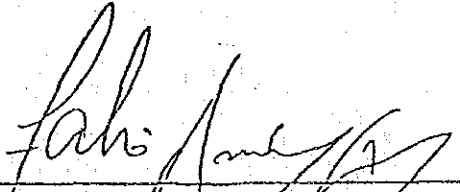



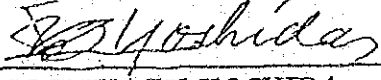
添 付 資 料

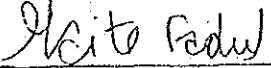
SCOPE OF WORK
FOR
THE FEASIBILITY STUDY
ON
THE SMALL SCALE IRRIGATION PACKAGE PROJECT IN SLOPE AREAS


FABIO BERMÚDEZ GÓMEZ
Director General del Instituto
Colombiano de Hidrología,
Meteorología y Adecuación de
Tierras (HIMAT)


HERNAN VALLEJO MEJIA
Ministro de Agricultura

Bogotá, June 7 , 1985


YOSHIKAZU YOSHIDA
Leader of the Japanese
Preliminary Study Team,
The Japan International
Cooperation Agency (JICA)


MAITE FADUL ORTIZ
Jefe de División de Cooperación
Técnica Internacional, Departa-
mento Nacional de Planeación.

I. INTRODUCTION

In response to the request of the Government of the Republic of Colombia, the Government of Japan decided to conduct the Feasibility Study on the Small Scale Irrigation Package Project in Slope Areas (hereinafter referred to as "The Study"), in accordance with the Agreement of Technical Cooperation between the Government of Japan and the Government of the Republic of Colombia signed on 22 November, 1976. Accordingly the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of technical programme of the Government of Japan, will undertake the Study in close cooperation with the authorities of Colombia. The present document sets forth the scope of work for the Study.

II. OBJECTIVES OF THE STUDY

The objectives of the Study are as follows:

1. To formulate the Project, which will be the model of similar projects in slope areas and verify its technical and economic feasibility; and
2. To undertake on-the-job training and transfer the techn-

logy to the Colombian counterparts in the course of the Study.

III. OUTLINE OF THE STUDY

In order to achieve the objectives mentioned above, the Study shall cover the following items:

1. Study area

This package project consists of 2 sub-projects, Santa Sofia and San Pedro de Iguaque, covering total study area of about 1.500 ha in Boyaca and 2 sub-projects, Caqueza and Fusa-Tibacuy covering total study area of about 1.500 ha in Cundinamarca.

2. Scope of the Study

The activities to be undertaken by the Team will be divided into two stages as follows:

(1) Phase I (Pre-Feasibility) Study:

To conduct the preliminary study on the agricultural development plan to the package project area.

(2) Phase II (Feasibility) Study:

To conduct the feasibility study of the small scale

irrigation package project in slope areas on the basis of the results of the phase I Study.

2.1. Work Plan for the Phase I Study

The Study will cover following items:

- (1) To collect and review the relevant existing data and information including:
 - a. Topography
 - b. Meteorology
 - c. Hydrology
 - d. Geology and Hydrogeology
 - e. Soil
 - f. Irrigation and Drainage
 - g. Agriculture
 - h. Agro/regional economy and institutions
 - i. Others

- (2) To survey in the Study areas including:
 - a. Topographical survey
 - b. Meteorological survey
 - c. Hydrological survey
 - d. Agricultural survey
 - e. Construction material and cost survey

f. Other survey

- (3) To review and evaluate existing and proposed agricultural development plans in slope areas.
- (4) To formulate an agricultural development plan in slope areas.

2.2. Work plan for the Phase II Study based on the results of the Phase I Study.

- (1) To study the following items
 - a. Soil and land classification survey
 - b. Geological survey
 - c. Land conservation survey
 - d. Socio-economic survey
 - e. Regional economic and agro-institutional survey
 - f. Others
- (2) To determine the following basic items for the development plan
 - a. Project area
 - b. Land use
 - c. Cropping pattern
 - d. Water requirements

- e. Irrigation systems
 - f. Estimation of yields
 - g. Agro-institutional plan
 - h. Others
- (3) Formulation of the integrated development plan for the projects
 - (4) Preliminary design of the major structures of the projects
 - (5) Operation and maintenance
 - (6) Preparation of the implementation schedule
 - (7) Estimation of the project costs and benefit
 - (8) Evaluation of the project
 - (9) Recommendation

IV. WORK SCHEDULE

The whole work will be carried out in accordance with the attached tentative schedule (See Appendix I).

V. REPORTS

JICA shall prepare and submit the following reports in English to the Government of the Republic of Colombia.

1. Inception Report Twenty (20) copies
At the beginning of the Phase I Study
2. Progress Report Twenty (20) copies
At the end of the field works of the Phase I Study
3. Pre-Feasibility Report Fifty (50) copies
At the beginning of the Phase II Study
4. Interim Report Twenty (20) copies
At the end of the field survey of the Phase II Study
5. Draft Final Report Fifty (50) copies
Within one (1) month after the end of the Phase II Study

The Government of the Republic of Colombia provides JICA

its comments on the Draft Final Report to JICA office in Bogotá within one (1) month after the receipt of the Draft Final Report.

6. Final Report Fifty (50) copies
- Within two (2) months after the receipt of the Colombian Government comments on the Draft Final Report.

VI. UNDERTAKING OF THE GOVERNMENT OF COLOMBIA

In accordance with the Agreement on Technical Cooperation between the Government of Japan and the Government of Colombia, the Government of Colombia shall accord privileges, immunities and other benefits to the Japanese Study Team.

1. To facilitate smooth conduct of the Study, the Government of Colombia shall take necessary measures.

- (1) To secure the safety of the Study Team.
- (2) To permit the members of the Study Team to enter, leave and sojourn in Colombia for the duration of their assignment therein, and exempt them from alien registration and consular fees.

- (3) To exempt the members of the Study Team from taxes, duties and other charges on equipment, machinery and other materials brought into Colombia for the conduct of the Study.
- (4) To exempt the members of the Study Team from income tax and other charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Study Team for their services in connection with the implementation of the Study.
- (5) To provide necessary facilities to the Study Team for remittances as well as utilization of the funds introduced into Colombia from Japan in connection with the implementation of the Study.
- (6) To secure permission for entry into private properties or restricted areas for the conduct of the Study.
- (7) To secure permission for the Study Teams to take all data and documents (including photographs) related to the Study out of Colombia to Japan. However such information is confidential and can not be used for

purposes different of those of the project without the permission of the Government of the Republic of Colombia.

(8) To provide medical services as needed. Its expenses will be chargeable on members of the Study Team.

2. The Government of Colombia shall bear claims, if any, arises against the members of the Study Team resulting from, occurring in the course of, or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or wilful misconduct on the part of the members of the Study Team.
3. El Instituto Colombiano de Hidrología, Meteorología y Adecuación de Tierras (hereinafter referred to as "HIMAT") shall act as the counterpart agency to the Study Team and also as coordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study.
4. HIMAT shall, at its own expense, provide the Study Team

with following, in cooperation with other relevant organizations:

- (1) Available data and information related to the Study.
- (2) Topographical survey (by the beginning of the Phase I Study).
- (3) Soil survey such as soil group classification and range of infiltration
- (4) Additional survey related to the Study if necessary
- (5) Counterpart personnel
- (6) Suitable office space with necessary equipment in project sites and Bogotá
- (7) Appropriate number of vehicles with drivers in the project area
- (8) Credentials or identification cards

VII. UNDERTAKING OF JICA

For the implementation of the Study, JICA shall take the following measures:

1. To dispatch, at its own expenses Study Team to Colombia.
2. To pursue technology transfer to Colombian counterpart personnel in the course of Study.
3. To provide the equipment necessary for the field work.

VIII. JICA and HIMAT shall consult with each other in respect of any matter that may arise from or in connection with the Study.

APPENDIX I

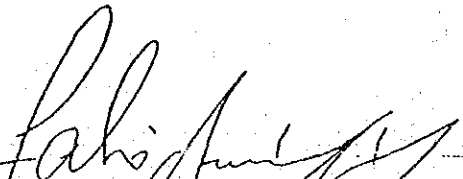
TENTATIVE SCHEDULE

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Field and Office Work in Colombia						—	—	—										
Office Work in Japan				—	—						—	—	—					
Submission of Reports	A Inc. R		A P.R			A Pre. R		A I. R							A I. R			A F. R
Remarks	Phase I Study					Phase II Study												

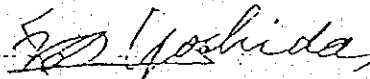
- Inc. R. Inception Report
- P.R. Progress Report
- Pre. R. Pre-Feasibility Study Report
- I.R. Interim Report
- D.R. Draft Final Feasibility Study Report
- F.R. Final Feasibility Study Report

ALCANCE DEL TRABAJO
PARA
EL ESTUDIO DE FACTIBILIDAD
SOBRE
EL PROYECTO GLOBAL DE IRRIGACION
EN
PEQUEÑA ESCALA EN LADERAS
EN
LA REPUBLICA DE COLOMBIA

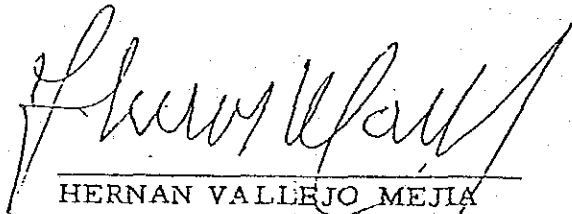
Bogotá, Junio 7, 1985



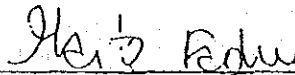
FABIO BERMUDEZ GOMEZ
Director General del Instituto
Colombiano de Hidrología,
Meteorología y Adecuación de
Tierras (HIMAT)



YOSHIKAZU YOSHIDA
Jefe del Equipo de Estudio
Preliminar Japonés
Agencia de Cooperación
Internacional del Japón (JICA)



HERNAN VALLEJO MEJIA
Ministro de Agricultura



MAITE FADUL ORTIZ
Jefe de División de Cooperación
Técnica Internacional, Departa-
mento Nacional de Planeación.

I. INTRODUCCION

En respuesta a la solicitud del Gobierno de la República de Colombia, el Gobierno del Japón ha decidido llevar a cabo el Estudio de Factibilidad sobre el Proyecto Global de Irrigación en Pequeña Escala en Laderas (que se llamará en adelante "El Estudio") de conformidad con el Acuerdo de Cooperación Técnica entre el Gobierno del Japón y el Gobierno de la República de Colombia, firmado el 22 de noviembre de 1976. En consecuencia, la Agencia de Cooperación Internacional del Japón (que se llamará en adelante "JICA"), la agencia oficial responsable de la implementación de los programas de cooperación técnica del Gobierno del Japón, llevará a cabo el Estudio en estrecha cooperación con las autoridades de Colombia. El presente documento establece el alcance del trabajo para el Estudio mencionado anteriormente.

II. OBJETIVOS DEL ESTUDIO

Los objetivos del Estudio son los siguientes :

1. Formular el Proyecto, el cual será el modelo de proyectos similares en áreas de laderas, y verificar su

factibilidad técnica y económica; y

2. Llevar a cabo el entrenamiento y la transferencia de tecnología a las contrapartes colombianas durante el curso del estudio.

III. PLAN PARA EL ESTUDIO

Con el fin de obtener los objetivos antes mencionados el Estudio cubrirá los siguientes aspectos :

1. Area de Estudio

Este proyecto global consta de dos sub-proyectos Santa Sofía y San Pedro de Iguaque, que cubren un área total de estudio de aproximadamente 1.500 hectáreas en Boyacá, y dos sub-proyectos Caqueza y Fusa - Tibacuy que cubren un área total de estudio de aproximadamente 1.500 hectáreas en Cundinamarca.

2. Alcance del Estudio

Las actividades a ser llevadas a cabo por el Equipo serán divididas en dos etapas, como sigue :

(1) Fase I del Estudio (Pre-factibilidad):

Dirigir el estudio preliminar del plan de desarro-

llo agrícola del área del proyecto global.

(2) Fase II del Estudio (Factibilidad)

Dirigir el estudio de factibilidad del proyecto global de irrigación en pequeña escala en áreas de ladera, sobre la base de los resultados de la Fase I del Estudio.

2.1 Plan de trabajo para la Fase I del Estudio.

El Estudio cubrirá los siguientes aspectos :

(1) Reunir y revisar la información y los datos relevantes que existan, incluyendo :

- a. Topografía
- b. Meteorología
- c. Hidrología
- d. Geología e Hidrogeología
- e. Suelos
- f. Irrigación y drenaje
- g. Agricultura
- h. Economía e instituciones agropecuarias regionales.
- i. Otros

- (2) Examinar las áreas de Estudio, incluyendo :
 - a. Examen topográfico
 - b. Examen meteorológico
 - c. Examen hidrológico
 - d. Examen Agropecuario
 - e. Examen de materiales de construcción y de costos
 - f. Otros Exámenes
- (3) Revisar y evaluar los planes de desarrollo agrícola existentes y propuestos para áreas de ladera.
- (4) Formular un Plan de Desarrollo agrícola para áreas de ladera..

2.2 Plan de trabajo para la Fase II del Estudio basado en los resultados de la Fase I.

- (1) Estudiar los siguientes aspectos :
 - a. Examen de la clasificación de tierras y suelos
 - b. Examen geológico
 - c. Examen de conservación de tierras
 - d. Examen socio-económico

- e. Examen de las instituciones agropecuarias y de la economía regionales.
 - f. Otros.
- (2) Determinar los siguientes aspectos básicos para el plan de desarrollo.
- a. Area del proyecto
 - b. Uso de la tierra
 - c. Patrones de cosechas
 - d. Necesidades de agua
 - e. Sistemas de irrigación
 - f. Estimación de rendimientos
 - g. Plan coordinación Inter-institucional
 - h. Otros
- (3) Formulación del plan de desarrollo integrado para los proyectos.
- (4) Diseño preliminar de las principales estructuras de los proyectos.
- (5) Operación y mantenimiento.
- (6) Preparación del programa de implementación.

(7) Estimación de los beneficios y costos del proyecto.

(8) Evaluación del proyecto.

(9) Recomendaciones.

IV. PROGRAMA DE TRABAJO

La totalidad del trabajo será llevada a cabo de acuerdo con el programa tentativo anexo (ver Apendice I).

V. INFORMES

JICA preparará y someterá a consideración del Gobierno de la República de Colombia los siguientes informes en inglés :

1. Informe Inicial Veinte (20) copias

Al comienzo de la Fase I del Estudio

2. Informe de Progreso Veinte (20) copias

Al final de los trabajo de campo de la
Fase I del Estudio

3. Informe de Pre-Factibilidad Cincuenta (50) copias

Al comienzo de la Fase II del Estudio

4. Informe Provisional Veinte (20) copias

Al final del trabajo de campo de la
Fase II del Estudio.

5. Borrador del Informe Final Cincuenta (50) copias

Dentro de un plazo de un (1) mes
contado a partir de la terminación de
la Fase II del Estudio.

El Gobierno de la República de Colombia entregará a
JICA, en sus oficinas en Bogotá, sus observaciones al
Borrador del Informe Final, dentro del mes siguiente
a la fecha en que reciba dicho Informe.

6. Informe Final Cincuenta (50) copias

Dentro de los dos (2) meses siguien-
tes a la fecha en que reciba las ob-
servaciones del Gobierno de Colombia
al Borrador del Informe Final.

VI. TAREAS DEL GOBIERNO DE LA REPUBLICA DE
COLOMBIA

De conformidad con el Convenio de Cooperación Técnica

suscrito entre el Gobierno del Japón y el Gobierno de Colombia, el Gobierno de Colombia concederá al Equipo de Estudio japonés los privilegios, inmunidades y otros beneficios en el estipulados.

1. Para facilitar el mejor desarrollo del Estudio, el Gobierno de Colombia tomará las medidas necesarias para :

(1) Garantizar la seguridad del Equipo de Estudio

(2) Permitir a los miembros del Equipo japonés de Estudio entrar, salir y permanecer en la República de Colombia por el periodo de duración de su asignación al Estudio y eximirles de llenar los requisitos de registro para extranjeros (derechos consulares).

(3) Eximir a los miembros del Equipo Japonés del Estudio, de impuestos, derechos de aduana, y otras obligaciones de aduana sobre equipo, maquinaria y otros materiales introducidos a la República de Colombia para el Desarrollo del Estudio.

- (4) Eximir a los miembros del Equipo Japonés del Estudio de impuestos a la renta y otros gravámenes de cualquier naturaleza sobre, o en conexión con, cualquier emolumento o subsidio pagado a los miembros del Equipo por sus servicios relacionados con la implementación del Estudio.
- (5) Proveer al Equipo Japonés del Estudio de las facilidades necesarias para hacer giros, comprendidas las utilidades de los fondos introducidos a la República de Colombia, enviados desde el Japón, relacionados con el desarrollo del Estudio.
- (6) Asegurar las autorizaciones de entrega a propiedades privadas o a áreas restringidas, en desarrollo del Estudio.
- (7) Asegurar las autorizaciones para que el Equipo del Estudio pueda llevar de Colombia al Japón todos los datos y documentos (incluyendo fotografías) relacionados con el Estudio; sin embargo esta información es confidencial y no podrá ser usada para propósitos diferentes a aquellos del proyecto sin permiso del Gobierno de la República

de Colombia.

(8) Proveer los servicios médicos cuando sean necesarios; estos gastos serán cargados a los miembros del Equipo Japonés del Estudio.

2. El Gobierno de Colombia sufragará los gastos de las demandas, si se presenta alguna, contra los miembros del Equipo de Estudio, que surjan de, que ocurran en el transcurso de o se relacionen con, el incumplimiento de sus deberes en la implementación del Estudio, excepto cuando dichas demandas surjan de negligencia crasa o de mala conducta voluntaria por parte de los miembros del Equipo de Estudio.
3. El Instituto Colombiano de Hidrología, Meteorología y Adecuación de Tierras (que en adelante se llamará HIMAT) actuará como la oficina contra-parte, del Equipo Japonés del Estudio y también como cuerpo de coordinación en relación con otras organizaciones gubernamentales y no gubernamentales interesadas, para la adecuada implementación del Estudio.
4. HIMAT proveerá al Equipo de Estudio, a sus expensas,

y en cooperación con las otras organizaciones concernientes, lo siguiente :

- (1) Información y datos adecuados en relación con el Estudio.
- (2) Levantamiento topográfico (en el comienzo de la Fase I del Estudio).
- (3) Estudio de suelos como clasificación de grupos de suelos y grado de infiltración.
- (4) Otros estudios adicionales que se requieran para el Estudio.
- (5) Personal de contra-parte
- (6) Adecuado espacio de oficinas con el equipo necesario, en los sitios del proyecto y en Bogotá.
- (7) Adecuado número de vehículos con conductor en el área del proyecto.
- (8) Credenciales o tarjetas de identificación.

VII. TAREAS DE JICA

Para la implementación del Estudio, JICA tomará las si -

güentes medidas :

1. Enviar, a sus expensas, el Equipo de Estudio a Colombia.
2. Procurar la transferencia de tecnología al personal colombiano de contra-parte durante el curso del Estudio.
3. Proveer el equipo necesario para el trabajo de campo.

VIII. JIGA e HIMAT se consultarán mutuamente en relación con cualquier aspecto que surja o se relacione con el Estudio.

APENDICE I

PROGRAMA TENTATIVO

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Trabajo de campo y de oficina en Colombia																		
Trabajo de oficina en Japón																		
Presentación de Informes.	R.I		R.D			R.Pre		R.P							A B.R			A R.F
Observaciones	Fase I del Estudio					Fase II del Estudio												

R.I Informe Inicial

R.D Informe sobre el Desarrollo de los Trabajos

R.Pre Informe de Prefactibilidad

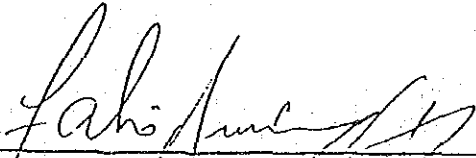
R.P Informe Provisional

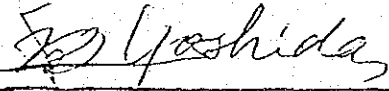
B.R Borrador del Informe Final

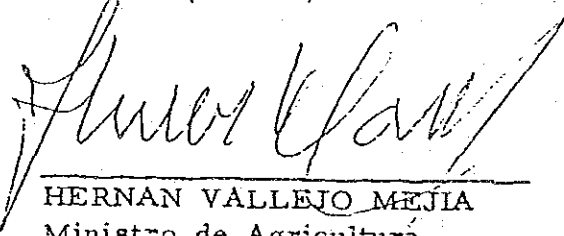
R.F Informe Final

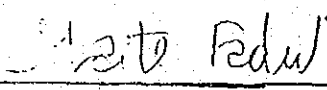
MINUTES OF MEETING

The Scope of Work for the "Feasibility Study on the Small Scale Irrigation Package in Slope Areas in the Republic of Colombia" signed by YOSHIKAZU YOSHIDA (Leader of the Japanese Preliminary Study Team, JICA), FABIO BERMUDEZ GOMEZ (Director General, HIMAT), HERNAN VALLEJO MEJIA (Ministry of Agriculture) and MAITE FADUL ORTIZ (Jefe de la División de Cooperación Técnica Internacional, DNP) on June 7, 1985, will be formalized between the Government of Japan and the Government of the Republic of Colombia in the form of separate Arrangement about the Feasibility Study on the Small Scale Irrigation Package Project in Slope Areas in the Republic of Colombia.


FABIO BERMUDEZ GOMEZ
Director General del Instituto
Colombiano de Hidrología,
Meteorología y Adecuación de
Tierras (HIMAT)


YOSHIKAZU YOSHIDA
Leader of the Japanese
Preliminary Study Team,
The Japan International
Cooperation Agency (JICA)

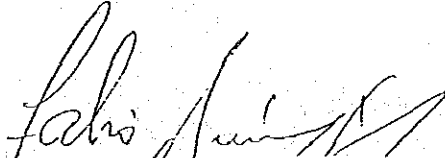

HERNAN VALLEJO MEJIA
Ministro de Agricultura

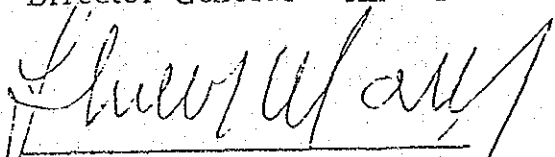

MAITE FADUL ORTIZ
Jefe de División de Cooperación
Técnica Internacional, Departa-
mento Nacional de Planeación.


MINUTA DE ENTENDIMIENTO

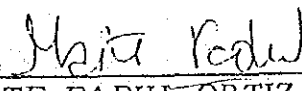
El Alcance del Trabajo para el "Estudio de Factibilidad sobre el Proyecto Global de Irrigación en pequeña Escala en Laderas en la República de Colombia" firmado por YOSHIKAZU YOSHIDA (Jefe del Equipo de Estudio Preliminar Japonés, JICA), FABIO BERMUDEZ GOMEZ (Director General, HIMAT), HERNAN VALLEJO MEJIA (Ministro de Agricultura) y MAITE FADUL ORTIZ (Jefe de la División de Cooperación Técnica Internacional, DNP) el 7 de Junio de 1985 será formalizado entre el Gobierno de Colombia y el Gobierno del Japón en la forma de Acuerdo separado sobre el Estudio de Factibilidad sobre el Proyecto Global de Irrigación en Pequeña Escala en Laderas.

Bogotá, Junio 7 de 1985.


FABIO BERMUDEZ GOMEZ
Director General - HIMAT


HERNAN VALLEJO MEJIA
Ministro de Agricultura


YOSHIKAZU YOSHIDA
Jefe del Equipo de Estudio
Preliminar Japonés. JICA


MAITE FADUL ORTIZ
Jefe de la División de Cooperación Técnica Internacional. DNP

Novedoso programa de riego en ladera

• Incentivará producción de hortalizas, frutales, y pastos

Más de 2.000 familias de pequeños campesinos serán beneficiarias de un revolucionario programa de riego en ladera que cubrirá 4.000 hectáreas en varios municipios de zonas minifundistas de Antioquia, Boyacá, Cundinamarca, Tolima, Santanderes, Huila, Valle, Nariño y Cauca.

El anuncio fue formulado por el ministro de Agricultura, Hernán Vallejo Mejía, quien destacó la importancia social que implica este programa que se cumple a través de la Agencia de Cooperación Internacional JICA, con las más modernas tecnologías japonesas.

El programa consiste básicamente en llevarles sistemas de riego a los campesinos en las zonas de ladera para que puedan desarrollar sus cultivos durante todo el año, ya que actualmente deben someterse a las dificultades originadas por las escasas lluvias. En Colombia, el mayor número de campesinos está asentado en las laderas. Las inversiones previstas para los próximos dos años son del orden de los 200 millones de pesos. En esta forma, se incentivará la producción de cultivos transitorios tales como las hortalizas, los frutales y pastos, en los cuales se hará mayor énfasis de acuerdo con la filosofía del programa, —dijo Vallejo Mejía.

A propósito, una misión japonesa llega al país este fin de semana para acordar aspectos fundamentales de este programa, cuya entidad ejecutora es el Instituto de Hidrología, Mete-



Hernán Vallejo Mejía Fabio Bermúdez Gómez

orología y Adecuación de Tierras (Himat).

El director de esta institución, Fabio Bermúdez Gómez precisó que los sistemas de riego en las zonas de ladera tienen que ser cuidadosamente diseñadas para no causar daños por erosión a los suelos.

Explicó el funcionario que, en esta materia, el Japón es un país que ha experimentado un gran avance y recordó que desde el inicio de este gobierno se formuló una solicitud de cooperación técnica con el Japón para realizar este programa.

El gobierno japonés cooperará con Colombia en los estudios y diseños, y con recursos del Banco Mundial se ejecutarán las obras dentro de la fase II del crédito otorgado al Himat.

Estará dirigido el programa a atender a los campesinos de diez departamentos en áreas comprendidas dentro del Plan Nacional de Rehabilitación, impulsado por el Gobierno Nacional.

Cooperación japonesa para proyectos de riego en Ladera

Por Rodolfo Prada

Chíquiza, Boyacá. El programa de desarrollo para el Distrito de Agua Blanca, en Cali, es el más importante proyecto en el que participa el gobierno japonés, ya que para su ejecución otorgó a Colombia un crédito por 75 millones de dólares. Este tipo de colaboraciones las seguirá prestando el Japón con el fin de estrechar las relaciones entre las dos naciones y divulgar la imagen de ese país en territorio colombiano.

Así lo afirmó el embajador de Japón, Yoshio Fujimoto, durante una visita que realizó a la población boyacense de Chíquiza, Boyacá, donde el Himat y la Embajada de Canadá hicieron entrega a la comunidad de un pequeño distrito de riego que ayudará a superar los serios problemas que en esa región existen por la falta de agua y el deterioro de los suelos.

El señor Fujimoto explicó que la colaboración que su gobierno presta al nuestro es recíproca, es decir, que Colombia también adelanta gestiones en Japón para realizar un intercambio tecnológico y cultural, hecho por el cual el canciller Augusto Ramírez Ocampo se encuentra en ese país oriental.

Riego en ladera

Actualmente se gestiona la vinculación japonesa en un ambicioso proyecto de riego en ladera para zonas rurales de Antioquia, Boyacá, Cundinamarca, Tolima, Santander, Huila, Valle, Narino, y Cauca, con el cual se beneficiarán cerca de dos mil familias campesinas, que habitan unas cuatro mil hectáreas.

El embajador japonés expresó que en dicho programa su gobierno hará aportes tecnológicos y económicos, a través de la Agencia de Cooperación Internacional, Jica.

Yoshio Fujimoto viajó a Chíquiza, un pequeño y olvidado pueblecito perdido en el corazón de Boyacá, para informarse sobre el proyecto de riego que allí entregó el Himat y el Canadá, sobre la situación de los habitantes y sobre la forma como el Japón intervendrá en la solución de los problemas relacionados con el agro en muchas regiones colombianas.

Buenas relaciones

Explicó el embajador que las relaciones colombo-japonesas son buenas desde hace mucho tiempo, y "estas se han fortalecido más en el actual gobierno de Belisario Betancur, quien se ha mostrado deseoso por que nuestro país intervenga en los programas de desarrollo que aquí se tienen previstos", dijo.

Anotó que aparte de los proyectos de Agua Blanca, donde se contruirá un acueducto y una planta para tratamiento de aguas negras, y de riego en ladera, el Japón está interesado en promover la industria pesquera y camaronera en las dos costas colombianas.

Con riego en ladera, Boyaca logrará 2 mil toneladas anuales de cebolla cabezona

CHIQUEZA, BOYACA. (Colpre-
sa). El director del Instituto Colombiano de Hidrología, Meteorología y Adecuación de Tierras (Himat), Fabio Bermúdez Gómez, aseguró que el programa de riego en ladera, que adelanta este organismo, acabará con el cultivo temporal y asegurará una producción agrícola continua.

El anuncio fue hecho en esta población del servicio en este municipio, que asegurará una producción anual de dos mil toneladas de cebolla cabezona, especialmente.

Actualmente esta región del país tiene una producción estimada en 700 toneladas, en época de temporada lo cual afecta a productores y consumi-

dores del bulbo.
Bermúdez Gómez señaló que el proyecto auspiciado por el gobierno nacional con la colaboración de Japón y Canadá, beneficiará específicamente a los cultivadores de hortalizas y frutas.

Destacó que el instituto aspira a colocar un sistema de riego en ladera en cada uno de los municipios del país en un lapso de tres años, con lo cual se estaría asegurando un incremento evidente de la producción agrícola en todo el territorio nacional.

Hasta el momento se han adelantado 7 sistemas de riego en ladera, de los cuales dos pertenecen a Boyaca, dos al departamento del Valle, dos a

Nariño y uno a Santander.

El gobierno canadiense realizó un aporte del 50 por ciento para financiar en parte el proyecto acordado por el Himat en la localidad de Chiqueza. Posteriormente Japón facilitará capital para instalar otro sistema en la población de San Pedro de Iguaque, en Boyaca.

El programa de riego en ladera y pequeños lagos, desarrollado por el Himat, consiste básicamente en dar un mejor aprovechamiento al agua, ya sea de ríos o aguas lluvias.

Las zonas de la costa del Caribe, los Llanos Orientales o el altiplano cun-

diboyacense, son propicias para recibir fuertes aguaceros en meses específicos como abril y mayo.

Con un buen aprovechamiento de este recurso natural es posible la construcción de pequeños lagos de almacenamiento, con el fin de mantener reservas de agua para los meses secos.

De esta manera, mediante el sistema de riego en ladera, que consiste en la construcción de tanques de almacenamiento en las partes elevadas de la región, se puede asegurar un bombeo que distribuya el agua en los sectores secos.

El beneficio del programa acoge a los pequeños propietarios que habi-

tan los terrenos de ladera, pues se hace posible la instalación en cada parcela de miniasperos, que cumplen la labor de riego.

Las ventajas inmediatas del sistema de riego en ladera consisten en un aumento de la producción, un incremento en el número de cosechas por año, la mayor oferta en períodos de sequía, control además la expansión de la erosión y la degradación de los suelos.

Además se logra una estabilización de los precios en el mercado de los productos pesqueros con base en la producción permanente.

El aporte canadiense al proyecto es

del orden de 1.9 millones de pesos. El gobierno canadiense indicó que hay intereses de su gobierno en incrementar las exportaciones de Colombia hacia su país, especialmente en el campo de camarones, jugos concentrados, café y flores.

Por su parte, el embajador japonés, Yoshio Fujimoto señaló que su gobierno facilitará el intercambio tecnológico y financiero, especialmente en los proyectos de Agua Blanca, en Cali, y de San Pedro de Iguaque, Boyaca. Japón buscará incrementar el intercambio especialmente en lo referente a los alimentos, camarones y el ferrocarril.

傾斜地の農業

Cuestionario

1- Condiciones de la agricultura en la República de Colombia

(1) Cuadro 1

Area cultivada y producción de las principales cosechas
(Unidad 10^3 ha., 10^7 ton.)

Nombre de la cosecha principal	1982		1983		1984	
	Area cultivada	Producción	Area cultivada	Producción	Area cultivada	Producción
1. Cultivos transitorios *	1.897.400	6.103.800	1.741.300	5.884.400	1.734.100	6.138.600
2. Cultivos Permanentes	1.142.000	8.893.800	1.166.700	9.043.600	1.191.600	9.332.800
3.						
4.						
5.						
TOTAL						

Nota: 1. Cosecha principal es la cultivada en extensiones mayores a 100 ha.

2. Las cosechas menores estan incluidas en el total

* Hace Referencia Año - agrícola.

(1)-2. Cuadro 2

Nombre de las principales cosechas cultivadas en área de ladera

Nivel sobre el mar	0-1000 mts.	1000-2000 mts.	2000-3000 mts.	3000 mts.
1	Banano	Banano	Maíz	
2	Maíz	Maíz	Papa	
3	Yuca	Yuca	Fríjol	
4	Fríjol	Fríjol	Hortalizas	
5	Plátano Hartón	Plátano Dominicó hartón	Hortalizas	
6	Caña Panela	Caña Panela		
7	Frutales	Frutales		
8		Hortalizas		
9		Arracacha		
		Café		

* Información dada por Federación de Cafeteros.

(2) Cuadro 3

Tamaño de los terrenos de operación (predios)

INCORA

Tamaño de los predios \ Nivel sobre el mar		0-1000 lts	1000-2000 mts	2000-3000 mts	3000 mts
		%	%	%	%
0 a	has	%	30 %	%	%
	has has	%	%	%	%
	has has	%	%	%	%
TOTAL		100 %	100 %	%	%

(3) Cuadro 4

Tasa de unidades familiares cuyo ingreso depende totalmente de la producción agrícola de su predio y tasa de las que dependen parcialmente de dicho ingreso.

División \ Nivel sobre el mar		0 a 1000 mts	1000 a 2000	2000 a 3000	3000 mts
		%	%	%	%
T a s a d e	Dependencia total del predio	%	%	%	%
	Dependencia parcial del predio	%	%	%	%
TOTAL		100 %	100 %	100 %	100 %

(4) Número de asociaciones

A. Asociaciones para riego

(a) Número de asociaciones

(b) Principales actividades de estas asociaciones

1.

2.

3.

B. Asociaciones para labores cooperativas, ventas, embarque, etc.

(a) Número de asociaciones para las principales cosechas (Cuadro 5)

Nombre de la cosecha	1. Curuba	Papa 2. Criollo	3.	4.	5.	Total
Número de asociaciones	Una	Una				

Nota: Las cosechas menores están incluidas en el total

(b) Principales actividades de estas asociaciones

1. Mercadeo
2. Insumos
3. Compra cosecha, precio sustentación.

C. Asociaciones co-operativas agrícolas

(a) Número de asociaciones cooperativas agrícolas dos

(b) Principales actividades de estas asociaciones

1. Mercadeo
2. Venta insumos
3. Compra cosecha, precios sustentación

(5) Contenido de los principales aspectos relacionados con áreas de laderas desarrollados por organizaciones de investigación y experimentación

1. Asistencia técnica ICA- DRI
2. Pruebas Regionales
3. Estaciones experimentales - SENA - ICA
4. Transferencia de paquetes tecnológicos ICA- DRI - SENA
- 5.

(6) Contenido de los principales aspectos relacionados con áreas de laderas en las estaciones de extensión agrícola.

1. San Pedro de Iguaque . No existe servicio de extensión agrícola
2. Santa Sofía. Tampoco existe este servicio.
3. Cáqueza - Existe Oficina del ICA que presta este servicio y el Programa DRI.
- 4.
- 5.

(7) Contenido de las políticas de sostenimiento de precios para las principales cosechas.

1. San Pedro de Iguaque . El mercadeo de las cosechas se hace en Tunja los días martes y viernes.
- 2.
3. Santa Sofía. Existe una cooperativa que mercadea curuba. Para otros productos acuden compradores de Tunja, Monquirá, Chiquinquirá.
- 4.
5. Cáqueza. La mayoría de productos se venden en Bogotá (Corabastos) y otra porción lo llevan compradores d Villavicencio.

(8) Principales aspectos de la situación agrícola del sector financiero.

1. San Pedro de Iguaque. Los créditos los facilita la Caja Agraria de Tunja y Villa de Leyva.
- 2.
3. Santa Sofía. Los créditos los facilita la Caja Agraria del lugar y la Caja Popular Cooperativa.
4. Cáqueza facilitan crédito la Caja Agraria y el Programa DRI.
- 5.

(9) Cuadro 6

Áreas de riego (Unidad 10^3 ha.)

<u>Sistema</u>	<u>Subsistema</u>	<u>Área Total</u>
1) San Pedro Iguaque	El Monte Cerrizal Yerbabuena	750 Has.
2) Santa Sofía	Hornillas Salitrillo Guatoque	750 has.
3) Cáqueza	Girones de Blanco Moyes Girones de Negro	750 has.
4) Tibacuy	La Portada El Tránsito Caracol	

Nombre de las principales cosechas	Año 1 9 8 4 Has San Pedro	1 9 8 4 Has. Santa Sofía	1 9 8 4 Has. Cáqueza
1. Cebolla cabezona	55		1.680
2. Papa	3.250	240	2.460
3. Trigo	450	145	69 tomate
4. Alverja	298	-	-
5. Maíz	368	290	1.382
Curuba	-	95	-
TOTAL	4.421	770	5.591

Nota: Lo explotado al año en el municipio.

Nota: 1. Cosecha principal es la que se encuentra más irrigada que otras

2. Las cosechas menores están incluidas en el total.

2- Condiciones de la Agricultura en San Pedro de Iguaque, Santa Sofía y Cáqueza.

La agricultura es diversificada pero con tecnología tradicional a excepción de Cáqueza donde es mayor la Tecnología.

*(1) Población. Santa Sofía (250 familias), San Pedro (200 familias) Cáqueza (600 familias)

(2) Número de granjas familiares No se conoce

(3) Nombre de las principales cosechas 1 - 5 Has.

1. Cebolla cab. 2. Papa 3. Trigo 4. Alverja 5. Maíz

(4) Área (incluidos bosques y áreas no plantadas) has.

(5) Tamaño de los predios para cada granja familiar.

*Población beneficiada.
 Santa Sofía - 5 hectáreas
 San Pedro - 4 hectáreas
 Cáqueza - 3 hectáreas

5. 傾斜地の農業 (政策)

Introduction

According to the premise that the adequate provisioning of food is a fundamental element for the social welfare and with the National Government's purpose of increase the agricultural vocation of the country taking into account a balanced development model, is adopted in the Development Plan "Change with Equity" a thoughtful and audacious policy of land adjusting.

The mentioned policy has the following specific objectives:

- a) Increasing the production and the agricultural productivity, converting the Districts in places of agricultural modernization.
- b) Increasing the employment and rural incomes.
- c) Fortify the internal marketing and retrofeeding the industrialization project.
- d) Diminishing the importations and increasing the agricultural exportations.
- e) Diminishing the inflationary pressures.
- f) Increasing the social welfare in the rural population as well as urban one.

g) Contributing with the obtaining of the peace by means of the improvement of the objective conditions.

h) Promoting the social efficiency in the use of the land.

The adopted land adjusting program, started from a diagnostic which indicated a low increase in the agricultural areas in the last 25 years, an increase of food production below to the national demand, with the consequent increase of the importations and the social irrationality that states the fact that the majority of lands of high agricultural potentiality is exploited in an extensive way, livestock mainly, due to the excess or lack of water and infrastructure.

The previous situation and the size and nature of the required works, suggested the necessity of the government participation to surpass the problem and guiding the use of the fundamental resource, as is the land in consequence with the social interest. The present government assumed this responsibility and adopted the necessary measures to give solid bases to the land adjusting process and to incorporate it in the agricultural intensive production.

Unfortunately, the budget difficulties, that our country have lived, menaces with delaying considerably the land adjusting program introduced in the Development Plan. Consequently, the purpose of this document is to clarify the situation and to submit to the CONPES the possible alternatives to face it.

ANTECEDENTS

Since 1930 many official Entities have carried out engineering works destined to amend or to improve the hydrometeorologic factors that obstructs the best profit of soil in the agricultural production. 1/

The law 107 of 1936 gave the responsibility to perform the studies and irrigation and drainage works to the Ministry of National Economy, which through the Department of Water and Meteorology, began the construction of three districts: La Ramada (irrigation) and Fúquene - Cucunubá (drainage) in Cundinamarca and Firavitava (drainage) in Boyacá, as well as Buga-lagrande channel in the Valle del Cauca. 2/

Between 1940-1950 the Instituto de Aprovechamiento de Aguas y Fomento Eléctrico - ELECTROAGUAS. 3/ undertook . . .

-
- 1/ The first important irrigation and drainage projects were constructed by the United Fruit Company in the Banana Zone of Santa Marta at the end of the last century for irrigating an area of 40.000 hectares approximated, using water from the rivers: Aracataca, Sevilla, Fundación and Frío, which continue operating (Prado District of Sevilla).
 - 2/ The two first ones are administrated by the CAR; the third one belongs to the Alto Chicamocha District of HIMAT and the last one is administrated by CVC.
 - 3/ Organization that replaced Departamento de Aguas y Meteorología.

the construction of the irrigation and drainage districts Samacá (Boyacá) and Río Recio (Lérida Sector) and of the works of Gualanday Channel, located the last two one in the Tolima Department, and of the drainage district of Alto Chicamocha (Boyacá).

At the end of the mentioned period the Caja Agraria started the construction of the irrigation and drainage systems of Coello y Saldaña and the enlargement of the Río Recio district (Ambalema Sector) in Tolima; the two first one are at the present time administrated by the users, by delegation of HIMAT. On 1958, the CVC began the execution of the Roldanillo-La Union-Toro project in Valle del Cauca. (Chapter 1).

With the issue of the Law 135 of 1961 about the Land Reform, INCORA was selected for "performing Studies and works of defences against inundations, regulation of the rivers flow, irrigation and drainage, with the purpose to adjust the greater possible land extension to a more productive forms of exploitation and to obtain, at the same time, a structure modification of the rustic property".

This initiative enabled to give a big promoting to the investments in irrigation, drainage and control of inundations works. Between 1963 and 1972 INCORA undertook the construction of 15 new projects in 7 departments of the country and in the Putumayo's Intendencia, that also allowed to accelerate the process of land distribution. (Chapter 1).

With the purpose to propiate the technical and administrative separation of the actions of Land Reform and Land Adjustments, by the Law Decree No.132 as of 26 of January of 1976, The Servicio Colombiano de Meteorología e Hidrología was transformed into Instituto Colombiano de Hidrología, Meteorología y Adecuación de Tierras - HIMAT - wich assumed the responsibility to execuses adjustment land works, to finish those works undertaken by INCORA, and to administrate and maintaining the districts of irrigation and drainage listed in Chapter 1.

The HIMAT gave emphasis to the formulation and bringing up to date of many prefeasibility studies and to the designing and to the identification of projects based on the evaluation of land potential liables to adjustments in some regions and hydrographic basins of the country. At the same time, he continued with the execution of drainage works in the districts of Manatí (Atlántico) and Cereté-Lorica (Córdoba) with resources of external credits ^{1/} contracted until 1976 by INCORA. Moreover, since 1980 he has been carrying out the irrigation and drainage works of Rio Prado district (Tolima) using resources from the national budget.

Majority of the districts, started by the forementioned official organisms, have not been finished because the required resources for invesment have not been enough to cover them. Consequently their using have been partial, so it has not allowed to collect the whole valorization quotas, neither the recovering of the investments.

1/ BIRF Loans Numbers 849-80 and 113-80, respectively.

On the other hand, this problem has caused some resistance by the users, because they do not want to pay the services fee for that deficient services, all in has induced to a progressive deterioration of the works, equipments and installations.

Between 1979 and 1980 the FAO Cooperation Program-World Bank collaborated with the Government in the identification and arrangement of an investment project for the rehabilitation and complementation of the works of 15 districts presented by HIMAT ^{1/}. The project was divided in two phases: the first one, made up of 8 districts ^{2/} and the second one, for the 7 remaining ^{3/}.

In the Development Plan 1979-1982 it was adopted as strategy for the Land Adjustment, the execution of investment project in rehabilitation in the two recommended phases by the Cooperation Program; for this it was contracted on 1982 the Loan BIRF 1996-CO for the performing of the first stage works and the elaboration, of the feasibility Studies of the second one.

^{1/} As antededents, it shall mentioned that in 1972 the Office of Technical Studies of INCORA performed the "Study of Projects Evaluation of Land Adjustment, wich allowed to determine the condition of the works in the districts and the necessary investments to finish them. On 1976 the Departamento Nacional de Planeación (DNP) contracted with the Company Ingenieria y Estudios Ltda. a new evaluation of the districts in operation that helps the Government for taking decisions about investment in the complementation of them.

^{2/} Samacá (Boyacá), Juncal and San Alfonso (Huila), Zulia (Norte de Santander) Sibundoy (Putumayo), Lebrija (Santander), Río Recio (Tolima) and Roldanillo La Unión-Toto (Valle).

^{3/} Repelón (Atlántico), María la Baja (Bolívar), La Doctrina (Córdoba), Prado de Sevilla (Magdalena), Abrego (Norte de Santander) and Coello y Saldaña (Tolima).

In the diagnostic that is presented below it is analyzing the problems that disturb the full development of the existing districts, taking into account that most of those limitants are solving with the execution of the two mentioned phases and the allocation of internal resources for the rehabilitation and complementation of the remaining districts.

DIAGNOSTIC

The area of the 25 districts of Land Adjustment administrated by HIMAT is of about 281.330 hectares that represents scarcely the 1.1% aprox. of the total area of the present agricultural borderland (estimated for 1982 in 25 millions of hectares) and the 4.7% of the area potentially adjustable according to the estimation of the Water National Study -ENA- ^{1/} (6.1 millions of has). The private sector, for its part, has adequated 461 thousand has. ^{2/}.

The above figures show the scarce efforts fulfilled in the country for incorporating to the production lands of high

^{1/} Contracted by DNP and its first phase conclude on November of 1983. According with the mentioned study, the adjustable area is Constituted by the flat topography soils of I,II,III and IV kinds- Using classification system design by IGAC on 1973.

^{2/} Estimated by ENA in accordance with the secondary information due to the shortage of resources, it was not possible to make field checking.

quality and that have, strong limitations of use because of the excess of water or the droughts relatively prolonged.

In the Chapter 2 it was verified that more than 79% of the adjustable lands potential are located in three regions: 34.4% in the Llanura del Caribe; 24% in the Llanos Orientales and the 20.7% in the Bajo Magdalena-Cauca; the remaining (21%) belongs to the Alto and Medio Magdalena, Valle del Cauca, Altiplano Cundiboyacense and the Santanderes. It shall be noticed that the 12.2% of that potential has studies at feasibility and pre-feasibility level and the 6.5% is constituted for projects that are found at identification phase.

The investments of the State on Lands adjustment lower drastically from the end of 1970-1980. Certainly, meanwhile between 1968 and 1970 they represented more than 0.6% of the Agricultural DIB, on 1977 lower at 0.07%, recovering slightly on 1981 and 1982 until reach aprox. 0.17%. (Chapter 3 and Diagram 1).

These figures reflect a situation of low investment in this activity, that begins on 1971 and its extended until 1982, period in which begins the execution of only one district and are performing a small investment for some of the existing districts. Among the main causes that originated this problem it is found the low priority that was assigned to the sector in public investment plans ^{1/} and in the slow process of

^{1/} The agricultural expenses represented more than 20% of the total expenses between 1970 and 1973 decreased to the 7.6% on 1981 and 1982.

recovering of the investments carried out by the State, for the problems forementioned.

It shall be added that incomes collected as irrigation and drainage tariffs, added to those resources included in the national budget, have not been enough to cover the financing of the operational and maintenance costs of 23 districts of HIMAT, ^{1/} which have incidence in the deterioration of the works and in the inadequate using of the existing irrigation and drainage infrastructure, all in means a less intensity in the use and in the exploitation of the adjustment lands and, as consequence, in a low production and employment sectors compared with the productive potential of the districts.

1. Exploiting of the Districts' Lands

In the Chapter 4 are clasified the 25 districts in reference in three categories: 18 of irrigation and drainage, 6 of only drainage and the reticular modules of Orocué.

From the area covered by these districts there is 66.050 has. that have only main works and, because of that, this area has not been full incorporated to the production.

In spite of the mentioned problems, the production of the districts was increased in important way (52%) from 543.000 to 826.000 tons between 1972 and 1982. The amount of this production represented the 5% of the gross weight of the

^{1/} Its exclude the districts of Rio Prado and Orocué Modules because are in way of construction.

agricultural production without coffee. In the development of the agricultural activities of the districts were employed 32.000 farmers.

The area of the districts were used mainly in agriculture. In the use of the land it has given emphasis to the production of exporting goods (cotton, banana, raice, cacao and sugar cane) which area on 1982 increase at 130.924 Has. ^{2/}, and of scarce products (oleaginous, bean, corn, sorghum and wheat) that in the same year reached an area of 39.987 has.

HIMAT has detected that a proportion of the operational holdings of bigger size in the Irrigation Districts is used by the rental system which contracts as general are from 1 to 2 years, this has avoided the performance of adjustment works at operational holding level for improvement the productivity of the rented properties.

To avoid the social cost of the lenders development in the irrigation districts and their possible implications about the productivity and costs of production, it is recommended to HIMAT and INCORA to Study the application of the instruments that Law 135 has for that purpose.

2. Tariffs

The problem of the very low tariffs collected for the water services, constitutes a limitant to collect the enough

1/ This area corresponding to the two semesters.

resources that allows to make a efficient maintenance and operation to the land adjustment districts. For this reason was stated in the Development Plan the necessity that HIMAT fixes reasonable tariff, duly administrated locally with the users.

According to those guidelines, the mentioned Institute has analyzed the present tariff structure and found that its incidence in the production cost is minimum ^{2/} if it is compared with the effect in the reduction of the climatic risks by the excess or defect of water and in the increase of the profits per hactare.

Nevertheless, the system of water tariffs will establish by HIMAT shall be directed to guarantee the maximum use of the resource, the financiacion of the maintenance and operation costs of the service and shall be taken into account the capacity of payment of the user.

On the other hand, the Tariffs of HIMAT have been high in those districts where the water is harnessed by means of pumps, in which the costs of the energy have a big incidence in the determination of tariffs. For this reason, and with the purpose to maintain them incorporated to the production it is suggested that the Tariffs National Board Studies the present electrical tariffs of the agricultural sector and designs a system according to priorities that the Government gives to the agro production.

^{2/} Average 2.5% of the production cost.

POLICIES OF LANDS IN THE
DISTRICTS

The Policy of Land adjustment adopted at the National Plan of Development established that "the rehabilitation and the construction of new districts requires the direct participation of the users through valorization payments . . . or establishing mechanisms of Lands Reform when the general interest recommends it".

Inside this context, it is considered that the districts of land adjustment that will be constructed shall pay rates of valorization on the lands that will be benefit with the project. The owners could pay the contribution of valorization by means of money or lands, which can be distributed to farmers without them according to a program.

One of the main problems for the collection of the valorization has been the lack of completion of the irrigation districts, that is legal previous condition for that collection. Additionally, and for the same reason, the owners have justified their waiver to pay.

As we can see, the completion of the irrigation districts not only offers all the economical and social advantages previously mentioned, but allows to initiate the collection of the corresponding valorization, making easy the financing of new works.

On the other hand, the delays on the performance of the

appraisals required by the law shall make difficult the establishing of the valorization payments, for this reason, it is recommended to compromise the Instituto Agustin Codazzi, by the requesting of HIMAT, for collecting them on time.

With the purpose to facilitate the collection of the valorization it is recommended to HIMAT to study the possibility to follow in two stages: In the first one and once the sectors of the districts start with the complete production, the corresponding costs of the investments carried out by the State will be collected; in the second, and once finished the appraisals, the collection with base to the higher acquired value of the lands will be adjusted.

PRIORITIES OF PUBLIC INVESTMENT

In developing of the guidelines stated ^{on} the Plan for the period 1983-1986, in the investment process, it was adopted the following priority order on the allocation and programation of the resources:

- To assure the necessary items for backing the payments of the credit BIRF 1996-CO and to guarantee, in this way, the rapid execution of the Phase I of the Rehabilitation and Complementation Project of 8 districts of land adjustment. (Chapter 5).

- Allocation of the resources for financing the feasibility and designing studies of the 7 projects that make part of the Phase II of Rehabilitation and Complementation, with the purpose to take shape a new credit operation with the BIRF on 1984 and to initiate its execution on 1985 (Chapter 6).
- Allocation of internal resources to continue the construction of the Rio Prado Project and to begin in the following years the rehabilitation and complementation of the remaining districts in operation ^{1/} Manatí and Santa Lucía (Atlántico), Macarí and Cereté-Lorica (Córdoba), El Porvenir (Huila) and San Rafael and Firavitoba (Boyacá).
- Allocation and programation of the resources to start the construction of the Valledupar, San Juan del César, Alto Chicamocha, Nechí-San Jacinto, Planicie del Valle del Cauca, Triángulo del Tolima and Riego de Ladera districts. With the purpose to distinguish these projects in the document, they will be called as "New projects". A credit with the BID is now in negotiation for supporting the financing of these projects. ^{2/} (Chapter 7).

^{1/} Which require investments relatively low because of their good maintenance.

^{2/} The four first were already approved by the CONPES, and, by means of the Resolution No.04408 as of sept.9/83, the Ministry of Treasury authorized the HIMAT to undertake the contracting of a external credit for US\$ 41.3 millions for its partial financing.

Given the high priority of the Rio Rancheria Project it is recommended to give it a similar financial treatment to the forementioned projects as it is explained after.

- To continue the prefeasibility and feasibility studies of the projects that are in advance level of formulation with the purpose to have the enough alternatives of investment at a medium and long terms that allow, through the social and economical criteria, to choose those which contribute more to the achievement of the priorities of the country development. (Chapters 8 and 9).

FINANCING OF THE PROGRAM

Within the possibilities of financing foreseen until 1985, it is possible to guarantee the execution of the Rehabilitation Project Phase I provided that the treasury payments shall be done on time and the Budget allocations of 1986 shall be guaranteed as it shows in Chapter 5. This project is financed with a Loan from the World Bank (1996-CO). The execution of Phase I progresses satisfactorily, with the programming of finishing the rehabilitation and complementation of the Juncal and San Alfonso districts at the present year and at the remaining 6 one on 1985-1986, that means that this last year they will be incorporated into the production of 63.000 has.

The World Bank has shown its interest on financing the Phase II. The studies are carrying out by Colombian Entities with the advising and supervision of technics of the FAO. The estimated cost of this Phase is about \$14.300 million pesos on 1983, and the Bank probably finances the 45% of this amount. (Chapter 6 - Cost of each project and investments).

For that year there is a defficit of 600 million for which it should be found financing from other Entity, if not, the program shall be performance slowly.

On 1988 the 23 districts subject to Rehabilitation, complementation and extension (Chapter 10) will be incorporated into the production at all. In this way the usable area will be increased to 97% and the production in tons to 80%. It is estimated that the production amount, in pesos of 1981; will be increased in \$12.000 millions to pass from \$10.433 on 1982 to \$22.474 million on 1988.

So the critical problem of financing is presented on the "new Projects" which cost is estimated on 32.620 million of 1983 and cover about 206.900 has. In the present conditions there are not available resources to finance them, neither to obtain fainancing from the International Bank.

Never the less it is open the possibility to obtain financing in the modality Government to Government. Certainly, in the Ministry of Agricultural have already offerred credits from representatives of interested countries like France, Holand, Italy and Japan for specific projects:

France - For Valledupar (Cesar), San Juan del Cesar (Guajira and alto Chicamocha (Boyacá).

Holand - For Alto Chicamocha (Boyacá).

Italy - For Rio Ranchería (Guajira).

Japan - For Rio Pamplonita (Norte de Santander).

The advantages of these credits are the followings:

- a) A lower interests and longer terms
- b) Total financing
- c) Investment at very short term
- d) Big guarantee of completion
- e) Possibility of repayment in colombian goods

On the other hand, the disadvantages will be:

- a) Are attached loans, so they imply less oportunities to use the goods and the national technical services.
- b) Requiring measures of exception, on the part of Ministries Council and with respect to the necessities of tender.

RECOMMENDATIONS

1. Authorizing the negotiation of loans Government to Government for the financing of the "new projects" of lands adjustment stated on the Developing Plan.
2. The Government shall recover the investments given to the irrigation districts by means of payments from the owners and in conditions according to their capacity of payment.
3. Approving the program and chronogram of lands adjustment attached in this document.
4. The HIMAT shall establish a system of water tariffs that guarantee the optimum use of the financing resource of the operation and maintenance of the service and shall take into account the capacity of payment of the users.
5. The National Board of Tariffs will study the present electrical tariffs given to the agro sector and will design a system according to the priorities that the Government assigns to the production of agro.

傾斜地かんがいプロジェクト例

チキサ・かんがいプロジェクト

- Republic of Colombia
- Ministry of Agriculture
- Instituto Colombiano de Hidrología, Meteorología y Adecuación de Tierras - HIMAT
- Chiquiza Channel Irrigation Project
- Planning Office, Bogotá, October 1984

Chiquiza Channel Irrigation Project

1. Project's area characteristics

1.1. Location

Project area is located in Boyacá Department, Chiquiza municipality, Centro "vereda", to the northwestern part of the municipality's head; its limits are comprised between Soavita and Sorcio streams and between the irrigation channel and Chiquiza stream. It comprises a total area of 65 hectares.

1.2. Topography

The region shows a strongly rough topography with some plain zones; the streams that are located in this zone, which function only during winter periods, has formed deep ditches in almost vertical walls.

1.3. Hydrology

Two main resources are located within the project's area: Soavita stream, which has a basin of about 5.0 square kilometers, with a length of 2 km to the water tap and a mean

flow of 17 liters/second. The Sorcia stream has a receiving area of about 1.3 km², its regime is torrential and it only functions in winter periods.

1.4. Climate

The average temperature of the region is centigrade 14° , the media year precipitation is 840 mm.; rains are few most of the year; April, October and November are winter periods.

1.5. Soils

Soils of the project are characterized by low fertility due to limitations such as lack of water, lack of effective depth, and erosion. These soils, by means of a good management and with the corresponding supply of water, answer in a suitable way for crops like onion and legouminous.

1.6. Roads

The project has secondary roads, now in a reasonable condition, that communicate it with the central road Tunja-Villa de Leyva and directly with San Pedro de Iguaque.

1.7. Services

- Energy

This part of the "vereda" is comprised within the Energy National Plan and because of this it has a satisfactory energy service.

- Health

In the municipality's head there is not a health's center

so people who need this service have to go to Tunja's Hospital.

- Telecommunications

This service exists in the municipality's head with low efficiency equipments.

1.8. Erosion Process

Physiographyly the basin shows three (3) sectors, as follows:

- a- High part - with an undulating topography formed by sandy lands; is a relatively stable zone.
- b- Medium part - with slopes of 7-12-25%; easily erosionable materials but with sandy lands mixtures which allow it a relative stability.
- c- Low part - Slopes between 12-25 and even 50% in some sectors; clay-muddy materials with a lot of gravels, pebbles and mixed limonites scattered within the profile. Over this low zone is located the project; below it is made a description of the erosion processes in this part of the basin.

1.8.1. Mass removing

In the study area this process is quiet located and it is characterized by landslides or fall of big blocks, as seen in the farm of Gonzalo Sierra (operational holding 211). In this area prevail very thick clay-muddy soils (4-6 mts); the probable montmorillonite clay content origins that when the soils are excessively dry, deep

ditches are formed, forming at the same time big blocks. During the winter or because of an excessive irrigation, water penetrates in those ditches acting like a lubricant and saturates the whole formation, which moves by gravity toward the low part of the basin; this movings may occur during the winter or in the summer when a large quantity of water is Kept within the ditches.

1.8.2. Strong surface erosion and ditches

This kind of erosion affects large areas within the project. It has its origin in several factors:

- Old burnings which finished the natural vegetation of the region (forest and small trees) leaving the soil without protection.
- Intensive use with clean crops
- The region's litology, with materials of low resistance to erosion agents, mixed clay - litos and lalitas within a sandy - clay matrix.
- Topographic characteristics determinate that this erosion, which affects zones with slopes above 25% , moves affecting zones with less slope.

The way as this process is carried - out is the following: the surface drips removes and pulls the sandy-clay matrix, leaving on the surface lutitas, clay - litas and sandy pebbles, seeming a stony outcrop. When waters get a bed, they form ditches that develop quickly by overcoming erosion and lateral fall.

1.8.3. Stony outcrops

This phenomenon is the result of an erosion process very strong; fortunately, it is very located and its area is quite little.

Conclusions and recommendations

In the map of erosion that has been made of this region, by means of air photography interpretation and the corresponding field survey, it has been identified the zones affected by mass removing erosion processes, strong laminar erosion and ditches, pointing out the level of developing in each process and their possible use and treatment; with the purpose of extending this, some recommendations are made below.

In low slope zones, affected by strong laminar erosion, it is possible to rise live barriers around for insolate them; to make a partial leveling, forming portions without deepening too much (30-40 cm), to sow pastures, to sow small trees in the depressed areas between portions; after pastures get a good covering and development this lands can be used for shepherding and then for farming, leaving a suitable protective zone around.

In zones with a strong slope, affected by laminar erosion, must be developed reforestation programs; in sectors affected by ditches and very strong laminar erosion, to insolate them to avoid pass of people and animals, leaving them to a natural recovering; in some places, to make intercepting channels to

avoid the drips and the developing of ditches. It is recommended the reforestation besides the streams.

In zones affected by mass removing (slidings) to avoid over-saturation of ^{water} and to make intercepting channels for rain waters.

2. Social aspects

In order to know in detail socio-economic conditions that now are benefited with the channel (65 ha) and the characteristics of the benefited families, it was carried-out a survey which shows the most important aspects.

2.1. Population

In the project area live 19 families for a population of 133 inhabitants: 52.2% female, 47.8% male.

2.2. Migration

The chiefs of the families has been linked to the land for always. It does not mean that there are not migrations in order to achieve a job. It was established that most of the people who emigrate are women, who usually emigrate looking for a remunerative job (domestic service) The second cause of migration was the necessity of education means.

2.3. Employment

The previous table shows the manpower which the small

property system (which is the basic one in the zone) supplies.

The technology used is primitive; it is used ox plough, hoe and pick what means and extensive use of manpower during sowing and harvest time, once in a year; the rest of the time there are unemployment conditions.

The basic necessity of people is to get food for themselves and for people in their charge but the economic conditions have increased misery because the operational holding exploitation does not permit to the farmer live with the remuneration of his job (price of the daily wage: 200 pesos); a wide manpower offer avoid and increasing in the daily wage.

Improving the condition of the channel it could be extended the use of land and the manpower demand, allowing higher incomes for the community and raising the standard of living of the benefited population.

2.4. Income

The base of the familiar incomes is not in any case the exploitation of the small property which is only a marginal resource and provides mainly subsistence crops or familiar consumption.

The source of the familiar incomes is the salaried job. The sons aid to that, receiving each person a daily wage of \$200 pesos, being the feeding in charge of the employer.

This daily wage is considered low but is justified because of the large offer of manpower.

2.5. Education

The illiteracy is 40% of the inhabitants of the study's zone and increases in the population over 40 years age. The elementary school goes only until third grade because in the head's municipality there is not studies forth and because it is considered that with that level of education is enough to defend oneself.

3. Economic aspects

Land's property

It is characterized basically by the small property system. The small property constitutes the 89% of the operational holdings with the 70% of the whole extension, with an operational holding's average of about 1.5 ha.

The dispersion of the land corresponds to heir trials because heir is the main way of acquisition of land. As seen, agricultural exploitation of this properties means a very low income for the farmer.

The characteristics of the exploitations are a kind of large vegetable garden with sowns of onion, maize, wheat, barley, pea, and cows and goats breeding, mainly; this supplies a part of the consumption feed and a small surplus that is commercialized as a marginal support for the familiar income.

The other part of the sector is dedicated to commercial exploitations like onion, which correspond to small property and employ the manpower that left over the small farms.

4. Agricultural Development

The agricultural exploitation is mainly directed to the farming activities and in a smaller scale to livestock activities.

4.1. Present use

According to the survey made it is considered that the zone is distributed because of its use as shown in table 3.

It is estimated that about the 40% of the area is not productive because of serious erosion problems (ditches and laminar erosion), that affect it, which must receive a special treatment. According to the soils studies carried out by IGAL, this zones are considered suitable for pasture due to the soils composition and the strong slope that the land shows.

It is necessary to ask INDERENA for the reforestation of same zones.

The main crop is onion which area corresponds to 30% of the study zone; it has some rotation with wheat and barley (these have higher prizes) pea, maize, being these last two for consumption only because they are sown in very small areas what does not permit a volume which justifies the

marketing. Table 4.

The onion is the basic source of incomes, in spite of the strong price fluctuation; during the last months the price went down from \$8000 pesos to \$1200 "carga" (aprox 125 kg.) in Tunja as well as in Bogotá.

The livestock is comprised by cows, sheep, pigs and aviculture; cow and sheep breeding is the main.

Livestock has two races. Norman and Criollo (native) dedicated to fattening. There are about 30 cows; the milk is for auto-consumption; each animal costs from 30000 to 40000 pesos in Tunja and Villa de Leyva.

Sheeps are in majority of farms. There are about 57 animals.

Their feeding is specially weeds and they clean the border of fences and ditches. They are useful because they improve the land's fertility and need little attention from the farmer. He obtains from it manure, meat and some wool for the craft industry. The price is between \$2000 and \$4000 pesos each animal.

The incomes coming from livestock are a marginal resource for family maintenance and its basic function is to serve as a base for familiar sustenance or consumption.

4.2. Technics and systems of agricultural production

There are dry farming and partial irrigation farming too. Water for irrigation is taken from the channel, opening holes in the border of it with pick so the water goes down to the place that is wanted to irrigate; another system is to fill small wells and then to take water out of them by means of watering hoses.

The farming practices are rudimentary; it is used ox plough hoe and pick. The low fertility of the zone's soils demands a lot of fertilizers that increases the production costs.

The livestock system is elementary; animals pasture tied down, rotating during the day.

Sheep presents the same conditions of livestock and although it is considered a secondary activity it is an important resource within the familiar incomes.

5. Channel's characteristics

The channel takes water from Soavita stream by means of a rudimentary structure that was built with stones of the same stream. From this tap starts a conduction piping of 6" with a length of 95 mts., that continues in an earth's channel of about 3 km.

The pass by ditches and streams (like "La Compuerta") is made by means of hollow trunks and low capacity pipes. These improvised structures are in bad conditions and the border

of the channel too, causing leaks of water.

The systems of irrigation mentioned in 4.2 also contributes to those leaks.

6. Description of the present situation

There are several factors that origin troubles; below it is made a small summary of the situation.

6.1. Slope structure

The lack of a suitable tap structure in Soavita stream causes lacks of water in the channel during some periods of the year due to the low volumes that are obtained with the present system.

6.2. Conduction system

The serious problems that this system has, which were mentioned before, cause troubles like a) water lacks, mainly in the last part of the channel, which affect production b) excess of water in some sectors, that may increase erosion process.

6.3. Operation

The lack of a good organization of users has created social problems; there are not turns which secure to each user the appropriate supply of water for irrigation on time.

6.4. Covering

The serious defect in the water's volumes has stop the

extension of the service to the whole zone that depends on the channel; this generates troubles among the inhabitants of the region and does not permit to benefit and to farm potentially productive areas.

After the construction of the necessary works the service of water would be extended to 65 ha. and 27 families would be benefited.

7. Rehabilitation plan

The rehabilitation plan provided to solve all the problems mentioned before and to start the functioning of an optimum irrigation system, being possible to extend the benefited area, is detailed as follows:

7.1. Proposed works

Deriver Dam

It was designed and calculated one of 1.50 mt. high; 3.2 mt. wide and 5.4 mts. length, with rectangular drain with lateral contraction. $Q=590$ Hs/Sec. unloading, shock absorber and leaving tooth.

7.2. Tap work

It consists on a 8" pipe with regulation valve that serves as evacuation pipe, and connected to a 6" pipe with regulation valve.

7.3. Conduction piping

Starting in tap work runs a conduction piping of 6" in a distance of 95mts.

7.4. Channel rehabilitation works.

Starting in abseissa 120 + 0.91.76 it must improve the channel's section with these measures: base 0.50 mts, brace 0.50 mts; apart of making the works of pass and tap that are detailed in Table 7 (work's quantities and conduction channel costs).

The image is a high-contrast, grainy black and white scan of a document. The background is filled with a complex, dense pattern of lines and dots, resembling a technical drawing or a map. The lines are thin and irregular, creating a textured, almost abstract appearance. In the center of the image, the letters "JICA" are printed in a bold, sans-serif font. The "J" and "I" are connected, and the "C" and "A" are also connected. The text is dark and stands out against the lighter, noisy background.

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