively, such as erosion, land degradation, and cultivation of marginal land, are having more impact on production than efforts to improve yields through improved varieties, fertilization, irrigation, and cultural practices.

Additional analysis of these data would be useful. It seems likely that positive area trends are decelerating while negative yield trends may be accelerating. Appropriate statistical techniques should be used to assess those possibilities. The data could also be used to establish geographic priorities for yield improvement programs. Payoffs are likely to be higher in major production sub-areas where yields have been falling. The payoff to additional programs in the few sub-areas with positive yield growth are likely to be subject to diminishing returns.

TABLE C-3  
GROWTH OF AREA, YIELD AND PRODUCTION OF WHEAT IN NEPAL  
1970/71-1987/88

UNIT: PERCENT/ANNUM

		Development Regions					Summary Agro- ecological Belt
		E	C	W	MW	FW	
Agroecological Belts							
M	Area	-3.09	4.76X	-1.95	-3.44	0.90	-0.08
	Yield	1.16X	0.79X	-1.23X	-0.89X	-0.64	-0.26
	Prod.	-1.88	5.50X	-3.20X	-4.32X	0.25	-0.35
H	Area	7.87X	3.16X	9.62X	11.51	3.80X	6.27X
	Yield	1.13X	1.58X	0.51	-0.46	0.22	0.27
	Prod.	6.72X	4.81X	10.18X	11.03	4.02	7.03X
T	Area	4.79X	5.66X	3.66X	6.22X	10.33X	5.92X
	Yield	4.18X	5.52X	2.66X	2.49X	2.66X	3.20X
	Prod.	8.93X	11.07X	6.34X	8.62X	13.77X	9.72X
Summary Dev. Regions	Area	5.97	4.83X	5.54X	5.80X	4.83X	5.56X
	Yield	3.30X	1.93X	1.95X	0.76X	0.90	1.20X
	Prod.	9.45X	6.86X	7.57X	6.61X	5.75X	6.89X

Source: DFAMS.

TABLE C-4  
GROWTH OF AREA, YIELD AND PRODUCTION OF MILLET IN NEPAL  
1970/71-1987/88

UNIT: PERCENT/ANNUM

		Development Regions					Summary Agro- ecological Belt
		E	C	W	MW	FW	
<b>Agroecological Belts</b>							
M	Area	1.53X	1.16X	2.59X	3.66X	2.94X	2.20X
	Yield	-2.03X	-1.35X	-2.21X	-2.16X	-2.10X	-1.94X
	Prod.	-0.51	-0.20	0.30	1.51	0.81	0.25
H	Area	4.28X	-1.19X	-1.53	3.87X	3.17X	1.65X
	Yield	-2.55X	-2.23X	-2.90	-0.62	-1.94X	-1.96X
	Prod.	1.62X	-3.30X	-4.48	3.23X	1.11X	-0.34
T	Area	0.001	-3.64X	-3.01	-5.31X	-3.04X	-2.84X
	Yield	-0.30	0.20	0.14	0.46	0.48	0.18
	Prod.	-0.30	-3.44X	-2.93	-4.87X	-2.57X	-2.66X
Summary Dev. Regions	Area	3.18X	-1.28X	1.25X	2.85X	2.21X	1.04X
	Yield	-1.89X	-1.03	-1.94X	-0.87X	-1.51	-1.67X
	Prod.	1.23X	-2.30X	-0.73	1.95	0.60X	-0.60

Source: DFAMS.

TABLE C-5  
GROWTH OF AREA, YIELD AND PRODUCTION OF BARLEY IN NEPAL  
1970/71-1987/88

UNIT: PERCENT/ANNUM

Agroecological Belts		Development Regions					Summary Agro-ecological Belt
		E	C	W	MW	FW	
M	Area	-3.86X	0.44	2.16X	0.93	2.28X	0.48X
	Yield	-0.60	-1.42	-0.48	-2.01X	-1.85X	-1.62X
	Prod.	-4.41X	-0.99	1.65	-1.33X	0.53X	-1.14X
H	Area	-0.78	8.29X	-0.60	3.37X	0.90X	2.05X
	Yield	-0.71	-0.69	-0.76	-1.60	-1.73	-0.41
	Prod.	-1.46	7.57X	-1.35X	1.72X	-8.85	1.62
Summary Dev. Regions	Area	-8.86X	-3.55	-11.61X	-2.39	27.97X	-1.82
	Yield	0.88	2.19X	1.44X	2.74	3.49X	2.16
	Prod.	-8.06X	-1.42	-10.30	-0.30	31.43X	0.38
Summary Dev. Regions	Area	-3.46X	-0.67	-2.52X	2.07	2.28X	-0.48
	Yield	-0.39	-1.25	0.16	-1.71	-1.67X	-0.71
	Prod.	-3.71X	-0.67	-2.34X	0.35	0.44	-1.19

Source: DFAMS.

APPENDIX D

LIST OF PERSONS CONTACTED

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Mr. Madav Gautam  
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