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ECUADOR

**ADDITIONAL FINANCING FOR THE FIRST PHASE OF THE
DAULE-PERIPA MULTIPURPOSE PROGRAM**

(EC-0099)

LOAN PROPOSAL

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1. Datos Generales

| | |
|--|-----------------|
| Población total (miles de habitantes) 1983 | 8.737,0 |
| Población rural (%) | 53,7 |
| Extensión territorial (Km ²) | 270.670,0 |
| Habitantes por Km ² | 32,3 |
| Tasa de crecimiento demográfico 1970-83 (% Promedio) | 3,0 |
| Producto interno bruto por habitante US\$ 1982 | 1.002,1 |
| Tasa de natalidad por mil habitantes (1977) | 33,3 |
| Tasa de mortalidad por mil habitantes (1978) | 7,2 |
| Tasa de mortalidad infantil por mil nacidos vivos | 63,0 |
| Médicos por 10,000 habitantes (1981) | 11,6 |
| Número de camas de hospital por cada mil habitantes (1981) | 1,8 |
| Alfabetismo (1980) % | 79,0 |
| Tasa de inscripción primaria (1976) % | |
| Tasa de inscripción secundaria (1976) % | 56,6 |
| Tasa de cambio (desde el 4 de septiembre de 1984) | US\$1 = S/.66,5 |
| Consumo de energía per cápita (año) Kwh 1978: | 245,0 |

Población Económicamente Activa por Sectores (1982):

| | <u>En miles</u> | <u>%</u> |
|----------------------------------|-----------------|--------------|
| Agricultura y pesca | 1.358,4 | 46,9 |
| Minería | 9,9 | 0,3 |
| Manufactura | 308,1 | 10,6 |
| Construcción | 141,3 | 4,9 |
| Comercio, restaurantes y hoteles | 315,0 | 10,9 |
| Otros | 764,5 | 26,4 |
| <u>T o t a l</u> | <u>2.897,2</u> | <u>100,0</u> |

2. Producto Interno Bruto 1/

| | Composición (%) | | | | | Tasa Real de Crecimiento Anual (%) | | | | |
|--------------------------|-----------------|-------|---------|---------|---------|------------------------------------|------|---------|---------|---------|
| | 1979 | 1980 | 1981 a/ | 1982 a/ | 1983 a/ | 1979 | 1980 | 1981 a/ | 1982 a/ | 1983 a/ |
| PIB a precios de mercado | 100,0 | 100,0 | 100,0 | 100,0 | 100,0 | 5,1 | 4,8 | 4,5 | 1,4 | -3,3 |
| Inversión interna bruta | 25,8 | 28,4 | 24,4 | 21,7 | 17,1 | -2,5 | 15,6 | -3,9 | -10,0 | -24,0 |
| Consumo | 81,3 | 83,1 | 84,0 | 84,4 | 85,4 | 5,7 | 7,2 | 5,1 | 1,9 | -2,2 |
| Exportaciones | 22,5 | 20,4 | 20,6 | 19,6 | 22,3 | 5,2 | -5,0 | 3,1 | -3,5 | 10,0 |
| Importaciones | -29,6 | -31,9 | -29,0 | -25,7 | -24,7 | 0,2 | 13,1 | -2,2 | -10,2 | -7,0 |

PIB por Origen

(a costo de factores)

| | | | | | | | | | | |
|----------------------------|-------|-------|-------|-------|--|------|-------|------|------|-------|
| Agropecuaria | 15,1 | 15,3 | 15,2 | 15,2 | | 3,6 | 5,2 | 5,7 | 2,0 | -14,9 |
| Minas y canteras | 12,3 | 10,2 | 10,7 | 10,1 | | 6,2 | -13,7 | 4,7 | -3,9 | 8,4 |
| Manufactura | 19,0 | 19,4 | 19,1 | 19,6 | | 8,4 | 6,4 | 5,1 | 4,6 | -5,6 |
| Electricidad, agua, gas | 0,8 | 0,9 | 0,8 | 0,9 | | 11,4 | 18,0 | 11,4 | 11,5 | 10,5 |
| Construcción | 5,1 | 5,0 | 4,8 | 4,6 | | -1,1 | 1,7 | 1,4 | -0,7 | -15,4 |
| Comercio | 16,8 | 17,3 | 17,5 | 17,2 | | 4,9 | 7,1 | 4,2 | 0,2 | 1,2 |
| Transporte | 6,9 | 7,2 | 7,1 | 7,3 | | 7,4 | 9,0 | 4,8 | 4,9 | |
| Servicios financieros | 9,0 | 9,0 | 9,0 | 9,0 | | 5,0 | 4,9 | 4,8 | 4,1 | |
| Otros servicios | 5,7 | 5,8 | 6,2 | 6,4 | | 9,0 | 6,1 | 7,7 | 7,2 | |
| Gobierno | 9,3 | 9,9 | 9,6 | 9,7 | | 4,7 | 10,6 | 3,6 | 2,5 | |
| PIB a precios de productor | 100,0 | 100,0 | 100,0 | 100,0 | | 5,6 | 4,1 | 4,8 | 2,2 | -3,3 |

1/ A precios de 1975.

a/ Provisional.

Fuente: Banco Central del Ecuador.

3. Comercio Exterior a/

| | (En millones de US\$) | | | | | Tasa de Crecimiento Anual (%) | | | | |
|--------------------------------------|-----------------------|---------|---------|---------|---------|-------------------------------|-------|-------|---------|---------|
| | 1979 | 1980 | 1981 | 1982 | 1983 a/ | 1979 | 1980 | 1981 | 1982 a/ | 1983 a/ |
| <u>Exportación de Bienes (FOB)</u> | 2.172,7 | 2.393,6 | 2.544,0 | 2.343,0 | 2.365,0 | 45,4 | 10,2 | 6,3 | -7,9 | 0,9 |
| Productos primarios | 1.634,6 | 1.791,3 | 2.036,0 | 1.884,0 | 2.092,0 | 49,6 | 9,6 | 13,7 | -7,5 | 11,0 |
| Productos industrializados | 538,1 | 602,3 | 508,0 | 459,0 | 273,0 | 34,1 | 11,9 | -15,7 | -9,6 | -40,5 |
| Productos principales | | | | | | | | | | |
| Banano | 200,1 | 237,0 | 216,0 | 213,0 | 153,0 | 16,5 | 18,4 | -8,9 | -1,4 | -28,2 |
| Cacao | 42,3 | 30,4 | 44,0 | 63,0 | 9,0 | -16,1 | -28,1 | 44,7 | 43,2 | -85,7 |
| Elaboración de cacao | 234,0 | 180,7 | 106,0 | 56,0 | 26,0 | 12,8 | -22,8 | -41,3 | -47,2 | -53,6 |
| Café | 263,1 | 130,0 | 106,0 | 139,0 | 149,0 | -6,4 | -50,6 | -18,5 | 31,1 | 7,2 |
| Piscícolas | 63,1 | 65,9 | 83,0 | 130,0 | 134,0 | 49,2 | 4,4 | 25,9 | 56,6 | 3,1 |
| Petróleo | 1.032,0 | 1.294,2 | 1.560,0 | 1.388,0 | 1.644,0 | 97,2 | 25,4 | 20,6 | -11,0 | 18,4 |
| Derivados de petróleo | 145,4 | 179,8 | 166,0 | 136,0 | 106,0 | 59,1 | 23,7 | -7,7 | -18,1 | -22,1 |
| Elaboradoras de productos del mar | 59,5 | 89,8 | 99,0 | 81,0 | 72,0 | 26,1 | 50,9 | 10,2 | -18,2 | -11,1 |
| <u>Importaciones de Bienes (CIF)</u> | 1.985,6 | 2.249,5 | 2.646,2 | 1.988,4 | n.d. | 21,8 | 13,3 | -0,2 | -11,5 | n.d. |
| Bienes de consumo no duradero | 87,0 | 123,4 | 104,3 | 133,2 | n.d. | 1,3 | 41,8 | -15,5 | 27,7 | n.d. |
| Bienes de consumo duradero | 93,5 | 126,7 | 98,4 | 97,4 | n.d. | 0,8 | 35,5 | -22,3 | 1,0 | n.d. |
| Combustibles | 13,5 | 23,3 | 25,7 | 25,8 | n.d. | 20,5 | 72,6 | 13,0 | 0,4 | n.d. |
| Productos intermedios | 836,3 | 942,9 | 922,8 | 916,7 | n.d. | 37,2 | 12,7 | -2,1 | -0,7 | n.d. |
| Bienes de capital | 955,3 | 1.033,2 | 1.095,0 | 815,2 | n.d. | 15,0 | 8,2 | 6,0 | -24,9 | n.d. |

a/ Con base en los permisos concedidos, por lo tanto difiere de los datos de la balanza de pagos del punto siguiente.

n.d.: No disponible.

Fuente: Banco Central del Ecuador, CONADE.

4. Balanza de Pagos

| | En millones de US\$ | | | | | Tasa de Crecimiento Anual | | | | |
|--|---------------------|---------|---------|----------|----------|---------------------------|------|------|---------|---------|
| | 1979 | 1980 | 1981 | 1982 a/ | 1983 a/ | 1979 | 1980 | 1981 | 1982 a/ | 1983 a/ |
| Saldo en Cuenta Corriente | -624 | -642 | -1.002 | -1.195 | -104 | -11,0 | 2,9 | 56,0 | 19,3 | -91,3 |
| Exportaciones | 2.151 | 2.544 | 2.544 | 2.343 | 2.365 | 40,7 | 18,3 | — | -7,9 | 0,9 |
| Importaciones | -2.097 | -2.242 | -2.362 | -2.181 | -1.408 | 23,1 | 6,9 | 5,4 | -9,7 | -35,4 |
| Servicios (netos) | -708 | -974 | -1.209 | -1.377 | -1.085 | 24,9 | 37,6 | 24,1 | 13,9 | -21,2 |
| Pagos de interés | (-322) | (-511) | (-670) | (-767) | (-683) | 88,3 | 58,7 | 31,1 | 14,4 | -11,0 |
| Transferencias | 30 | 30 | 25 | 20 | 24 | | | | | |
| Movimientos de Capital (Neto) | 654 | 867 | 715 | 962 | 101 | | | | | |
| Uso de préstamos | 1.995 | 1.950 | 2.609 | 2.225 | 2.721 | | | | | |
| Público | (1.456) | (1.003) | (1.522) | (883) | (1.733) | | | | | |
| Privado | (539) | (847) | (1.087) | (1.342) | (988) | | | | | |
| Amortizaciones | -1.397 | -899 | -1.386 | -1.866 | -2.219 | | | | | |
| Público | (-1.109) | (-417) | (-598) | (-700) | (-1.126) | | | | | |
| Privado | (-228) | (-482) | (-788) | (-1.166) | (-1.093) | | | | | |
| Otros | 56 | -184 | -568 | 376 | -456 | | | | | |
| Cambio en el Nivel de Reservas (-Aumento) | -30 | -225 | 287 | 460 | 58 | | | | | |

a/ Provisional.

Fuente: Banco Central del Ecuador.

| 5. <u>Finanzas Públicas</u> | En Porcentaje del PIB | | | | | | | | | |
|--|-----------------------|--------|--------|--------|---------|-----------------------------|--------|--------|--------|--------|
| | Sector Público | | | | | Plan Nacional de Desarrollo | | | | |
| | 1979 | 1980 | 1981 | 1982 | 1983 a/ | 1980 | 1981 | 1982 | 1983 | 1984 |
| Ingresos corrientes | 20,3 | 24,6 | 22,3 | 21,1 | 27,8 | 25,6 | 25,8 | 25,6 | 25,1 | 25,7 |
| Tradicional | (13,7) | (13,3) | (12,5) | (11,0) | | (15,5) | (16,1) | (16,7) | (16,6) | (17,1) |
| Petróleo | (6,6) | (11,3) | (9,8) | (10,1) | | (10,1) | (9,7) | (8,9) | (8,5) | (8,6) |
| Gastos corrientes | 17,1 | 19,3 | 19,2 | 18,5 | | 18,3 | 18,2 | 17,9 | 17,5 | 17,9 |
| Ahorro en cuenta corriente | 3,2 | 5,3 | 3,1 | 2,6 | | 7,3 | 7,6 | 7,7 | 7,6 | 7,8 |
| Ingresos de capital | 0,3 | 0,3 | 0,1 | 0,6 | | 0,6 | 0,4 | 0,5 | 0,4 | 0,4 |
| Gastos de capital | 9,0 | 11,9 | 10,5 | 9,7 | 28,1 b/ | 11,7 | 12,1 | 11,9 | 11,6 | 11,3 |
| Inversión real | (8,8) | (11,0) | (9,7) | (9,6) | | (10,0) | (10,2) | (10,6) | (10,7) | (10,8) |
| Inversión financiera | (0,2) | (0,9) | (0,8) | (0,1) | | (0,8) | (0,7) | (0,6) | (0,6) | (0,5) |
| Transferencias | (-) | (-) | (-) | (-) | | (0,9) | (1,2) | (0,7) | (0,3) | (-) |
| Déficit (-) o Superávit (+) | -5,5 | -6,3 | -7,3 | -6,5 | -0,3 | -3,8 | -4,1 | -3,8 | -3,6 | -3,1 |
| Financiamiento del déficit o disponibilidad del superávit | 5,5 | 6,3 | 7,3 | 6,5 | 0,3 | 3,8 | 4,1 | 3,8 | 3,6 | 3,1 |
| Crédito interno neto | (4,9) | (2,1) | (2,5) | (1,7) | (-0,5) | (0,8) | (0,5) | (0,5) | (0,3) | (-) |
| Crédito externo neto | (-) | (4,7) | (4,5) | (4,5) | (0,8) | (2,5) | (3,5) | (3,3) | (3,3) | (3,1) |
| Otros | (0,6) | (-0,5) | (0,3) | (0,3) | | (0,5) | (0,1) | (-) | (-) | (-) |

| | En Porcentajes del PIB | | | | |
|--|------------------------|-------|-------|-------|-------|
| | Gobierno Central | | | | |
| Ingresos corrientes | 14,3 | 13,2 | 13,4 | 13,7 | 13,1 |
| Gastos corrientes | 14,1 | 10,3 | 13,8 | 13,5 | 11,9 |
| Ahorro en cuenta corriente | 0,2 | 2,9 | -0,4 | 0,2 | 1,2 |
| Gastos de capital | 4,0 | 4,3 | 4,3 | 4,4 | 4,2 |
| Déficit (-) o Superávit (+) | -3,8 | -1,4 | -4,7 | -4,2 | -3,0 |
| Financiamiento del déficit o disponibilidad del superávit | 3,8 | 1,4 | 4,7 | 4,2 | 3,0 |
| Crédito interno neto | (4,4) | (0,9) | (2,5) | (1,7) | (2,2) |
| Crédito externo neto | (-0,6) | (0,5) | (2,2) | (2,5) | (0,8) |

a/ Provisional.

b/ Incluye gastos corrientes y de capital.

Fuente: CONADE.

| 6. Sistema Bancario Nacional | (Millones de Sucres al 31 de Diciembre) | | | | | Tasas de Crecimiento Anual | | | | |
|--------------------------------|---|---------|---------|---------|---------|----------------------------|------|-------|-------|-------|
| | 1979 | 1980 | 1981 | 1982 a/ | 1983 a/ | 1979 | 1980 | 1981 | 1982 | 1983 |
| Reservas internacionales netas | 17.070 | 23.291 | 15.475 | 9.400 | 6,800 | 5,8 | 36,4 | -33,6 | -39,3 | -27,7 |
| Autoridad monetaria | 15.773 | 21.413 | 14.072 | 6.930 | n.d. | 5,0 | 35,8 | -34,3 | -50,8 | n.d. |
| Bancos comerciales | 1.297 | 1.878 | 1.403 | 2.470 | n.d. | 16,5 | 44,8 | -25,3 | 76,1 | n.d. |
| Crédito interno total | 55.521 | 68.481 | 76.998 | 115.000 | 194.500 | 21,7 | 23,3 | 12,4 | 49,4 | 69,1 |
| Sector público neto | -10.492 | -12.241 | -19.457 | -19.200 | -22.000 | 60,6 | 16,7 | 59,0 | -1,3 | 14,6 |
| Sector privado | 53.525 | 66.434 | 79.499 | 107.800 | 169.200 | 22,6 | 24,1 | 19,7 | 35,6 | 57,0 |
| Otros | 12.488 | 14.288 | 16.956 | 26.400 | 47.300 | 47,1 | 14,4 | 18,7 | 55,7 | 79,2 |
| Dinero | 34.998 | 44.790 | 50.047 | 60.167 | 78.400 | 17,0 | 28,0 | 11,7 | 20,2 | 30,3 |
| (Porcentaje del PIB) | 15,3 | 15,7 | 14,9 | 14,7 | 13,7 | | | | | |
| Quasi-dinero | 7.325 | 8.653 | 9.539 | 11.900 | 16.700 | 16,5 | 18,1 | 10,2 | 24,8 | 40,3 |
| (Porcentaje del PIB) | 3,2 | 3,0 | 2,8 | 2,9 | 2,9 | | | | | |

a/ Provisional.

n.d. No disponible.

Fuente: Banco Central del Ecuador.

| 7. Precios | 1979 | 1980 | 1981 | 1982 | 1983 a/ | 1979 | 1980 | 1981 | 1982 | 1983 a/ |
|--------------------------------|-------|-------|-------|-------|---------|------|------|------|------|---------|
| Deflactor del PIB (1975 = 100) | 168,4 | 201,2 | 227,6 | 264,5 | 383,7 | 17,5 | 19,5 | 13,1 | 16,2 | 45,1 |
| Al Consumidor (promedio) | | | | | | | | | | |
| (mayo 1978 - abril 1979 = 100) | 106,5 | 120,1 | 137,8 | 160,2 | 237,7 | 10,1 | 12,8 | 14,7 | 16,3 | 48,4 |

a/ Índice ponderado nacional.

Fuente: Consejo Nacional de Desarrollo.

| 8. Deuda Pública Externa Pagadera en Divisas | Contratada a Final del Año (US\$ millones) | | | | Deuda Total | | | |
|---|--|-------|-------|---------|-------------|---------|---------|-------|
| | 1979 | 1980 | 1981 | 1982 a/ | Año | Pública | Privada | Total |
| Total | 2.948 | 3.680 | 4.257 | 4.699 | | | | |
| Por tipo de acreedor | | | | | | | | |
| Proveedores | 306 | 306 | 302 | 526 | | | | |
| Bancos privados | 1.525 | 1.963 | 2.277 | 3.014 | 1979 | 2.848 | 706 | 3.554 |
| Emisión de bonos | 69 | 56 | 42 | 27 | 1980 | 3.530 | 1.071 | 4.601 |
| Organismos internacionales | 714 | 960 | 1.121 | 754 | 1981 | 4.416 | 1.371 | 5.787 |
| BID | | | | | | | | |
| Gobiernos | 334 | 395 | 515 | 378 | 1982 a/ | 4.699 | 1.536 | 6.235 |
| | | | | | 1983 a/ | 5.165 | 1.524 | 6.689 |

a/ Provisional.

n.d. No disponible.

Fuente: Banco Mundial.

| <u>Servicio de la Deuda</u> | <u>1978</u> | <u>1979</u> | <u>1980</u> | <u>1981 a/</u> | <u>1982 a/</u> | <u>1983 a/</u> |
|-----------------------------|-------------|-------------|-------------|----------------|----------------|----------------|
| Servicio Total en (US\$) | 208,4 | 625,2 | 800,3 | 923,0 | 1.101,0 | 691,0 |
| Servicio/export de B. y S. | | | | | | |
| No atribuibles a factores | 12,2 | 25,9 | 27,9 | 30,8 | 40,3 | 26,3 |

Préstamos del BID (Aprobados hasta 12/31/83)

| | |
|--------------------------------|---------|
| Total | 1.126,1 |
| Capital ordinario | 188,8 |
| Capital interregional | 235,3 |
| FOE | 609,0 |
| Otros Fondos | 93,0 |
| Por Sector (%) | 100,0 |
| Agrícola | 23,5 |
| Industrial | 10,5 |
| Transportes | 9,7 |
| Energía | 38,4 |
| Educación ciencia y tecnología | 5,0 |
| Vivienda y obras urbanas | 2,4 |
| Salud | 9,3 |
| Preinversión | 1,0 |
| Otros | 0,2 |

a/ Provisional.

Fuente: Banco Central del Ecuador.

19-X-84
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DATA-EC/RGZEC

ECUADOR

ADDITIONAL FINANCING FOR THE FIRST PHASE OF
THE DAULE-PERIPA MULTIPURPOSE PROGRAM

(EC-0099)

LOAN PROPOSAL

I. BACKGROUND

- 1.01 The purpose of the financing presented for consideration in this document is to provide additional external resources for the construction of Stage I of the Daule-Peripa Project, which is already being executed. It consists in the construction of a dam (physical advance 30%) and of an irrigation and drainage system for 17,000 ha. and received loan resources from the Bank in 1979. ^{1/} As a result of this financing, the current financing plan would be changed to adapt it to the economic conditions of Ecuador, without in any way changing the scope and goals envisaged in 1979 for this Stage I.

A. Basic Data

1. The application

- 1.02 Applicant and Borrower, Date of Application: The loan application was presented to the Bank by the Minister of Finance and Public Credit in a note dated July 3, 1984, which was confirmed by the present government on October 15.

- 1.03 Executing Agency: It would be the Comisión de Estudios para el Desarrollo de la Cuenca del Rio Guayas (CEDEGE).

2. Objective and description of the project

- 1.04 The purpose of the project is to execute the first stage of the Daule-Peripa multipurpose program, which consists in the construction of a dam with a capacity of approximately 6,000 million m³ and an irrigation and drainage system for 17,000 hectares.

3. Total cost of the project

- 1.05 The total estimated cost of the project is the equivalent of US\$403 million, which implies an increase of US\$51.3 million relative to the original budget prepared in 1979, which amounted to US\$351.7 million.

^{1/} See documents PR-969 and PR-969-A.

4. Amount and financing conditions

- 1.06 The loan, all of which would be granted in foreign exchange, would amount to US\$175 million, which, added to the US\$70 million granted in 1979, raises the Bank's total to US\$245 million or 60% of the total updated cost, this is still less than the percentage established in the financing matrix for Group D countries for the agricultural and rural development sector (75%).
- 1.07 Furthermore, it is recommended that this financing come from the interregional capital resources of the Bank and that the following terms and conditions be established:

| | | |
|-------|---|------------|
| (i) | Interest | Variable |
| (ii) | Credit Fee | 1-1/4% |
| (iii) | IDB General Inspection and Supervision Fund | 1% of loan |
| (iv) | <u>Periods</u> | |
| | - Amortization | 20 years |
| | - Disbursement | 4 years |
| | - Grace | 4 years |

B. Background of the Project

- 1.08 On December 20, 1979, the Bank granted the Republic of Ecuador loan 610/SF-EC for the equivalent of US\$70 million, all in foreign exchange, chargeable to the Fund for Special Operations; Loan 32/VF-EC for US\$25 million from the Venezuelan Trust Fund and a complementary line of credit (LCC) for US\$70 million (58/IC-EC), for the financing of Stage I of the Daule-Peripa multiple purpose program, the estimated cost of which was US\$351.7 million. The financing also included a nonreimbursable technical cooperation (ATN-SF-1810-EC) for US\$1.4 million chargeable to the net income of the Fund for Special Operations, for the preparation of a regional development plan.
- 1.09 Since US\$20 million of the LCC was subsequently cancelled, which reduced the amount of the resources of loan 58/IC to US\$50 million, the plan for the financing of the project, in terms of its original cost, 1/ is as follows (for comparative purposes, the financing plan that would result from approval of the financing under review here is also included):

1/ The present cost, excluding interest on the new loan (see section C, Chapter III), now amounts to US\$373.7 million.

| Financing | Financing Plan | | | |
|--------------------|-----------------|-------|-----------------|-------|
| | Original | | Present | |
| | US\$ million | % | US\$ million | % |
| Loan 610/SF | 70.0 | 20.0 | 70.0 | 17.0 |
| Loan 32/VF | 25.0 | 7.0 | 25.0 | 6.0 |
| LCC 58/IC | 50.0 | 14.0 | 50.0 | 12.0 |
| Local contribution | 206.7 | 59.0 | 83.0 | 21.0 |
| Loan IC (New) | - | - | 175.0 | 43.0 |
| Total | 351.7 <u>1/</u> | 100.0 | 403.0 <u>2/</u> | 100.0 |
| | ===== | ===== | ===== | ===== |

- 1.10 The reasons for this financing plan were the following: (i) an overestimate of the country's capacity to generate the local counterpart at the time the loan was approved, taking into account the especially favorable situation of Ecuador at that time due to oil prices in the international market and the export possibilities of the country; (ii) the availability of IDB resources and (iii) the decision of the national authorities to distribute a limited amount of IDB resources among the different projects and sectors that required financing from international agencies at that time.
- 1.11 The corresponding loan contracts were signed on April 15, 1980 in the case of loan 610/SF-EC and 32/VF-EC and on June 16, 1980 in the case of loan 58/IC-EC. By September 30, 1984, US\$13.5 million of loan 610/SF-EC (19.3%) had been disbursed, US\$168,000 of loan 32/VF-EC (0.67%) and US\$50 million of loan 58/IC-EC (100%). The current deadline for the final disbursement of the loans awaiting disbursement expires on April 15, 1988. 3/ In accordance with the provisions of the LCC Contract (58/IC-EC), it should have been disbursed before June 16, 1983 and therefore those resources were invested first, which explains the imbalance in the percentage disbursed between loan 58/IC and loans 610/SF-EC and 32/VF-EC.
- 1.12 Since 1980, Ecuador has been going through a financial crisis that affects its ability to generate a sufficient amount of resources for meeting its investment needs both for projects at present under execution and for projects to be executed in the future. In addition, the situation is occurring at a time when the international capital

1/ Estimated cost upon approval of loans 610/SF, 58/IC and 32/VF in 1979.

2/ Present cost, estimated in June 1984, including interest on the new loans (see Section C, Chapter III).

3/ This deadline has been extended for 2 years. The original deadline expired April 15, 1986. A pertinent explanation appears in section B of Capital IV, Execution of the Project.

markets are contracting since commercial banks have been reluctant to expand their operations and rollover the loans granted. Therefore, Ecuador has had difficulties in obtaining resources for supplementing the domestic funds which it had to use for financing projects that could contribute to the economic and social development of the country.

1.13 In the case of the Daule-Peripa flexibilization measure, which was adopted first, because of its strong impact on the total of the local counterpart contributions of Ecuador in 1983-1985 (approximately 68%), the pari-passu was changed from 33% external financing, 67% local contribution, to 75% external contribution, 25% local financing for that period.

1.14 If the pari-passu at present being used were to continue in the future without any additional financing being granted, the resources from the IDB loan and from the Venezuelan Fund would be exhausted in early 1986, as may be seen from the following table.

(US\$ million equivalent)

| Source | 1984 | 1/ | 1985 | | 1986 | | 1987 | | 1988 | | Total | 2/ |
|--------------------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|
| | Amount | % | Amount | % | Amount | % | Amount | % | Amount | % | Amount | % |
| External funds | 74.9 | 73.1 | 65.3 | 75.0 | 4.8 | 6.6 | - | - | - | - | 145.0 | 38.8 |
| Local contribution | 27.5 | 26.9 | 21.8 | 25.0 | 79.1 | 93.4 | 73.4 | 100.0 | 26.9 | 100.0 | 228.7 | 61.2 |
| Total | 102.4 | 100.0 | 87.1 | 100.0 | 83.9 | 100.0 | 73.4 | 100.0 | 26.9 | 100.0 | 373.7 | 100.0 |
| | ===== | ===== | ===== | ===== | ===== | ===== | ===== | ===== | ===== | ===== | ===== | ===== |

1.15 When the programming mission visited Ecuador in February, 1984, the Ecuadorian authorities emphasized the adverse situation facing the project and the impact it was having on the economy as a whole and reaffirmed their interest in having recourse to the IDB for solving this problem. This interest was confirmed by the new government on October 15, 1984.

II. FRAME OF REFERENCE

A. Agricultural Sector

2.01 At present agriculture accounts for 12% of the GDP of Ecuador, about 35% of the total income derived from exports and absorbs almost 50% of the

1/ Includes the accumulation up to the end of 1984.

2/ Total present cost, exclusive of interest (see Section C, Chapter III of the Project Report).

economically active population of the country. Between 1970 and 1981 the production of the principal crops expanded at a real average rate of 2% annually.

- 2.02 External factors, coupled with intermittent unfavorable weather, price and commercial policies, an overvalued exchange rate, and the structural defects of the sector joined together to curb growth during the abovementioned period and thus made the country even more dependent on food imports.
- 2.03 Nevertheless, it is believed that an efficient substitution of imports of selected products could eventually lead to the buildup of surpluses that could be exported. In this regard the most promising crops are flint corn and rice. Indicative estimates of comparative advantages show that Ecuador can efficiently promote the production of cotton and soybeans in addition to the production of rice and flint corn.
- 2.04 The three agricultural areas of Ecuador are the Sierra, the Costa and the Oriente. The first two are important regions for agriculture although the Oriente has long-term potential. Because of the vast difference in their climatic and ecological conditions, the characteristics of production and specialization differ: the Sierra contributes the bulk of the production of food crops (except rice) while export crops and other high value products are cultivated in the Costa.
- 2.05 Since the two regions complement one another and each has comparative advantages, the agricultural strategy of the country has primarily focused on the two regions and on eliminating the principal constraints and developing their potential. The Costa, which is a region of very fertile tropical lowlands and is the principal agricultural resource of Ecuador, has a substantial potential for the development of non-traditional exports, in particular rice and corn, as well as traditional exports, such as coffee, cocoa, bananas and sugarcane. The region also has potential for producing soybeans, sufficient to replace all imports and eventually even to generate a surplus for export. However, its potential development is hampered by the lack of irrigation infrastructure that would permit it to increase productivity and increase the area of land being farmed.

B. The Irrigation Subsector

1. At the national level

- 2.06 Ecuador has a water potential that would enable it, if works for exploiting it are built, to develop and substantially promote the growth of the agricultural sector. The estimate of the water potential at the national level, divided according to the eastern and western slope, shows for the western slope, which has an area of approximately 96,000 km², a runoff of 110,000 x 10⁶ m³/year; and for the eastern slope, which has an area of 93,000 km², a runoff of 108,000 x 10⁶ m³/year.

- 2.07 In relation to this water potential, the irrigation infrastructure is still limited. It is believed that the total irrigation system covers approximately 200,000 ha., of which more than 75% belong to the private sector. In addition, it should be emphasized that the construction of hydraulic systems and works has been largely stimulated by the need to meet emergency situations resulting from droughts or floods. This has prevented a systematic program being carried out and, in some cases, has meant duplication of resources since various national or regional institutions concerned with water resources have developed and executed their own programs for which they have used a short-term approach rather than organically structured plans with long-term objectives.

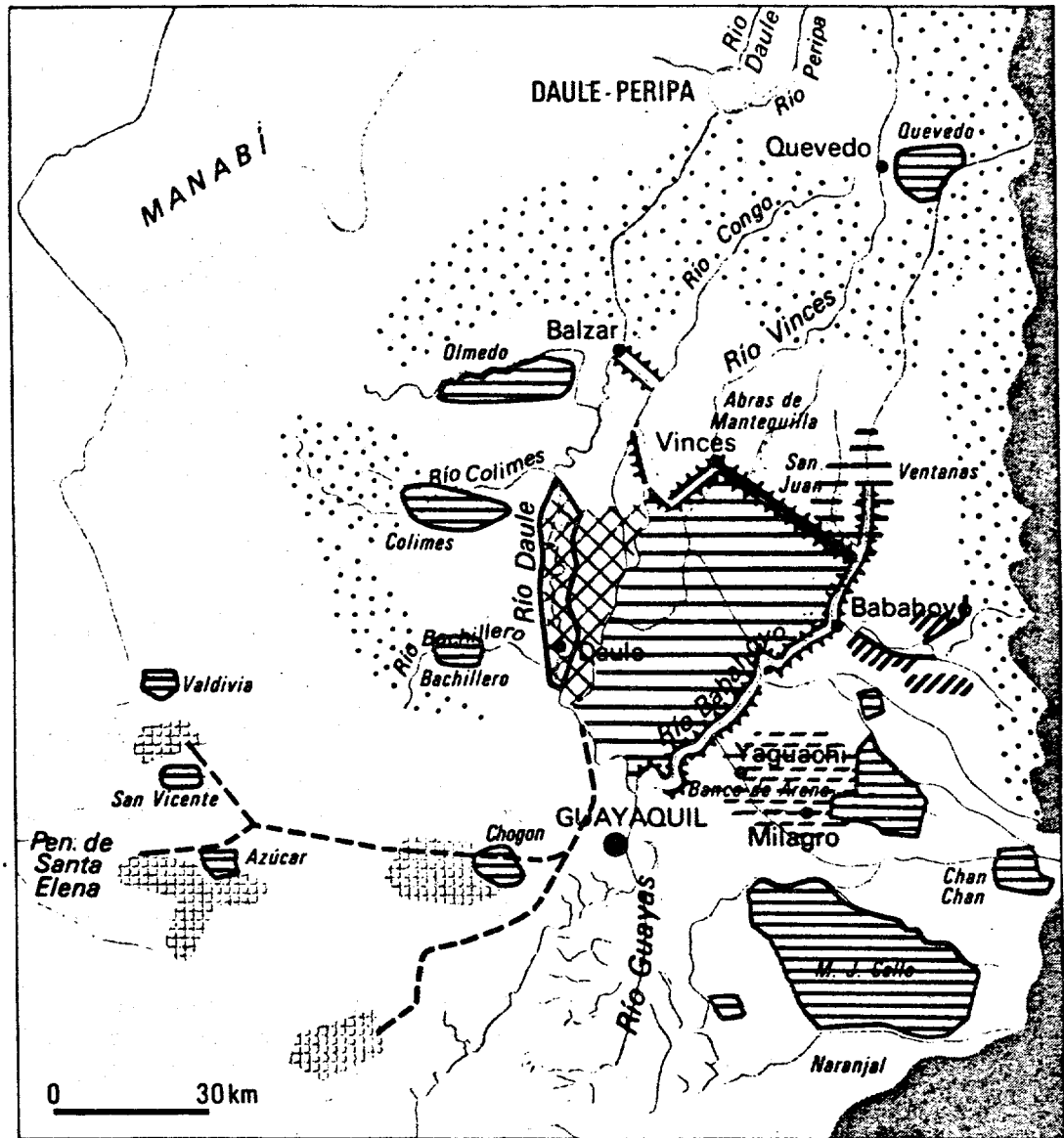
2. Situation of the Guayas basin

- 2.08 The Guayas river basin 1/ is a hydrographic system that covers the area defined by the subsystems of the Daule, Vinces and Babahoyo rivers, to the north of Guayaquil, with an area of 34,000 km², or 13% approximately of the total surface area of Ecuador. The Guayas plain covers approximately 10,000 km² and consists largely of flat land at sea level with silty soil of low permeability.
- 2.09 The Guayas Basin is a major producer of agricultural products for the country and, there, 90% of the rice and approximately 50% of bananas, coffee and cocoa are cultivated. It is estimated that, although there are 2.6 million ha. of arable land, only 30% of the area has reached an acceptable level of productivity, primarily because of the fact that only 160,000 ha. (5.7% of the arable land) are under irrigation.
- 2.10 As stated above, this region is of vital importance to the agricultural development of the country. However, the expansion of its development has been hampered by the following hydrological problems: (a) 80% of the annual rains fall in the first four months of the year, which gives rise to serious flooding; (b) the various silty soils that distinguish the region are subject to periodic flooding and have deficient drainage as well as inadequate irrigation during the dry season; (c) the effect of the tides makes itself felt 80 km. to the north of Guayaquil during the dry season and 40 km during the rainy season; and (d) there is an imbalance in the availability of water between the different basins, there being surpluses in some and deficits in others, during the summer.
- 2.11 CEDEGE has so far concentrated its efforts on presenting solutions to the problems of the Guayas basin in general and of the sub-basins of the Babahoyo, 2/ Vinces and Daule in particular. The Daule-Peripa project is the first step in a global approach to controlling the water resources of the entire Guayas basin. The dam on the river Daule (which

1/ In accordance with its statutes the jurisdiction of CEDEGE covers the entire Guayas Basin.

2/ See Chapter VII. Evaluation of loan 377/SF-EC.

Ordenamiento de la Cuenca del Guayas



Cordillera litoral (300m)

Cordillera andina (1.000 m)

Colinas (100-300 m)

Llanura

Perímetro de regadíos de la Comisión de Estudios para el Desarrollo de la Cuenca del río Guayas (CEDEGE)

Proyecto Guayas

Canales

Proyecto América

Derivaciones

Proyecto Babahoyo

Diques

Presa y central hidráulica

Trasvase de aguas del Río Daule a la península de Santa Elena

Perímetro de regadíos (proyectos)

Acueducto (175 km)

Perímetro de regadíos del Instituto Ecuatoriano de Recursos Hidráulicos (INERHI)

Proyectos realizados parcialmente

Utilización de aguas subterráneas (estudio)

is one of the principal tributaries of the Guayas) will regulate a substantial percentage of the water that passes through Guayaquil and empties into the sea (30 billion m³/year).

C. Objectives and Description of the Program

1. Objectives and description

2.12 The purpose of the Daule-Peripa Multiple Purpose Program is to develop the available resources of the Guayas river basin in the agricultural, energy and sanitation (drinking water) sectors. The agricultural production to be obtained from the program would be used for domestic supply and export. Hydroelectric energy would be incorporated into the national interconnected system and the regulation of the river would facilitate the supply of drinking water after treatment to the city of Guayaquil.

2.13 The program comprises the following activities:

- Construction of a dam and reservoir with a capacity of 6 billion m².
- Construction of an irrigation and drainage system for approximately 50,000 ha on the low-lying plain of the river Daule, which is divided into 17,000 ha on the right bank of the river and 33,000 on the left bank, which would be principally devoted to rice production.
- Construction of a hydroelectric plant with an installed capacity of 130 MW at the foot of the dam, which would produce 510 million kilowatt/hours a year.
- Construction of an irrigation and drainage system for the Santa Elena peninsula, which would bring under irrigation approximately 50,000 ha by means of an inter-basin transfer system from the Daule River.
- Construction of inter-basin transfer works to supplement the deficits of the Poza Honda and La Esperanza impoundments in the Province of Manabí. 1/
- In addition, as a result of the construction of the dam, the following would be obtained: (i) the regulation of the river, which would facilitate the supply of water for urban consumption in Guayaquil and the cities on the banks of the river Daule and maintain the necessary flow for controlling the salinity and the pollution of the river; and (ii) the retention of the volume

1/ To be executed by the Manabí Rehabilitation Center.

representing floods of up to 25 years recurrence with the purpose of controlling the floods that occur in the low-lying valley of the river Daule.

2. Stages of the program

- 2.14 In view of the magnitude of the program, both the resources required for carrying it out and the executing capacity that would be needed, CEDEGE has so far defined three stages of execution activities: Stage I, construction of (i) the Daule-Peripa dam and (ii) the irrigation and drainage system for 17,000 ha on the right bank of the river Daule. These two components, which constitute Stage I, are the subject matter of this financing; Stage II, construction of the 130 MW hydroelectric Plant; and Stage III, construction of the irrigation and drainage system for 33,000 ha on the left bank of the river Daule.
- 2.15 At present the program is in Stage I of construction. In this document Stage I will be called "The Project" and details of its characteristics and state of execution are presented in the following chapters. The schedule of the future stages of the program are subject to adjustments, in accordance with the availability of financial resources and the completion of additional studies that may be necessary.
- 2.16 Thus, with respect to Stage II, which provides for the construction of a hydroelectric plant, at a direct cost of approximately US\$120 million, the final designs, which are the responsibility of the consortium Hidroservice-Astec-INELIN, are now being completed. The construction of the irrigation infrastructure for 33,000 additional ha in the Daule Valley, the direct cost of which is in principle estimated at US\$110 million, is scheduled to begin in 1987 and be completed in 1991. It is estimated that the supplementary basic studies and the preparation of designs will be contracted in 1985. 1/ The part corresponding to the 50,000 additional ha. of the Santa Elena Peninsula, the total direct cost of which is estimated at US\$300 million and whose preliminary designs have been the responsibility of the Centro de Estudios Hidrográficos de Madrid (which has been considered in principle as Stage IV) do not yet have a tentative schedule (see details in Appendix II-3 of the Project Report) like the Pozo Hondo and La Esperanza diversion (cost tentatively estimated at US\$160 million) whose feasibility studies have been contracted and are expected to be completed by late 1985.

1/ These studies have been included for financing in this additional loan (see section B.3 of Chapter III and Appendix III-1 of the Project Report).

III. THE PROJECT

A. Objectives and Goals

- 3.01 As already indicated, the project for the execution of Stage I of the Daule-Peripa Multiple Purpose Program consists in the construction of a dam with a capacity of 6 billion m^3 and the bringing into cultivation of 17,000 ha through the construction of an irrigation and drainage system. The land area to be brought under cultivation represents 42.5% of the total area at present under irrigation in the three sub-basins (40,000 ha) and the reservoir capacity, 52% of the capacity expected to be used according to the hydraulic plan (11.4 billion m^3).

B. Description of the Project

1. Dam and reservoir

- 3.02 The dam is being constructed approximately 10 km downstream from the confluence of the rivers Daule and Peripa and 140 km to the north of the city of Guayaquil. The principal elements that make up the structure for the impoundment of a maximum storage volume of 6 billion m^3 are: (a) zonified dam, of granular material and impermeable core, 78 m. high and approximately 4 million m^3 of fill; (b) discharge and diversion works, which consist in the construction of two tunnels, 9 m. in diameter, of which one (tunnel 1) is 531 m. in length and in the future will be used for the permanent regulation of the flow of the river Daule and the other (tunnel No. 2), 490 m. in length, will provide water to the Daule-Peripa Hydroelectric Plant; (c) Spillway, designed to discharge the waters produced by the external floods, consists in a spillway with three radial gates, 8 x 17 m., which will have a discharge capacity of up to 3,600 m^3/s ; (d) Intake works, which consist in the construction of a concrete tower, 77 m. high, with its corresponding intake gates and protection grids at certain levels and an inclined ramp intake structure and roller gate for drawing water for generation; (e) lateral dike, designed to contain the water of the reservoir at elevation 85 (meters above sea level), which will extend for 21 km and whose height ranges from 5 to 15 m.; and (f) an emergency spillway, on the lateral dike, that will have a capacity of 500 m^3/s .
- 3.03 In addition, the construction of the dam calls for the following additional works: (i) operations building, which includes the construction of 14 houses and a pavillion with 34 rooms; and (ii) access roads to the dam site, which total approximately 16 km and have been designed for heavy construction traffic.

2. Irrigation and drainage system

- 3.04 The works for construction of the irrigation and drainage system consists of: (i) 225 km of irrigation canals; (ii) 170 km of drainage

canals; (iii) 263 km of metaled roads; (iv) masonry structures, consisting, inter alia, of 416 intakes, 258 checks, 57 culverts; and (v) 10 pumping plants, for a total capacity of 32 m³/s in irrigation and 35 m³/s in drainage.

3. Complementary activities

- 3.05 The project also includes the following activities: (a) engineering and supervision of the civil works; (b) final designs for the construction of the dam and the irrigation area; (c) technical and institutional strengthening of CEDEGE, including the Executing Unit in the following fields: (i) highly specialized experts for providing advice on the construction of the dam (board of consultants); (ii) systems for the follow-up and evaluation of the project, which was executed by IICA and was approved by the Bank in late 1980; (iii) financial administration information system; and (iv) regional development plan; (d) study of the environmental impact of the project, which was prepared by individual consultants and whose recommendations resulted in what is stated in item (b) of the following paragraph; (e) agricultural development activities, consisting in the promotion of the project among farmers for the establishment of cooperatives, establishment of basic community services and improvement of the technological level of agricultural production in the area; (f) program for the relocation of the persons affected by the construction of the dam and the priming of the reservoir; (g) program for the redistribution of land in the irrigation area; and (h) procurement of equipment and vehicles necessary for the operation and maintenance of the irrigation system of the 17,000 ha. and of the dam.
- 3.06 In addition, the following complementary activities have been included in this new loan: (a) preparation of studies for the construction of the irrigation and drainage system of the 33,000 ha. on the left bank of the river Daule; (b) complementation of the environmental studies made, consisting of: (i) study of water quality and hydrobiological resources; (ii) plan for the occupation of the space of the hydrographic system, which include studies for the management of conservation of the renewable natural resources of the hydrographic system of the basin; and (c) study of a multivariate model of probabilistic simulation of the reservoir.

C. Total Cost and Financing

1. Total cost

- 3.07 The following table shows the total updated cost of the project, which amounts to US\$403 million, or US\$51.3 million more than the original estimate. This table shows the originally estimated cost (1979) and the present cost. A comparison of the costs for the direct investment categories, at constant values of June 1984, appear in section D. of Chapter III of the Project Report.

Present Cost of Project 1/

| | Original Cost | Present Cost 2/ | Differences Total | 4/ % | Present Cost 3/ Incurred up to June/84 | To be Incurred |
|---|------------------|--------------------|----------------------|---------|---|-------------------|
| 1. <u>Engineering, Administration and Supervision</u> | 14.90 | 33.42 | 18.52 | 124.3 | 11.43 | 21.99 |
| 1.1 Engineering and Administration | 5.40 | 14.96 | 9.56 | - | 5.94 | 9.02 |
| 1.2 Studies for the Dam | 3.90 | 2.34 | (1.56) | - | 1.50 | 0.84 |
| 1.3 Irrigation Studies | 1.10 | 0.10 | (1.00) | - | - | 0.10 |
| 1.4 Supervision Dam Construction | 2.20 | 12.19 | 9.99 | - | 3.86 | 8.33 |
| 1.5 Supervision Irrigation Works Construction | 1.50 | 3.16 | 1.66 | - | - | 3.16 |
| 1.6 Board of Consultants | 0.30 | 0.30 | - | - | 0.09 | 0.21 |
| 1.7 Consultants for the Executing Unit | 0.30 | 0.04 | (0.26) | - | 0.04 | - |
| 1.8 Consultants in Financial Administration | 0.20 | 0.33 | 0.13 | - | - | 0.33 |
| 2. <u>Direct Costs</u> | 135.70 | 204.36 | 86.66 | 50.6 | 56.60 | 147.76 |
| 2.1 Roads, Camps and Miscellaneous | 10.30 | 11.08 | 0.78 | - | 4.84 | 6.24 |
| 2.2 Tunnels | 21.90 | 18.53 | (3.37) | - | 14.82 | 3.71 |
| 2.3 Intakes and Accessories | 12.00 | 19.40 | 7.40 | - | 16.26 | 3.14 |
| 2.4 Dam | 17.80 | 41.41 | 23.61 | - | 8.38 | 33.03 |
| 2.5 Spillway | 29.90 | 32.02 | 2.12 | - | 7.70 | 24.32 |
| 2.6 Dikes and Emergency Spillway | 15.70 | 33.84 | 18.14 | - | 4.60 | 29.24 |
| 2.7 Irrigation Pumping Station | 5.10 | 8.74 | 3.64 | - | - | 8.74 |
| 2.8 Drainage Pumping Station | 1.40 | 4.59 | 3.19 | - | - | 4.59 |
| 2.9 Irrigation and Drainage Canals | 20.10 | 30.62 | 10.52 | - | - | 30.62 |
| 2.10 Complementary Works | 1.50 | 4.13 | 2.63 | - | - | 4.13 |
| 3. <u>Equipment and Machinery</u> | 1.10 | 2.86 | 1.76 | 16.0 | 0.15 | 2.71 |
| 3.1 Vehicles-Operation and Maintenance | 0.20 | 0.26 | 0.06 | - | 0.15 | 0.11 |
| 3.2 Operation and Maintenance Equipment | 0.80 | 2.50 | 1.70 | - | 0.15 | 2.50 |
| 3.3 Vehicles-Supervision of Works | 0.10 | 0.10 | - | - | - | 0.10 |
| 4. <u>Land Preparation at Farm Level</u> | 6.80 | 6.80 | - | - | - | 6.80 |
| 5. <u>Associated Costs</u> | 21.30 | 22.93 | 1.63 | 7.7 | 2.50 | 20.43 |
| 5.1 Land | 3.30 | 2.30 | (1.00) | - | 0.80 | 1.50 |
| 5.2 Relocation Program | 10.90 | 18.40 | 7.50 | - | 1.70 | 16.70 |
| 5.3 Resettlement Irrigation Area | 7.10 | 2.23 | (4.87) | - | - | 2.23 |
| 6. <u>Finance Charges</u> | 46.00 | 91.40 | 45.40 | 98.7 | 10.50 | 80.90 |
| 6.1 Interest FSO | 1.50 | 2.40 | 0.90 | - | 0.01 | 2.39 |
| 6.2 Interest VFF | 4.70 | 7.13 | 2.43 | - | 0.02 | 7.11 |
| 6.3 FSO Credit Fee | 1.40 | 1.42 | 0.02 | - | 1.42 | - |
| 6.4 VFF Credit Fee | 1.20 | 1.08 | (0.12) | - | 1.08 | - |
| 6.5 Interest and Commissions 58/IC | 36.20 | 42.80 | 6.60 | - | 7.40 | 35.40 |
| 6.6 ISF/FSO | 0.70 | 0.70 | - | - | 0.42 | 0.28 |
| 6.7 ISF/VFF | 0.30 | 0.25 | 0.05 | - | 0.15 | 0.10 |
| 6.8 Interest IC (new loan) | - | 29.06 | 29.06 | - | - | 29.06 |
| 6.9 IC Credit Fee | - | 4.81 | 4.81 | - | - | 4.81 |
| 6.10 IC-ISF | - | 1.75 | 1.75 | - | - | 1.75 |
| 7. <u>Unallocated</u> | 125.90 | 41.23 | (84.67) | (67.3) | - | 41.23 |
| 7.1 Contingencies | 27.00 | 17.56 | (9.44) | - | - | 17.56 |
| 7.2 Escalation | 98.90 | 23.67 | (75.22) | - | - | 23.67 |
| Total | 351.70 | 403.00 | 51.30 | 14.6 | 81.18 | 321.82 |
| | ===== | ===== | ===== | ===== | ===== | ===== |

1/ For the purpose of facilitating comparison, this cost table has a level of detail similar to that which appears in the original Project Report and Loan Proposal (Documents PR-969 and 969-A). The table shows the present financial cost at June 1984.

2/ Shows the portion of contingencies and escalation to date, distributed in the corresponding categories.

3/ The sum of the two columns is equal to the present cost of the project.

4/ An explanation of the reasons for the cost differences appears in paragraphs 3.23-3.28 of the Project Report.

2. Bases for Cost Calculation

- 3.08 To estimate the costs of the dam, the value of the contract with Agromán Empresa Constructora, S.A. was used, since it is a work already being constructed. The figures have been updated to June 30, 1984, for which purpose the cost incurred to date was adjusted to include escalation, in accordance with the price adjustment formula stipulated in the contract. To this was added the cost of what remained to be executed, updated to 1984, plus a price escalation equal to that of the projected international inflation. A similar procedure was used to calculate the cost of the Operations Building and Access Road, which works are under construction and close to completion.
- 3.09 With respect to the irrigation area, the costs of the civil works of the irrigation and drainage systems and roads have been taken, in accordance with the reference budget prepared by CEDEGE for the works tender, updated to June 30, 1984; added to these costs were those for electromechanical equipment of the irrigation and drainage pumping stations, provision and installations. To these costs were added price escalations, in accordance with the international inflation rate expected during the construction period.
- 3.10 The cost of the engineering, administration and contingencies category was calculated on the basis of the executing agency's past experience of contracts signed to date with various consultants, on which basis the outstanding consultancy was estimated. Likewise, on the basis of the cost of contracts concluded the cost of the equipment and machinery, land preparation and cost of expropriation and resettlement were updated.
- 3.11 A provision of 5% was made for contingencies in the portions of categories I, IV and V that have yet to be executed, and of 10% for those of categories II and III.

3. Financing

- 3.12 The additional financing of the Bank would be granted in its entirety in foreign exchange, chargeable to interregional capital and would amount to US\$175 million. The recommendation to grant this amount of new financing is the result of : (i) the updating of the total cost of the project; (ii) the current financing plan, which would imply a local counterpart contribution of US\$228.7 million for the next 4 years; (iii) the possibilities of the country of having such an amount for completing the project; (iv) the criterion of establishing a loan amount that is consistent with the objective of ensuring the completion of the project under a realistic and adequate financing plan; and (v) the disbursement schedule provided for.
- 3.13 The following table shows the pertinent breakdown.

Financing Table

(In US\$ millions)

| | <u>External Financing</u> | | | | <u>Total Ex- ternal</u> | <u>Local Contri- bution</u> | <u>Total</u> |
|---|---------------------------|--------------|---------------|-------------------|---------------------------------|-------------------------------------|--------------|
| | <u>58/IC</u> | <u>32/VF</u> | <u>610/SF</u> | <u>New IC</u> | | | |
| 1. <u>Engineering, Administration and Supervision</u> | 4.15 | - | 8.90 | 5.06 | 18.11 | 15.31 | 33.42 |
| 2. <u>Direct Costs</u> | 43.95 | 15.50 | 37.50 | 97.55 | 194.50 | 9.86 | 204.36 |
| 2.1 Roads, Camps and Other | 4.45 | - | - | 2.49 | 6.94 | 4.13 | 11.07 |
| 2.2 Dam | 39.50 | 1.1 | 36.80 | 62.07 | 139.47 | 5.73 | 145.20 |
| 2.3 Irrigation Area | - | 14.40 | 0.70 | 32.99 | 48.09 | - | 48.09 |
| 3. <u>Equipment and Machinery</u> | 0.25 | 0.10 | 0.90 | 1.56 | 2.81 | 0.05 | 2.86 |
| 4. <u>Land Redistribution</u> | - | - | - | 6.80 | 6.80 | - | 6.80 |
| 5. <u>Associated Costs</u> | 1.65 | - | - | - | 1.65 | 21.28 | 22.93 |
| 6. <u>Finance Charges</u> | - | 5.00 | 2.20 | 52.59 | 59.79 | 31.61 | 91.40 |
| 6.1 Interest | - | 4.70 | 1.50 | 50.84 | 57.04 | 23.79 | 80.83 |
| 6.2 Commitment Fee | - | - | - | - | - | 7.10 | 7.10 |
| 6.3 ISF | - | 0.30 | 0.70 | 1.75 | 2.75 | 0.72 | 3.47 |
| 7. <u>Unallocated</u> | - | 4.40 | 20.50 | 11.44 | 36.34 | 4.89 | 41.23 |
| 7.1 Contingencies | - | 2.50 | 3.90 | 9.13 | 15.53 | 2.03 | 17.56 |
| 7.2 Escalation | - | 1.90 | 16.60 | 2.31 | 20.81 | 2.86 | 23.39 |
| Total | 50.00 | 25.00 | 70.00 | 175.00 | 320.00 | 83.00 | 403.00 |
| | ===== | ===== | ===== | ===== | ===== | ===== | ===== |
| Percentage | 12 | 6 | 17 | 43 | 79 | 21 | 100 |

3.14 The resources of the new financing would be used to increase the contribution of the Bank in the engineering and administration category and in that of direct costs, which would be financed almost entirely, as well as the equipment and machinery category and that of land preparation. In addition, the resources of the Bank would also finance the corresponding contingencies and escalation, as well as interest during execution of the project, of loans 610/SF, 58/IC and the new IC financing.

IV. EXECUTION OF THE PROGRAM

A. Execution Mechanism

- 4.01 The project is being executed by CEDEGE, through an executing unit especially established for that purpose. The works of the dam and the reservoir, as well as the access road to the dam and the construction of the operations building, were distributed in four contracts, three of which, with exception of that for the cleaning of the reservoir, have so far been signed. The works for the construction of the infrastructure of the irrigation system, which could be tendered for in one or two contracts, would also be contracted with a specialized firm or consortium. The supplementary activities relating to the irrigation works, such as land preparation, promotion, relocation and redistribution of plots, are being executed with the support of other institutions with which pertinent agreements have been signed: IERAC, INIAP, BNF, MAG, INERHI, PNA, ENAC, EAMP-G, INECEL. 1/ For the supervision of the dam and reservoir, as well as for the irrigation infrastructure, provision has been made for the contracting of specialized consulting firms (in the first case already contracted).

B. Status of Feasibility Studies and Designs

- 4.02 The feasibility studies and designs for the dam tender were prepared by the consortium TAMS-Agrar-Integral (United States, Germany and Ecuador), the feasibility studies having been delivered in July 1978 and the designs in November 1980. The designs at the construction level were prepared in 1981, parallel with the tenders, and were the responsibility of TAMS-Integral. All these studies have been approved by the Bank.
- 4.03 The designs at the tender level for the construction of the civil works of the irrigation and drainage system for the 17,000 ha. were prepared by CEDEGE, with the support of national consultants in specific aspects and were approved by the Bank and INERHI, in accordance, in the last-mentioned case, with the provisions of the Water Law. In addition, CEDEGE prepared preliminary studies for the electromechanical designs of the irrigation and drainage pumping stations and in the second half of this year plans to contract individual consultants for the designs and technical specifications. It is estimated that the time required for the execution of this work will be approximately 3 months and it is foreseen that the bidding documents will be available by the end of this year.

1/ Details of the state of advance and fulfillment of the agreements appear in section B.2 of Chapter IV of the Project Report.

C. Present Status of Execution

1. Executing unit

4.04 Pursuant to the Resolution of the Board of Directors of CEDEGE dated September 1980, the Executing Unit of the Project was established and immediately began to operate. This unit is responsible for programming, directing, executing and supervising the construction of the project, the execution and coordination of the institutional activities incumbent upon CEDEGE, and the programs for the operation and maintenance of the works. It is answerable to the Board of Executive Directors of CEDEGE. It consists of four Directorates: Dam, Irrigation, Hydroelectric Plant and Agricultural Development and Resettlement. It has a staff of approximately 80 persons distributed as follows: 4 managers, 35 professionals, 10 technicians, 14 administrative personnel, 6 service personnel and 10 day laborers. To organize it appropriately, a consultant was contracted, as provided for in the project. It is estimated that its technical level is adequate and that it has sufficient personnel for the level of advance of the project. Once the agricultural phase of the project begins, it is expected that it will be necessary to strengthen the personnel for that purpose and that once the infrastructure being constructed enters into operation, it will be necessary to further strengthen the institution and the Executing Unit. Pertinent details appear in section B.1 of Chapter IV of the Project Report.

2. Contracting of goods and services

(a) Tenders awarded with contracts under execution

4.05 Construction of the dam. In March 1982 the contract was signed with a Spanish firm Agromán, Empresa Constructora S.A. (this contract is being financed in part out of IDB resources) for the construction of the dam whose execution period is estimated at 6 years with effect from the month and year mentioned above. The weighted advance to date is 30% and is in accordance with the execution plan provided for in the contract although there is a delay of almost 2 years with respect to the original PEP that was approved as a condition precedent to the first disbursement, which is due to the delay in contracting the works caused by the delay in the preparation of the construction designs that, when the original financing was approved, were not completed, as stated in paragraph 4.07 of document PR-968. The supervision of the works is the responsibility of the consortium composed of the firms TAMS-Integral.

4.06 The contract includes the execution of the following works:

- (a) Discharge works, consisting of the following components, to which is added a portion of the percentage advance of excavation in relation to the total provided for; (i) upstream portal (97%); (ii) downstream portal (97%); (iii) tunnels Nos. 1 and 2 (100%) and 49%

of advance in the concrete work. The provisional diversion of the river, through tunnel No. 2, took place on July 30, 1984 after which the dam foundation works began;

- (b) Stilling pool. Twenty per cent of the total for the stilling pools of the tunnels has been poured;
- (c) Intake structure. The cement used amounts to 20% of the total and the reinforcement placed to 38%;
- (d) Divider dike. The advance in the excavation amounts to 30% of the total;
- (e) principal dam and auxiliary dam. Machine moving activities, building of embankments and excavation of abutments have been carried out.

4.07 Access road to the dam site: This road was awarded to the national firm of "R y H Construcciones y Equipos". In October 1983 CEDEGE decided to cancel the contract and transfer it to Agromán because of the delay in the advance of the works and the financial situation of the R y H enterprise. At present the road is completed to the subbase level and, in the dry season of this year, the base and the asphalt treatment will be completed. The physical advance is presently estimated at 80%.

4.08 Contractor's camps. It was included in the contract with Agromán. So far, the work connected with the camps, offices, access roads and appurtenant works are completed. Operations Building, which will be used to accommodate the supervisory and inspection personnel began to be constructed in November 1981 by the national firm INARQ, which showed itself to be unsatisfactory and that, coupled with climatic problems, has resulted in a physical advance to date of 90%. It is expected to be completed by December 1984.

(b) Tenders in process

4.09 Irrigation and drainage system for 17,000 hectares. In March of this year calls for bids were published and 14 prequalified firms and consortia originating from Ecuador and another 10 member countries of the Bank were invited to submit bids. The bids were opened in June 1984 and at the date of the preparation of this document the Bank was analyzing the recommended award made by the Tenders Committee of CEDEGE. The contract includes the construction of: (i) supply and drainage channels; (ii) roads, dikes and masonry structure; and (iii) civil works of the irrigation and drainage pumping plants. In accordance with the bidding documents, the execution period of the contract will no be more than 40 months. For the supervision of the works, five firms have been invited to put in bids for services and it is believed that the consultants selected will be contracted at the end of this year.

(c) Tenders pending

- 4.10 The following are the tenders that are still pending and the time limits provided for their contracting are as shown:

| <u>Tender</u> | <u>Amount</u> <u>(US\$ thousands)</u> | <u>Estimated</u> <u>Date</u> <u>Contracting</u> | <u>Estimated</u> <u>Date</u> <u>Completion</u> |
|--|--|---|--|
| Cleaning Basin | 1,700 | 2nd sem./85 | 1st sem./87 |
| Pumping equipment | 10,200 | 2nd sem./85 | 1st sem./87 |
| Maintenance and operating equipment | 2,500 | 1st sem./87 | - |
| Land preparation | 6,800 | 1st sem./87 | 2nd sem./87 |

3. Contracting of consulting services

- 4.11 The following consulting services provided for in the project, in addition to those required for the supervision and completion of the designs, have been contracted and executed: (i) cooperation for the organization of the executing unit; (ii) Board of Consultants; (iii) preparation of the agricultural development plan by ECLA/ILPES (ATN/SF-1810/EC); (iv) environmental impact study; (v) advisory assistance in preparing the methodology for the ex post evaluation, executed by IICA; and (vi) in October of this year the firm for the institutional strengthening of CEDEGE (clause 6.15) was contracted. In addition, four studies have been added under the new financing, one for the preparation of the designs for the construction of the irrigation and drainage system for the 33,000 ha, which represents the third stage of the program which may be executed by Spain's Centro de Estudios Hidrográficos, another for completing the environmental plan (see section D of this Chapter) and a third for designing a multivariate simulation model of the reservoir, plus another corresponding to the mathematical model for operation of the Daule-Peripa reservoir with the rest of the interconnected system in conjunction with INECCEL. In all cases, the contracts would be let in accordance with procedures acceptable to the Bank (see Appendix IV-2 of the Project Report).
- 4.12 The studies for the preparation of the designs of the 33,000 ha cover a period of 20 months and it is recommended that they be contracted within a period of six months from the date of the signature of the loan contract (see Recommendations) and that five months after the signature of the consultancy contract the consultants present a technico-economic report in which they provide evidence that the solution proposed at the preliminary design level represents a least cost solution selected from among feasible technical alternatives (see Recommendations). The initiation of the final design stage would be subject to the approval of that report. The studies for the multivariate simulation model will

also have to be contracted within the period of six months from the date of the signature of the contract (see Recommendations).

4. Sites, resettlements and land distribution

- 4.13 For the construction of the dam and the camps it was necessary to expropriate about 560 ha, which was done in 1980-1982. The area to be occupied by the reservoir covers a total of approximately 30,000 ha; for that purpose, a Ministerial Decision was issued in February 1982, declaring that area to be an intervention and expropriation area. Up to the end of June 1984, judgments on the expropriation of approximately 2,600 ha have been issued and another 4,800 ha have been measured and valued.
- 4.14 In fulfillment of contractual clause 6.16 (a) of loans 610/SF-EC and 32/VE-EC, CEDEGE submitted to the Bank for approval in November 1981 a plan of agricultural settlements in the irrigation area whereby those properties which in accordance with the law were not adequately farmed would be expropriated and would be distributed among farmers that have plots of less than 6 ha in order to achieve economic units that will make the full development of campesino families possible. 1/
- 4.15 In view of the advisability of avoiding any action that might involve major changes in land distribution as a result of the construction of these works, it is recommended that the contract for the new financing include a clause whereby the borrower undertakes to take the necessary measures, to ensure that, prior to the first disbursement of the loan, legal provisions are enacted to prohibit the sale of property and the constitution of encumbrances in the project area and to permit IERAC to promptly occupy plots that may be the subject of redistribution (see Proposed Resolution). In addition, within 12 months from the signature of the prospective loan contract, the borrower would undertake to submit, through CEDEGE, a definitive program for the expropriation of plots and settlements in the irrigation area of the project that includes the detailed schedule of expropriations and awards, in accordance with the plan presented by CEDEGE in fulfillment of clause 6.16 of loan contracts 610/SF and 32/VF-EC (see Recommendations). In addition, the borrower would present annually, beginning in the second year from the signature of the loan contract, reports on the progress made in the execution of the expropriations plan until the end of the fourth year from the signature of the contract, when that report would be final, giving an account of the activities carried out to fully implement the plan set forth in the above mentioned clause (see Recommendations). In accordance with the current situation of clause 6.19 of loan contracts 610/SF and 32/VF-EC, the borrower, through

1/ Appendix IV-6 of the Project Report contains a financial analysis of the income of farmers owning 6 ha, which shows that this size is the economic minimum for supporting a campesino family.

CEDEGE, will have to provide evidence in April 1985 that it has completed the plan for the expropriation of plots in the irrigation area and has implemented the plan of provisional settlements for the cooperatives and beneficiaries (see section E of Chapter IV of the Project Report). After the new financing is approved, this clause is expected to be extended to 1988.

D. Environmental Impact

- 4.16 The ecological impact of the project has received special attention by CEDEGE and the government. To study its impact, a consultant was contracted in accordance with the pertinent clause in the loan contract. His recommendations have been supplemented with an analysis and short and long-term plans prepared by CEDEGE in cooperation with TAMS-AHT-INTEGRAL. Thus, the operation of the dam and the reservoir include provisions for the protection of the flora and fauna and a program for cleaning the vegetation that will be flooded so as to prevent any adverse effect of the decomposition of organic matter, together with the conservation of the habitat of the forests and the river. Provision has also been made for the establishment of a laboratory to control the quality of the water in the reservoir and in the irrigation areas.
- 4.17 As a result, complementary and more specific studies have been identified that call for the contracting of consultants and the establishment of groups of national experts, who together will prepare studies. They would be contracted six months after the signature of the contract (see section D, Chapter IV of the Project Report and Recommendations). The consultants required for making the studies of this environmental plan would be selected in accordance with the procedures acceptable to the Bank (Appendix IV-2 of the Project Report). The total time required for that purpose would be 30 months although each study has a defined duration: (i) water quality, 18 months; (ii) impact of agrochemicals on hydrobiological resources, 12 months; (iii) management of renewable resources and of the plan for the occupation of the space of the hydrographic system, 15 months.
- 4.18 To ensure that the recommendations made are implemented within the period of six months from the approval of the final report on the studies of the environmental plan, the borrower, through CEDEGE, will present a plan and schedule for that purpose (see Recommendations).
- 4.19 The impact of the Daule-Peripa project on the supply of potable water to Guayaquil has two considerations: (i) the regulation of the runoff system of the Daule river, which would reduce the intrusion of saline water and pollution caused by the ebb tides in low-rainful years; and (ii) the presumed deterioration in the quality of the water of the river due to pollution from runoffs from agricultural irrigation with the inevitable carriage of agrochemical products and possible industrial wastes, which could achieve alarming levels. However, this effect will

be attenuated by the regulation that the project would provide for, since the regulated flows of the river will be greater than the low water flows without the project. It should also be pointed out that the consumption of agrochemicals corresponding to the patterns of cultivation expected in the project area, fundamentally rice, is substantially less in quantity and in quality than those of other products cultivated in the area such as bananas, corn and soja beans.

- 4.20 In addition, since the project favors organized agricultural activity, control measures and pesticide management can be adopted. As a result of these preventive and corrective measures, it can be reasonably stated that as a result of the project the capacity to guarantee that the quality of the water for drinking purposes can be maintained within the abovementioned standards is assured.

E. Fulfillment of Contractual Clauses

- 4.21 With the exception of that relating to the presentation of financial statements audited to the satisfaction of the Bank, the contractual clauses established in the loans granted are up to date, although in several cases it has been necessary to extend the time limit for their fulfillment.
- 4.22 The following clauses corresponding to the execution of the project and important for that purpose will have to be fulfilled in the future:

| <u>No.</u> | <u>Clause</u> | <u>Date</u> | |
|------------|---|-------------------|-------------------|
| | | <u>Original</u> | <u>Extended</u> |
| 6.15 | Contracting of consultants for institutional strengthening of CEDEGE | Apr. 82 | Oct. 84 |
| 6.17 | Operating regulations reservoir | Apr. 84 | Apr. 86 |
| 6.18 | Evidence possession reservoir area and relocation of expropriated habitants completed | Apr. 84 | Apr. 86 <u>1/</u> |
| 6.19 | Evidence of completion of plan for expropriation of land in irrigation area and implementation of plan for provision of settlements | Apr. 85 <u>1/</u> | |

F. Execution Period

- 4.23 The disbursement period is estimated at four years from the date of the signature of the contract, as a result of which 1988 would be maintained as the date for the completion of the project. This is based on the fact that the contract signed for the construction of the dam which so

1/ It is believed that these deadlines will be extended after the new financing is approved.

far is advancing at a normal pace and in accordance with the schedule provided for, has an execution period of six years from the date of the signature of the contract in 1982. In turn, the contract for the execution of the irrigation infrastructure, which will have to be awarded this year, has an execution period of 40 months so that this contract will have to be completed by mid-1988.

V. THE BORROWER AND THE EXECUTING AGENCY

- 5.01 The borrower will be the Republic of Ecuador and the executing agency, CEDEGE. This agency was established under Supreme Decree 2676 of 1965. Its purpose is to carry out investigations and prepare studies as well as to execute programs, projects and other works considered necessary for the comprehensive development of the Guayas basin and the Santa Elena peninsula.
- 5.02 The institution has approximately 400 employees, of which 43% consists of managerial, professional and technical personnel. It has just entered into a contract with a consulting firm for the technical cooperation provided for in the current loans for institutional strengthening, whose terms of reference have been reviewed and approved by the Bank. They also include a study on the human resources of the institution. The execution period of the study is one year.
- 5.03 CEDEGE assets consist of: (i) budgetary appropriations; (ii) appropriations of regional institutions; (iii) internal and external loans; and (iv) income from the operation of works, rates, and other services rendered.
- 5.04 The local counterpart resources will be provided by BEDE, through a loan that it will grant the government, which would transfer the resources to CEDEGE as contribution.
- 5.05 The local contribution disbursed to date amounted at the end of September to approximately US\$30 million. Furthermore, recently CEDEGE obtained financing in the amount of s/1,500 million (approximately US\$24 million) from the government, via BEDE, for the local counterpart requirements of which US\$5 million are included in the aforementioned US\$30 million and US\$19 million remain to be disbursed. Since the total amount of the counterpart would now be reduced to US\$83 million, if this financing is approved, an additional amount of US\$34 million would be needed to complete the project. 1/

1/ See Special Aspects.

VI. JUSTIFICATION OF THE PROJECT

A. Technical Feasibility

- 6.01 During the updating of the analysis of this project, a review was made of the aspect relating to the availability of water from the Daule-Peripa reservoir for satisfying the needs resulting from the different stages of the comprehensive development program, namely: irrigation of 50,000 ha in the Daule Valley, irrigation of 50,000 ha on the Santa Elena peninsula, generation of between 400 and 500 Gwh, inter-basin transfer of water to the province of Manabí and the Vinces basin, supply of drinking water to Guayaquil, and control of the saline intrusion due to the effects of the tides at the site of the intake and dilution flows for lowering the concentrations of agrochemicals in the irrigation return water.
- 6.02 With respect to water quality, the flows generated in the reservoir make it possible to ensure that the regulation of the river will have positive effects from the point of view of the control of salinity and dilution of the sewage that is discharged into the river in Guayaquil and other population centers.
- 6.03 In addition, since the project favors organized farming, the adoption of measures for the control and management of agrochemicals would be facilitated through legal regulations limiting their use.
- 6.04 To determine the corrective and preventive measures necessary for the optimal management of the natural resources of the project and guaranteeing the quality of the water for multiple purposes, in particular for the supply of drinking water, financing is included for the preparation of studies at the feasibility level for the environmental plan, which includes research and specific studies on water quality.
- 6.05 The contractor in charge of executing the dam works has demonstrated considerable capacity in conducting his activities. Although the contract began with a delay of two years, due to difficulties arising from delays in the tendering process and the award of the works, the present advance of the works is on schedule; the deviation of the river, which represents one of the principal activities, has already been completed. The present advance indicates that the execution period envisaged for this contract is adequate.
- 6.06 The firm responsible for the supervision of the works is carrying out its work effectively and has given effective support to the executing unit and the relationship between the parties is a smooth one.
- 6.07 The contract for the execution of the works for the irrigation and drainage system is about to be awarded. The firms selected, which were

invited to present bids, were not objected to by the Bank and represent firms and/or consortiums with adequate experience in this field. Pertinent measures should be adopted to ensure that the schedule is fulfilled as provided, since the period of 40 months established in the specifications for the execution of the works may be adjusted, depending on the climatic conditions during that period.

- 6.08 The contracting of the supervision of these irrigation and drainage works is at the selection stage. The Bank has not objected to the list of firms that has been invited to present bids, and the period for their presentation expires at the end of November 1984.
- 6.09 The cost estimates were reviewed in detail, taking into account both the statements of expenditures already presented by the contractors, for the purpose of establishing the portion already executed, and the aspects that affect the estimates of the portion to be executed.
- 6.10 In accordance with what was stated concerning the state of advance of the contract for the dam and concerning the contract for the construction of the irrigation and drainage system, it is estimated that the period for completing the execution of the project, four years from the date of the signature of the contract for this new financing, is sufficient for its conclusion. Furthermore, the measures adopted in relation to these aspects that affect the management and operation of the hydroelectric plant, as well as the state of advance of the designs of that plant, indicate that the construction of this plant, which constitutes stage II of the program, will be able to be begun in sufficient time to enter into operation at the required time. Likewise, pertinent measures are being adopted in connection with the studies for the construction of the irrigation and drainage system for the 33,000 ha on the right bank, which constitutes stage III of the program.

B. Institutional and Financial Feasibility

1. Institutional feasibility

- 6.11 Since its establishment, CEDEGE has been executing studies and infrastructure projects in its area of influence, particularly the Babahoyo project financed in part with IDB resources through loan 337/SF-EC, and has been supervising the studies and execution of the Daule-Peripa project. In that period, the institution has gained significant technico-administrative experience, which has enabled it to execute large-scale projects relatively successfully.
- 6.12 In addition to the physical execution of the project works, supplementary activities are required to support production in the area of the project and thus maximize the economic benefits. To that end, CEDEGE has signed agreements with public institutions that are helping to strengthen technical assistance services, campesino organization, research, marketing, etc. These agreements have been developing normally and in accordance with the advance and the needs of the project.

- 6.13 The CEDEGE shows certain administrative weaknesses, especially in the accounting-financial area and in the operation of the Babahoyo project. To strengthen these areas, a consulting firm is being contracted and will begin work in early 1985.
- 6.14 The physical execution of the project is developing satisfactorily, and is being supported by an experienced consulting firm. In addition, studies on phase II of the hydroelectric plant are being made and, within this financing, provision is made for the studies of phase III of the 33,000 ha under irrigation.

2. Financial feasibility

(a) Local contribution

- 6.15 It is estimated that the local counterpart resources that will have to be disbursed by the end of 1984 would amount to US\$30 million and that, when added to the 1,500 million sucres (equivalent to US\$24 million) of the domestic loan granted by the Development Bank of Ecuador (BEDE) in 1984, of which US\$5 million have been disbursed, the additional local counterpart resources required will amount to US\$34 million.
- 6.16 The counterpart resources for this project represent, of the total projects financed out of IDB resources, 51%, 40% and 54% of the commitments of the local contribution for the years 1984, 1985 and 1986, respectively.
- 6.17 In 1980-1984, the government has contributed the equivalent of approximately US\$30 million to the project; in addition, as a result of the BEDE financing, resources for the rest of 1984 and for 1985 are ensured. For the subsequent years the government, through its budget or by means of domestic financing, will contribute the necessary resources since the project is a priority project for the development of the area in particular and of the agricultural sector of the country in general and therefore no problems are expected in promptly obtaining those resources.

(b) Rates that cover operating and maintenance costs and amortization of the investments

- 6.18 As a first approximation, the calculation of the rate, including the amortization of the investment, includes only the investments for the irrigation works. To that end, two situations were considered: the first taking a amortization of 40 years corresponding to the useful life of these works and the second, based on a scale of rates used by INERHI in accordance with the Water Law, of 75 years. The rates so calculated would be as follows:

| <u>Project</u> | <u>Annual Rate (\$/ha/year)</u> | |
|--------------------|---------------------------------|-----------------|
| | <u>40 years</u> | <u>75 years</u> |
| 17,000 ha | 245 | 185 |
| 33,000 ha | <u>225</u> | <u>174</u> |
| Average Irrigation | 235 === | 179.5 ===== |

- 6.19 According to the estimates in Appendix VI-2 of the Project Report, the net income per ha excluding irrigation rates will be approximately US\$750-850 ha/year in the period when the project is in full operation.
- 6.20 In view of the rate structure and the amortization of investments in 75 years, it is clear that the rate would not produce sufficient funds to service the debt; however, once the loans are amortized, financial surpluses would be produced.
- 6.21 It should be emphasized that the potential financial impact estimated does not include possible future income that would mitigate it. In the first place, since the size of the dam makes it possible to expand the irrigated area beyond the 50,000 ha considered here in the Daule Valley, the eventual incorporation of additional areas will increase the income of CEDEGE, since these will have to contribute their corresponding share to the amortization of the dam and thus reduce the necessary fiscal contributions. Furthermore, when the fiscal contributions for the project are taken into account, it should not be ignored that these, in turn, will help increase the fiscal income as a result of the mere application of the tax legislation in force in the country, which aspect has not been quantified.
- 6.22 In view of the foregoing considerations, it is necessary to design an adequate rate structure which, taking into account the payment possibilities of the different sizes of parcels, maximizes the income of the project from rates. (See proposed resolution and Recommendations).

C. Economic Feasibility

- 6.23 The analysis made consists in a comparison of the direct economic benefits generated by the multiple uses of the water stored in the dam with the economic costs corresponding to the execution of the program in its first three stages mentioned in the foregoing paragraphs. The multiple uses to which reference is made have been basically reduced to three, since they are the only ones with immediate possibilities of development. They are: (i) irrigation and flood control in the river Daule Valley, financed in part on this occasion; (ii) the generation of electricity by the future hydroelectric plant provided for in the next stage; and (iii) provision of water for domestic consumption in the metropolitan area of Guayaquil.

6.24 In view of the complexity of the project, the results of the analysis of each one of the components are presented separately and jointly with the dam. Therefore, we have the following analytical variants. 1/

(a) The Daule-Peripa project: first three stages, namely: (a) dam; (b) irrigation area (50,000 ha in the Daule Valley); (c) hydroelectric plant; and (d) drinking water.

(b) The project that is at present the subject of the financing by the Bank, both the original and the supplementary proposed in this document: (a) dam; and (b) irrigation area: 17,000 ha on the right bank of the river Daule.

(c) Separate components: (a) irrigation area right bank (17,000 ha); (b) irrigation area left bank (33,000 ha); and (c) hydroelectric plant.

1. Agricultural benefits

6.25 Once production is consolidated in the year 2000, the total project would produce each year 330,000 tons of husked rice. It is estimated that approximately 100,000 MT would be surplus and available for export. The years for which the largest exportable surpluses are projected are 1992-1996, because of the lower level of consumption; the surplus varies between 158,000 and 169,000 MT. Appendix VI-5 shows the balance between production and consumption and the exportable surplus for each year.

6.26 The production corresponding only to the irrigation project at present being financed on the 17,000 ha on the right bank would amount to 100,000 tons of husked rice from 1995 onwards.

6.27 With respect to the other crops, the consolidated production for the total project would amount to 21,350 tons of corn, 3,800 MT of soybeans, 20,000 MT of tomatoes, 8,500 MT of castor beans, 12,000 MT of cotton, 10,000 MT of beans and 1,500 MT of sorghum. Similar outputs of the various products on both banks of the river are expected.

6.28 In terms of economic benefits for the farmers, this increased production means an average increase in income of approximately US\$4,115 for the 2,719 farmers on the right bank, although the range varies from less than US\$1,000 to more than US\$30,000 for the case of owners of more than 50 ha. Most of the beneficiaries are members of cooperatives and small owners and tenants with less than 20 ha, whose individual incomes would increase by approximately US\$2,820. The distribution of the benefits is deemed to be reflected by the distribution of land since there are no

1/ The term "analytical variante" means a specified set of investments whose costs and benefits are analyzed in each case.

major economies of scale in the range under consideration. This distribution is represented in the Lorenz curve for the area of 17,000 ha, for which the Gini coefficient is 0.68.

2. Benefits attributable to the Daule-Peripa Hydroelectric Plant

- 6.29 The least cost analysis of the expansion of the capacity of the system indicates that Daule-Peripa is better than other alternatives for supplying a given demand, but it does not establish the economic benefit of supplying that demand; for the purpose of estimating the contribution of the Daule-Peripa plant to the system, the economic value of the energy sold by Daule-Peripa was estimated.
- 6.30 The net present value of the benefits of the plant at a discount rate of 12% annually (without considering common project costs) is US\$12 million, calculated on the average demand assumption; this assumption has been selected as the basis for the estimation of the benefits primarily because it is used by INECEL for its expansion decisions; given the general financial conditions in the country, INECEL has decided to manage demand through the limitation of expansion works for services in new areas. In the case of high demand, a NPV of US\$24.2 million is obtained. The assumed date of entry into operation of the plant under the average demand assumption is 1993.

3. Drinking water component

- 6.31 When the river is regulated, the Daule-Peripa dam generates significant benefits for the sector. First, the necessary flows for satisfying the future demand for drinking water in the metropolitan area of Guayaquil, estimated at 12 m³/s in the year 2000 are ensured. In turn, the operation of the dam ensures the necessary continuous flow for reducing the saline intrusion in the area of the intake of the drinking water system. Finally, the regulated flow provides an additional benefit of ensuring better levels of dilution of the irrigation return waters.
- 6.32 With respect to the last mentioned aspect, CEDEGE compared four alternatives for the supply of water to the metropolitan sector of the city, two of them based on the use of the Daule River with its flow regulated by the Daule-Peripa dam; the third alternative based on the harnessing of underground water available in the Yaguachi-Milagro sector; and the fourth, a mixed alternative that assumes the combined use of regulated water from the Daule River and underground water from the above-mentioned sector. The drinking water benefits incorporated into the cost-benefit analysis reflect a comparison of the least cost alternative, based on the Daule-Peripa dam, with the third alternative, the only one of the four studied that does not require that dam, that is, the saving of the costs of expanding the system due to the project.
- 6.33 The result of this comparison gives the flow of benefits presented in Appendix VI-9, with a net present value of US\$10.1 million.

6.34 Nevertheless, it is important to adopt the measures and mechanisms for monitoring water control and controlling the use of pesticides in order to ensure that the agricultural activities of the project do not lead to the adoption of any practice contrary to the recommendations concerning the use of pesticides, herbicides, and other potentially dangerous chemical elements.

4. Results of the cost-benefit analysis of the project

6.35 In accordance with the analytical variants mentioned in 6.41, the results of the cost-benefit analysis are presented in Appendix VI-9 of the Project Report. The principal result focuses the total project, based on irrigation and flood control on 50,000 ha, the electrical benefits with economic values of the energy under assumptions of average demand, benefits for drinking water due to the supply of the necessary flows and control of saline intrusion and taking the future costs considering the costs invested to date (end of 1984) as sunk costs. This comparison of incremental benefits and costs of the total project shows an internal rate of economic return (IRER) of 11.7% and a negative net present value (NPV) of US\$-8.5 million.

ECUADOR - DAULE-PERIPA PROJECT
Cost-Benefit Analysis

| <u>Variant</u> | <u>% IRER</u> | <u>NPV at 12% ^{1/} US\$ million</u> |
|---|-------------------|--|
| Total project ^{2/} (Dam ^{3/} + Irrigation + Electricity) | | |
| Future costs ^{4/} | 11.7 | -8.5 |
| Historical costs ^{5/} | 8.8 | -124.2 |
| Incremental investments | | |
| 17,000 ha (Right bank) | 12.3 | 1.4 |
| 33,000 ha (Left bank) | 21.1 | 60.1 |
| Hydroelectric plant | 15.3 | 12.0 |

^{1/} Calculated with a discount rate of 12% in 1984 prices.

^{2/} Consists in the first three stages of the Daule-Peripa program.

^{3/} The dam ensures flood control and provides drinking water.

^{4/} All the costs up to 1984 are considered "sunk costs" (US\$102.2 m. in 1984, equivalent to \$115.7 m. NPV updated to 1984 at 12%).

^{5/} Includes all costs since 1980 expressed in 1984 dollars, adjusted using the United States GNP deflator.

- 6.36 The economic indicators of these two components considered for the immediate future are more positive than the irrigation component on the right bank. While the last mentioned shows a IRER of only 12.3%, marginally positive in terms of the normal criteria of the Bank, a NPV of only US\$1.4 million, largely due to its relatively high state of present development, the future project for the irrigation of the left bank would have an IRER of 21.1% and an NPV of US\$60.1 million.
- 6.37 In addition, the hydroelectric subproject shows an IRER of 15.3% and an NPV of US\$12 million, using the average demand assumption for the valuation of the energy.
- 6.38 Therefore, the analysis made when considering the project as a whole, including the costs already incurred, confirms the conclusions of the original analysis that were used as the basis for approving loans 610/SF-EC, 32/VF-EC and 58/IC-EC. However, given the present situation, and the substantial amount of investments already made and the construction of the dam already begun, the evaluation of the additional investments shows substantially similar results to the normal criteria accepted by the Bank.
- 6.39 Decision whether or not to continue the works must be taken by comparing the results of the analysis made with the costs associated with the suspension of the works in their present state. It should be pointed out that only if the NPV of the costs associated with the suspension of the works were lower than US\$8.5 million could it be argued, in economic terms, not to continue the works. In this regard, the economic implications of technical origin that have not been estimated must be taken into account such as the fact that the river has already been diverted to permit the construction of the dam. Furthermore, it is necessary to consider the financial implications of a unilateral cancellation of the works contract. An analysis of the corresponding clauses suggest that the outlays that would have to be made for removal equipment and personnel, compensation for profits not realized, and the contractual obligation to purchase the equipment and machinery that the contractor has at the worksite, far exceeds US\$8.5 million.

5. Sensitivity analysis

- 6.40 All the variants analyzed were submitted to sensitivity tests in which the benefits, the investment costs, and the operating and maintenance costs were varied one by one while the other two flows were kept constant. The detailed results of this analysis are presented in Appendix VI-10 of the Project Report.
- 6.41 For the total project, excluding the sunk costs, a 10% increase in the benefits would raise the IRER from 11.7% to 12.6% while a decrease in investment costs of the same order would also raise it to 12.5%. The IRER would amount to 12% with an increase of only 4% in the benefits. This could occur as a result of a combination of more intensive use of

the land and slightly higher yields and a greater demand for electricity than that considered.

6. Distributive analysis

- 6.42 The results of the distributive analysis, performed in accordance with Bank procedures whereby public and private costs are itemized, are shown in the following table. They indicate that most of the investments are in the public sector, with minimal recovery of the investment within the lines of the present financing, particularly of the dam, since it was designed to irrigate a substantially larger area than the present 17,000 ha. Details of the methodology used appear in Section C.7 of Chapter VI of the project report (paragraphs 6.110 to 6.114). The analysis conducted shows that 89% of the benefits go to beneficiaries in the low-income group.

ANALYSIS OF THE DISTRIBUTION OF BENEFITS AND COSTS
(In US\$ millions)

| <u>Investment</u> | <u>Private Groups</u> | | <u>Public Sector</u> | <u>Total NPV</u> |
|--|-----------------------|--------------|----------------------|----------------------|
| | <u>Low-Income 1/</u> | <u>Other</u> | | |
| Dam (70 years) 2/ | 0 | -0.7 | -210.6 | -211.3 |
| Irrigation district (40 years) 3/ | -4.6 | -4.7 | - 42.1 | - 51.4 |
| <u>Operation and maintenance (O & M)</u> | | | | |
| Dam 4/ | | -0.1 | - 2.4 | - 2.5 |
| Irrigation district 5/ | -8.2 | -4.5 | | - 12.7 |
| <u>Benefits</u> | | | | |
| Agriculture 6/ | 34.5 | 19.1 | * | 53.6 |
| Water supply 7/ | | | 10.1 | 10.1 |
| Flood control 8/ | 3.0 | | | 3.0 |
| <u>Labor 9/</u> | | | | |
| - Construction | 4.5 | | | 4.5 |
| - O & M | 0.5 | | | 0.5 |
| - Farm | 13.5 | -3.5 | | 10.0 |
| Total | 43.2 | 5.6 | -245.0 | -196.2 |
| | (89%) | | | |

1/ Farmers with less than 20 ha, 64.4% of the area.

2/ A proportion of the investment in the dam, amortized at 70 years without interest, only for parcels of more than 30 ha, assessed in accordance with the part (31.9%), of the dam used for that particular purpose (40% for irrigation, 10% for flood control) and pro-rated for the 17,000 ha irrigation district ($17,000/150,000 = 0.11$ for irrigation; and $17,000/50,000 = 0.34$ for flood control).

3/ Irrigation district, with an amortization period of 40 years without interest, in proportion to the size of the parcel, with a differential rate (paid only by owners of more than 6 ha).

4/ O & M for the dam alone, collected only on parcels larger than 30 ha of the pro-rated area.

5/ One hundred percent of the irrigation O & M paid, in proportion to the size of the parcel, i.e. the cost per ha is the same for all.

6/ Farm benefits in proportion to the size of the parcel, 70% to low-income groups.

7/ Water supply benefits to the public sector resulting from savings in investment.

8/ Flood control benefits, in addition to those received by the irrigation district, to small farmers on banks of the river.

9/ Benefits from unskilled labor, adjusted by the shadow price. To tally the net economic costs, equal parts were added to these benefits for: (i) construction workers and O & M; and (ii) for the economic investment costs and O & M, and then divided between the public and the private sectors.

* The public sector may receive a share of these benefits as a result of its farm price policy, including possible levies on rice exports.

VII. EVALUATION OF LOAN 377/SF-EC

A. General Aspects

- 7.01 Loan 377/SF-EC, granted to the Republic of Ecuador in the amount of US\$20.8 million for a total cost of US\$29.8 million, 1/ was intended for the agricultural development of an area of 11,500 ha in the Babahoyo area and the creation of an infrastructure for rice processing. The execution of the project was the responsibility of CEDEGE.
- 7.02 For that purpose provision was made for the following activities: (a) construction of works for (i) irrigation and drainage infrastructure, (ii) land redistribution, (iii) flood control works (dikes), (iv) internal roads, (v) community centers and housing for the beneficiaries, and (vi) construction of a service center; (b) purchase and installation of a rice processing plant; (c) purchase of agricultural machinery and equipment and vehicles for the operation and maintenance of the project, converted into an irrigation district; (d) provision of support services to production (credit, technical assistance and marketing); (e) purchase and redistribution of land; and (f) organization of cooperatives.
- 7.03 Some of the basic dates are the following:

| | <u>Original</u> | <u>Actual</u> |
|------------------------------|-----------------|---------------|
| Approval ED | Nov. 73 | - |
| Signature contract | Apr. 74 | - |
| First disbursement | Oct. 74 | Jan. 75 |
| Final disbursement <u>2/</u> | Apr. 78 | Jul. 82 |

- 7.04 The delay in the disbursement of the loan, which ended up by being made in 7-1/2 years instead of the 4 years provided for, and the cost increase from US\$29 million to US\$52.2 million (at 12/31/82), which last mentioned aspect was primarily concentrated in the irrigation infrastructure and the rice processing plant, was mainly due to the following factors: (i) problems in the tendering for areas A and B 3/ which were declared null and void on two occasions; (ii) rotation at the managerial levels of CEDEGE and change in priority of the Daule-Peripa project; (iii) lack of accuracy in the topographic studies and changes in the designs of some works; (iv) shortcoming of some contractors; (v)

1/ Amount updated at 12/31/82 = US\$52.2 million.

2/ Approximately US\$1.7 million of the total amount of the loan (US\$20.8 million) was cancelled.

3/ The irrigation area of 11,000 ha is divided in three sections: A, of 5,000 ha, B of 4,000 ha and C of 2,000 ha.

abnormal rainfull conditions during several periods of the execution; (vi) delay in the prompt investment of the counterpart resources by the government and (vii) lack of final designs for the rural construction works at the time of the approval of the financing.

B. Execution Status

- 7.05 The weighted physical advance to date is 85%. The construction of the irrigation infrastructure, drainage, flood control and access roads to the areas that are known as A and B (which are the areas financed by the Bank) and represent 9,000 ha of the 11,000 ha the project includes, are complete. The remaining 2,000 ha which were put out to tender in May of this year (they are being financed out of own resources), could not be awarded because of lack of interest on the part of the firms selected and therefore the new authorities are studying a decision on the subject.
- 7.06 However, of the 9,000 ha of irrigated land only about 4,000 ha will have land preparation and land distribution works ready by the end of this year. For its part, the program of agrarian reorganization and promotion of cooperatives was executed rather completely, for which purpose a total of 13,100 ha, somewhat more than the total area required for the project, were acquired by expropriation through the payment of the corresponding compensation and a total of 25 cooperatives have been organized.
- 7.07 The rice processing plant has just entered into operation. It will be managed by a mixed company of private capital and CEDEGE; it is an integrated complex which, because of its installed capacity and design, is the largest and most modern in the country. Its reception capacity is 100 ton/h, drying capacity 40 ton/h, and storage capacity 30,000 tons. In addition, it has a seed treatment capacity (2 ton/h) and a milling or husking capacity (300 qq/h). Its installation in the center of the project area will have an enormous impact on the future of the region, including on the production of the Daule-Peripa project as regards the quality of the product and the marketing of the rice.
- 7.08 The machinery was acquired in accordance with what was provided for as regards amount, although there were delays in the schedule. The status of the machinery is precarious due to maintenance problems and availability of spare parts, low utilization and operational difficulties. To date, CEDEGE is studying the most advisable method of administration and operation for the future.

C. Results and Conclusions

- 7.09 The goals for the project envisage that, when the land redistribution work was completed, rice production would increase until it amounted to about 75,000 ton. This increase would be due primarily to three factors: (i) a total of 15,000 ha in 8,400 ha physical ha would be sown; (ii) a total of 8,000 ha would be redistributed with a consequent

increase in productivity; and (iii) in areas A and B, two sowings would be made and in area C only one sowing.

7.10 At present the project is benefitting approximately 1,000 families, which is equivalent approximately 8,000 persons in all. Eight thousand hectares are being sown, of which 5,000 are winter and 3,000 are summer. The yield is 42 bags/ha (4.1 ton/ha) higher than the neighboring areas outside the project area, where the yield averages about 35 bags. The total production is 32,800 ton/year of rice, equivalent to approximately 5.5% of the national production. In addition, soyabeans, corn and beans are being cultivated in the area although to a lesser extent.

7.11 However, there are project activities that still have to be completed. They are listed below:

| <u>Goals envisaged</u> | <u>Present status of execution pending</u> |
|---|--|
| Construction irrigation infrastructure on 11,000 ha. | Irrigation infrastructure on 2,000 ha located in area C must be constructed. |
| Construction of redistribution of parcels on approximately 8,000 ha. | Redistribution of parcels for approximately 4,000 ha. must be constructed. |
| Award of land to members of co-operatives and beneficiaries in an area approximately 10,000 ha. | Approximately 7,000 ha. of land must be awarded to members of cooperatives and beneficiaries. |
| Construction of 5 community centers | Five community centers must be constructed. |
| Construction of approximately 1,250 sites with services. | 1,250 sites with services must be constructed. |
| Establishment of an enterprise for the administration operation of the agricultural machinery park. | Procedure for the administration of this equipment must be established or alternative solutions to the present situation must be proposed. |

D. Correction Measures and Measures for Completing the Project

7.12 As was mentioned earlier, at the end of August of this year, a new administration took charge of the institution and during the month of September made a preliminary evaluation of the project. Because of the limited time available for carrying out the work in depth and the complexity of the problems involved, it was agreed with CEDEGE that, before the financing was approved, it would submit to the Bank for information the general lines of the steps to be taken and that, before

the first disbursement of the financing, it would submit a detailed plan for completing each one of the following activities: (i) land redistribution outstanding in areas A and B; (ii) irrigation infrastructure and land redistribution in area C; (iii) final award of land of the three areas that make up the project; (iv) construction of community centers and sites with services; and (v) method of administering and putting into operation the equipment and machinery available and identification of steps to be taken and their respective schedule (see Proposed Resolution).

- 7.13 In fulfillment of the first of these agreements, CEDEGE submitted to the Bank on October 3, 1984, a preliminary plan which is the product of the recommendations of a special committee set up for that purpose. It is considered adequate, and its detail appears in section E of Chapter VII of the Project Report.

PROPOSED RESOLUTION 1/

ECUADOR. LOAN /IC-EC TO THE REPUBLICA DE ECUADOR
(Additional Financing for the First
Phase of the Daule-Paripa
Multipurpose Project)

The Board of Executive Directors

RESOLVES:

That the President of the Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, to enter into such contract or contracts as may be necessary with the República de Ecuador, as borrower, for the purpose of granting it an additional loan to cooperate in the execution of the First Phase of the Daule-Peripa Multipurpose Project. This financing shall be subject substantially to the following conditions:

1. Amount and Currencies: Up to US\$175,000,000, or its equivalent in other currencies which are part of the interregional capital resources of the Bank, to pay for goods and services acquired through international competition in the member countries of the Bank and for such other purposes as may be specified in the loan contract. Payments of amortization and interest shall be made in the currency or currencies specified by the Bank, in a quantity equivalent to the corresponding amount owed, calculated in units of account in terms of dollars of the United States of America, in accordance with provisions to be included in the loan contract.
2. Source of Funds: The interregional capital resources of the Bank.
3. Guarantee: The general responsibility of the borrower.
4. Credit Fee: 1-1/4% per annum on the undisbursed portion of the financing, commencing to accrue 60 days after the date of the loan contract and payable in dollars of the United States of America on the same dates as the interest.
5. Amortization: The borrower shall amortize the loan in a period of 20 years from the date of the loan contract, by means of semiannual, consecutive and, insofar as possible, equal installments. The first installment shall be paid six months after the date scheduled for the last disbursement of the financing. The Bank may credit the amortization installments proportionally to the outstanding balance of each of the portions of the loan which accrue different rates of interest.

1/ The provisions contained in this Appendix will only be final when the Board of Executive Directors has approved the loan proposal.

6. Interest: The Borrower shall pay interest semianually on the outstanding balances of the loan. The first payment shall be made six months after the date of the loan contract. During the disbursement period, the Bank: (a) shall determine the rate of interest to be applied as of the first day of each January and for the life of the loan to any amount disbursed during the ensuing year, and (b) may modify the interest rate, in accordance with the policy of the Bank, to be applied to disbursements of the loan made during the second half of the year. At the request of the borrower, resources of the financing may be used to pay interest during the period of disbursement thereof.
7. Disbursement: The term for disbursement of the financing shall expire 4 years after the effective date of the loan contract.
8. Special Conditions:
 - (a) The resources of the loan shall be utilized in their entirety by the borrower through the Comisión de Estudios para el Desarrollo de la Cuenca del Río Guayas (hereinafter referred to as the "Executing Agency" or "CEDEGE") in coordination with the Instituto Ecuatoriano de Electrificación (INECEL), the Instituto Ecuatoriano de Recursos Hidráulicos (INERHI), the Banco Nacional de Fomento (BNF) and the Instituto Ecuatoriano de Reforma Agraria y Colonización (IERAC) (hereinafter referred to jointly as "cooperating agencies"). If modifications in the legal provisions or the basic regulations concerning CEDEGE and/or the cooperating agencies are approved which, in the opinion of the Bank, may substantially affect the project, the Bank shall have the right to require the borrower and/or CEDEGE to provide explanatory and detailed information in order to determine whether such modification or modifications may have an adverse impact on the execution of the project. Only after hearing the borrower and/or CEDEGE and assessing their information and clarifications, may the Bank take such measures as it deems appropriate in accordance with provisions to be set forth in the loan contract.
 - (b) The resources of the loan, together with the resources of Loans 610/SF-EC, 58/IC-EC and 32/VF-EC, shall be used to participate in the execution of a project estimated at the equivalent of US\$403,000,000. Consequently, the loan contract shall contain such provisions as the Bank deems appropriate to ensure that such national resources as may be necessary, in addition to the loan, for the complete execution of the project shall be duly provided, in an amount estimated at the equivalent of US\$83,000,000, in accordance with a schedule of investments satisfactory to the Bank.
 - (c) Prior to the first disbursement of the loan, the borrower, through CEDEGE, shall submit the following to the Bank's satisfaction:

- (i) the legal instrument relating to the lands of the irrigation area to be used for the execution of the project, through which IERAC: (1) prohibits their transfer and the establishment of liens; and (2) proceeds to the timely occupancy of those lands that will eventually be redistributed; and
 - (ii) a plan, with its corresponding execution schedule, describing the necessary activity required for completing and/or reformulating the goals of the project financed in part through loan 377/SF-EC, which consist of: (1) construction of the remaining works on farms to prepare them for irrigation in areas A and B; (2) construction of the irrigation infrastructure and works on farms in area C; (3) final awarding of all of the lands of the project area; (4) construction of five community centers and of the sites and services; and (5) administration and start-up of the available equipment and machinery. The plan shall include the commitment by the borrower to provide the additional resources which may be required for this purpose.
- (d) The borrower shall agree that the necessary measures, acceptable to the Bank, shall be adopted, so that the rates applied by CEDEGE for the irrigation service in the project areas are sufficient to cover the administration, operation and maintenance costs and, if possible, the depreciation of the system. The rate structure shall be established pursuant to recommendation 8 of Appendix II.
- (e) In the acquisition of machinery, equipment and other materials for the project and in the awarding of construction contracts, the system of public bidding shall be followed in each case in which the value of such acquisitions or contracts exceeds the equivalent of US\$100,000. The bidding shall be subject to the procedures to be attached as an annex to the loan contract.
- (f) The Bank shall establish such inspection procedures as it deems necessary to ensure the satisfactory execution of the project, and the borrower shall extend all cooperation which is required for the most effective accomplishment of this purpose. From the financing, the sum of US\$1,750,000 shall be allocated for credit to the general income accounts of the Bank to meet expenses of general inspection and supervision.
9. Conditional provision: This resolution will enter into force only when the Board of Executive Directors has determined by means of resolution that the Bank has sufficient resources available in the interregional capital to cover the loan authorized by this resolution.

RECOMMENDATIONS

- A. It is also recommended that the following conditions, to be fulfilled to the satisfaction of the Bank, be included in the loan contract in addition to those set forth in the proposed resolution:
1. Prior to the call for bids for each work or group of works or, if bidding is not required, before commencement of those works, the borrower through CEDEGE, shall agree to:
 - (a) submit for the Bank's approval the plans, designs, specifications and other documents required for the construction, and also, if appropriate, the documents pertaining to the call for bids and the respective draft contracts; and
 - (b) submit evidence to the Bank that legal possession or the necessary rights are held on the lands where the works of the project will be built.
 2. The borrower shall submit evidence to the Bank, within the first sixty (60) days of each fiscal year, commencing with the first year of operation of the dam, that it has contributed to CEDEGE the necessary budgetary resources to cover the administrative, operation and maintenance expenses of the dam and of the irrigation district. This obligation shall cease after the borrower has submitted evidence, to the satisfaction of the Bank, that CEDEGE is generating sufficient resources to cover those expenses.
 3. Within six (6) months from the effective date of the loan contract, the borrower, through CEDEGE, shall present to the Bank's satisfaction evidence that it has:
 - (a) established a technical team for preparing the studies of the environmental plan of the project prepared by CEDEGE and acceptable to the Bank that would act as counterpart of the consultants referred to in letter (d);
 - (b) contracted or implemented, in coordination with INECOL, the design of a mathematical model of joint operation of the Daule-Peripa reservoir with the rest of the interconnected national system;
 - (c) completed a plan and schedule for hiring additional personnel to strengthen the Executing Unit in accordance with the project's needs;
 - (d) contracted the consultants to carry out the studies regarding:
 - (i) the impact and effects of the project on the quality of the

water of Daule-Peripa-Guyas hydrographic system; and (ii) the handling and conservation of the renewable natural resources of said hydrographic system;

- (e) contracted the consulting services for the preparation of the final designs for construction of the irrigation and drainage system for the 33,000 has. on the left bank of the Daule River, which will constitute Phase III of the program, with the requirement that, within five (5) months from the signing of the pertinent contract, the consultants shall submit a technical-economic report demonstrating that the solution proposed at the preliminary design level is the least-cost solution selected from among the feasible technical alternatives;
 - (f) amended the existing agreement between CEDEGE and BNF, in order to update the amounts of the loans that will be used for the project area; and
 - (g) completed the studies for designing a multivariate simulation model of the reservoir.
4. Within six (6) months from the approval of the final report of each study and research programmed in the environmental plan referred to in Recommendation 3(a), the borrower, through CEDEGE, shall submit an environmental plan and schedule for executing the recommendations made in each study, which will be implemented upon approval by the Bank. Additionally, the borrower, through CEDEGE, undertakes to: (i) report every 6 months during the two (2) years following initiation of the execution of each of the studies pertaining to the environmental plan, regarding the progress achieved in the implementation of each of them; and (ii) continue to submit said reports, but on a yearly basis, for four years following the two years mentioned in (i) above.
5. Within twelve (12) months from the effective date of the loan contract, the borrower, through CEDEGE, shall submit for the Bank's approval the necessary measures for the implementation of the plan designed by CEDEGE in fulfillment of clause 6.16(a) of loan contracts 610/SF-EC and 32/VF-EC, which are to include a detailed schedule of expropriations and awards in the irrigation zone of the project.
6. The borrower, through CEDEGE, shall undertake to submit to the Bank, within twenty-four (24) months from the effective date of the loan contract and annually during the following two years, reports on the degree of progress in the execution of the development plan referred to in Recommendation 5. The third and last of these reports shall include the recounting of the activities undertaken to fulfill said plan.
7. The borrower, through CEDEGE shall agree to contract within eighteen (18) months from the effective date of the loan contract, consultants for the preparation of, the studies on the impact of agricultural chemicals in the development of the hydrobiological resources of the hydrographic system.

8. The borrower, through CEDEGE, shall agree to submit to the Bank, within twenty-four (24) months from the effective date of the loan contract, the structure of differential rates to be applied in the irrigation area of the project. The tariff structure to be applied to the beneficiaries shall be as follows:
 - (a) beneficiaries with holdings smaller than 6 ha. shall only pay for operating and maintenance expenses;
 - (b) beneficiaries with holdings from 6 ha. to 30 ha. shall pay: (i) operating and maintenance expenses; y (ii) a proportion of recoveries from investments in the system of irrigation and drainage; and
 - (c) beneficiaries with holdings larger than 30 has. shall pay: (i) operating and maintenance expenses; (ii) recovery of investments in the irrigation and drainage system; and (iii) recovery of that portion of investment in the dam chargeable to irrigation.
9. The borrower, through CEDEGE, agrees to submit to the Bank each year for up to three years after the date of the last disbursement of the financing: (a) the comparative annual data that will serve to evaluate the results achieved with the project; and (b) together with the documentation referred to in Recommendation 10, information on the measures adopted the preceding year concerning: (i) institutional reorganization and improvement of CEDEGE; (ii) the implementation of the plan for land owners and provisional and final awards of holdings in the project's irrigation area; (iii) the production-support services that it has provided for credit, technical assistance, research and marketing, (iv) the implementation of the relocation plan for inhabitants in the area of the dam to be flooded; and (v) the development of the state of chemical contamination of the water and its impact on the hydrobiological resources of the hydrographic system.
10. The borrower, through CEDEGE, shall submit to the Bank, at the end of the third and sixth years after the date of the last disbursement, evaluation reports on the project based on the methodology and guidelines agreed upon with the Bank.
11. The financial statements of the project, during its execution and those of the CEDEGE, for a period of ten years from the date of the loan contract, shall be submitted yearly to the Bank, audited by the Contraloría General del Estado pursuant to requirements satisfactory to the Bank.
12. The loan contract shall include an annex with contents substantially similar to those of appendix III (The Project).

THE PROJECT
(Annex A to the Loan Contract)

I. Objectives and Goals

- 1.01 The project consists of the execution of the Phase I of the Daule-Peripa Multipurpose Program for the construction of a dam and reservoir with a capacity of approximately 6 billion cubic meters and the incorporation of approximately 17,000 has. for agriculture through the construction of an irrigation and drainage system.

II. Description of the Project

- 2.01 The project consists of the following works and activities:

(a) Construction of the dam

- 2.02 The construction of the dam consists of the following works: (i) zoned dam of granulated material and an impermeable core of approximately 78 ms. high and approximately 4 million cubic meters of fill; (ii) discharge and diversion works, consisting of the construction of two tunnels of approximately 9 ms. in diameter, one of which (tunnel No. 1) will be approximately 531 ms. long and will serve in the future for the permanent regulation of the flow of the Daule River and the other (tunnel No. 2) will be approximately 490 ms. long and will provide water for the Daule-Peripa Hydroelectric Plant; (iii) spillway for excess, consisting of a pouring structure of three radial gates of 8 x 17 m., with a capacity to discharge up to 3,600 m.³/second; (iv) intake works, consisting of the construction of a concrete tower approximately 77 ms. high with its pertinent intake gates and protective grills at certain levels and an inclined ramp structure and a fixed wheel gate for generation extraction; (v) lateral dike, to contain the water of the reservoir at the level 85 (meters above sea level) and which will extend for approximately 21 km with a height ranging from 5 to 15 m.; and (vi) emergency spillway on the lateral dike, with a capacity of approximately 500 m.³/second.

- 2.03 In addition, construction of the following supplementary works: (i) an operation camp, which includes the construction of 14 houses and a dormitory for 34 rooms; and (ii) an access road to the site of the dam of 16 km.

(b) Irrigation and drainage system

- 2.04 The irrigation and drainage system which will benefit a total of 17,000 net has. located between Colimes and Nobol on the right bank of the Daule River, consists of five independent subprojects named: San Jacinto, Higuerón, Mate, América and Lomas. Each subproject has an intake structure from the river through direct pumping, a water distribution system through lined canals and a network of drainage water sewers.

- 2.05 The works to be built for the irrigation and drainage system consist of: (i) approximately 225 km of irrigation canals; (ii) approximately 170 km of drainage canals; (iii) approximately 263 km of gravel-surface roads; (iv) engineering works; and (v) irrigation and drainage pumping plants.

c) Supplementary activities

- 2.06 The project also includes the following activities: (a) agricultural development; (b) relocation of persons affected by the construction of the dam and the filling of the reservoir; (c) land redistribution in the irrigation area; (d) acquisition of equipment and vehicles needed for operation and maintenance of the irrigation system; (e) preparation of the designs for the construction of the irrigation and drainage system of 33,000 has. located on the left bank of the Daule River; and (f) supplement to the existing environmental studies, including a study of water quality, a study of hydrological resources and a plan to settle the area of the hydrographic system.

III. Total Cost and Financing

- 3.01 The total cost of the project is estimated at the equivalent of US\$403 million, as shown in the following table:

Financing Table
(In millions of US\$)

| | External Financing | | | | | Local | Total |
|---|--------------------|-------|--------|--------|----------------|-------------------|--------|
| | 58/IC | 32/VF | 610/SF | New IC | Total external | Contri- bution | |
| 1. <u>Engineering, Administration and Supervision</u> | 4,15 | - | 8,90 | 5,06 | 18,11 | 15,31 | 33,42 |
| 2. <u>Direct Costs</u> | 43,95 | 15,5 | 37,50 | 97,55 | 194,50 | 9,86 | 204,36 |
| 2.1 Roads, camps and others | 4,45 | - | - | 2,49 | 6,94 | 4,13 | 11,07 |
| 2.2 Dam | 39,50 | 1,1 | 36,80 | 62,07 | 139,47 | 5,73 | 145,20 |
| 2.3 Irrigation zone | - | 14,4 | 0,70 | 32,99 | 48,09 | - | 48,09 |
| 3. <u>Equipment and Machinery</u> | 0,25 | 0,1 | 0,90 | 1,56 | 2,81 | 0,05 | 2,86 |
| 4. <u>Rural Sistemization</u> | - | - | - | 6,80 | 6,80 | - | 6,80 |
| 5. <u>Associated Costs</u> | 1,65 | - | - | - | 1,65 | 21,28 | 22,93 |
| 6. <u>Financing Costs</u> | - | 5,0 | 2,20 | 52,59 | 59,79 | 31,61 | 91,40 |
| 6.1 Interest | - | 4,7 | 1,50 | 50,84 | 57,04 | 23,79 | 80,83 |
| 6.2 Commitment fee | - | - | - | - | - | 7,10 | 7,10 |
| 6.3 Inspection and Supervision Fund | - | 0,3 | 0,70 | 1,75 | 2,75 | 0,72 | 3,47 |
| 7. <u>Unassigned</u> | - | 4,4 | 20,50 | 11,44 | 36,34 | 4,89 | 41,23 |
| 7.1 Contingencies | - | 2,5 | 3,90 | 9,13 | 15,53 | 2,03 | 17,56 |
| 7.2 Escalation | - | 1,9 | 16,60 | 2,31 | 20,81 | 2,86 | 23,39 |
| Total | 50,00 | 25,0 | 70,00 | 175,00 | 320,00 | 83,00 | 403,00 |
| Percentages | 12 | 6 | 17 | 43 | 79 | 21 | 100 |

IV. Bidding

- 4.01 Whenever the goods or services to be contracted are financed totally or partially by foreign exchange from the loan, the procedures and specific guidelines governing the bidding or other forms of acquisition or contracting shall allow for the free competition of goods and services, including those relating to whatever means of transportation, originating from member countries of the Bank. Consequently, those procedures and specific bases shall not include conditions that impede or restrict the supply of goods or services or the participation of contractors from those countries.

V. Selection and Contracting of Consultants

- 5.01 In the selection and contracting of consulting services financed in full or in part out of the loan, no provisions or conditions may be established that restrict or impede the participation of consultants originating in the member countries of the Bank.

VI. A Posteriori Evaluation of Project Results

- 6.01 To fulfill the provisions in regard to the a posteriori evaluation of the results of the project, the following data shall be gathered:

VII. Initial Basic Data

A. Data Relative to the Project Area

1. Number of farms and distribution by size.
2. Total agricultural area, irrigated or not irrigated, by crop, identifying that susceptible to be irrigated.
3. Production and productivity indices by crop.
4. Indices of utilization of input and technology by crop.
5. Structure of land tenancy.
6. Prices for the producer by crop.
7. Availability of basic services (transport, telecommunications, water, education, health, electricity).

B. Data Relative to Individual Farmers

1. Farm area irrigated, not irrigated and susceptible to be irrigated, area utilized for each crop.
2. Farming data by crop: cost per hectare and its composition, use of water, inputs and technology.

3. Production, yield and price obtained per crop.
4. Use of labor: family and contracted.
5. Socioeconomic data: family size, income level, education level, characteristics of housing, possession of capital goods, automobiles and domestic apparatus, access to basic services.

VIII. Comparative Data

A. General Data Relative to the Total Project

1. Investments.
2. Preoperational expenses.
3. Financing.
4. Operation and maintenance charges.
5. Operational income and tariffs.
6. Incorporation of land.
7. Availability and use of water.
8. Assistance services for production and marketing.
9. For the final year of the evaluation the data included in paragraph I.A. shall be updated.

B. Data Relative to Individual Farmers

Annual data shall be presented as from operational start up of the project, for the same categories indicated in paragraphs A(b)1 to 4. For the final year of the evaluation the data included in paragraphs A(a) and A(b)5 shall also be up-dated.

IX. Methodological Aspects

The data to be utilized shall refer to the specific area of the project. A statistically representative sample shall be selected of the farmers working the land. The samples shall be selected at the initiation of operations of the project. The evaluation report shall include an analysis of:

1. Comparison of physical goals foreseen and reached, regarding construction, incorporation of land, productivity and other expected results.
2. Identification of changes in the designs, delays and/or cost overruns and their respective causes.

3. Technical aspects of the operation.
4. Financial aspects of the operation.
5. Cost-benefit of the project.
6. Distributive impact of the project.
7. Conclusions and recommendations.